Abstract

This study reports Chinese preservice teachers' perceptions of appropriate technology use in early childhood education (ECE). China provides an interesting but understudied research context as research into technology use in the early years is western-centric and the contemporary Chinese ECE is characterized as a hybrid combining traditional Chinese values and Western influences which differ from each other in a rather fundamental manner. Interpretive analysis of qualitative interviews with eight purposefully selected preservice teachers revealed three intertwining determinants as appropriate technology use: objective, time and context. Both, Chinese cultural traditions and Western educational ideas were evident in shaping the participants' perceptions of appropriate technology use, with the former being the major influence in restraining the preservice teachers' vision and understanding of technology integration. Implications for teacher education, educational policies and future research are discussed.

Practitioner Notes

What is already known about this topic

- Chinese ECE is a hybrid model combining transmissive Chinese traditions and participatory Western influences.

- Educational policies and curriculum, globally, are emphasizing the appropriate use of technology in early childhood education.

- Professional judgment is required to determine whether technology use is appropriate.

What this paper adds

- New theoretical understanding about the relationality and situationality of perceptions of appropriate technology use.

- Preservice teachers' reports of key determinants for appropriate technology use.

- Empirical evidence of the hybrid nature of Chinese early childhood education and its influence on teachers' perceptions of appropriate technology use.

Implications for practice and/or policy

- Policymakers need to develop specific policies and curricula to guide and support educators to develop a clear understanding of appropriate technology use.

- Initial and continuing teacher education should update teachers' knowledge and broaden their vision for constructing appropriate technology use (eg, drawing on research-based evidence to inform their professional learning).

Introduction

While early childhood teachers' perceptions about the benefits and disadvantages of educational technology integration have been subject of moderate amount of empirical research (Hatzigianni & Kalaitzidis, 2018; Lindahl & Folkesson, 2012; Palaiologou, 2016) the current stage of research is Western-centered and focused mainly on in-service teachers (Mertala, 2019). This qualitative research contributes to broadening the geographical and participatory sphere by analyzing Chinese preservice teacher (PST) perceptions of appropriate technology use in early childhood education (ECE), which here refers to institutional education of children from zero to six.

The value of studying PSTs' perceptions is that they are often portrayed as digital-native teachers who can ride the wave of potential pedagogical affordances of new technologies (Szeto, Cheng, & Hong, 2016). Such a claim does not take into account the context as where PSTs learn and develop as professionals. Instead, PSTs are treated as members of a fictitious homogenous generation and are not recognized as teachers in training, who interpret and evaluate things from the perspective of a (future) educational professional. Neither do such claims acknowledge, that PSTs have a lifetime of experiences of witnessing, participating in and socializing into pedagogical cultures and traditions (Bullock, 2011).

These experiences are not context-free, but differences in sociocultural backgrounds and historical traditions impact how people perceive the world and construct meaning (Blanck, 1990). Culture-wise, China provides an interesting research context as the contemporary Chinese ECE is characterized as a hybrid combining traditional Chinese values and Western influences (Zhu & Zhang, 2008), which, takes form as "pedagogical interaction that is a fusion of participatory and transmissive pedagogies" (Huang, Yang, & Li, 2019, p. 81). Traditional Chinese ECE is shaped by a communist ideology which values unity, order, collectivism, control, as well as Confucianism which emphasizes peace, good order and harmony with the purpose of shaping and fitting every individual into a harmonious society (Tobin, Hsueh, & Karasawa, 2009). Practice-wise, Chinese ECE teachers are traditionally expected to teach individual subjects by giving whole class instructions at a unified pace (Zhu & Zhang, 2008). While some of these features, namely subject-based teaching, are familiar to other context as well (eg, Sofou & Tsafos, 2010; Walsh, McGuinness, Sproule, & Trew, 2010) on a philosophical level the traditional Chinese education is a unique pedagogical entity.

Western influences, which have been integrated into Chinese ECE via top-down reforms since the 1980s (Tobin et al., 2009), emphasize child-centered education, along with constructivism, play-orientation and child-initiated learning (eg, Edwards, 2013; Tobin et al ., 2009). Since 2001, Chinese

ECE has been guided by the Guidelines for Kindergarten Education (Ministry of Education, 2001) in which the aforementioned principles have been popularized to replace the traditional ones (Liu & Feng, 2005). However, this reorganization has not had notable effects on early childhood teacher education which still emphasizes traditional approaches (Yang & Li, 2019).

As the summary above illustrates, Chinese traditions and Western influences differ from each other in a rather fundamental manner. Thus, what appears as pedagogically appropriate from the Western point of view may not be so from the traditional Chinese point of view. Indeed, there are cultural conflicts "between Western and Chinese pedagogies in several important respects, including teaching philosophy, teacher-student relationships, learning strategies encouraged, student characteristics encouraged, and 'good' teacher qualities" (Li, Wang, & Wong, 2011, p. 9). This can lead to contradicting and competing perceptions of appropriateness at the general level (Huang et al ., 2019) as well as technology wise. Technology integration offers an informant-rich case to study this pedagogical dichotomy as technology is often portrayed as a "Trojan horse" (Ham, 2010) which will transform traditional teacher-centered pedagogy into participatory and learning-centered practices (Selwyn, 2015).

Research questions

The first research question guiding this study is: *How do Chinese PSTs construct appropriate technology use in ECE*? Due to the hybrid nature of Chinese ECE, we also sought answers to the question: *How are Chinese educational traditions and Western pedagogical ideas visible in Chinese PSTs' perceptions of appropriate technology use*?

Developmentally appropriate practice and technology use in early childhood education

Since the introduction of Developmentally Appropriate Practice (DAP) in the 1980s, developmental appropriateness has been one of the leading concepts in the field of ECE (Cohen, 2008) and has been used as a guiding concept in curricular development in Western contexts (Gestwicki, 2013; Walsh et al ., 2010). DAP emphasizes educator's knowledge of children's age, interests, abilities, linguistic and cultural backgrounds in order to meet their individual needs, and developmental level (Copple & Bredekamp, 2009). This so-called appropriateness discourse has also been prominent in the discussions around technology use in ECE (eg, Parette, Quesenberry, & Blum, 2010; Rosen & Jaruszewicz, 2009). Parette et al . (2010, p. 335) named technology use as an integral part of "21st century view of Developmentally Appropriate Practice" and pleaded, that

we in the field of early childhood education must become strong advocates for embedding meaningful, developmentally, and culturally appropriate uses of technology into our teacher preservice and in-service training so that teachers better understand the importance of infusing technology into instructional strategies. (2010, p. 338)

Parette and others' (2010) idea of "culturally appropriate uses of technology'" is worthy of note here as it suggests the importance of cultural context for understanding/judging 'appropriateness'. While DAP is often presented as universal guidelines, it is important to recognize that it is a product of a specific pedagogical culture. Put differently, whereas play-based pedagogy and child-initiated learning are characteristic in contemporary Western contexts (Edwards, 2013; Georgeson, Campbell-Barr, Bakosi, Nems, Pálfi, & Sorzio, 2015; Robertson, Kinos, Barbour, Pukk, & Rosqvist, 2015) this does not apply to all ECE traditions, globally. Take China, the empirical context of the present study, for example. The communist ideology, which values unity, order, collectivism and control has influenced Chinese early years curricula and practices with one concrete example being that frontal teaching, where teachers instruct the whole class at the same time is a highly valued pedagogical model in Chinese ECE (Dong & Newman, 2016). Accordingly, memorization and rote-learning have long been associated with the Chinese cultural belief that remembering and reciting classics equals learning and literacy (OECD, 2011). Such practice is in contrast with DAP as the ideas, that "curriculum and environment [would be] essentially the same for each group of children that comes through the program" as well as "teachers attempt to move all children through the same subskills in the same time frame" are considered as developmentally inappropriate practice (Cohen, 2008, p. 14). This example showcases that appropriate technology use can mean different—even contradictory things in different contexts making appropriateness a situational concept.

Putting cultural issues aside, technology use itself also contains its own specific issues in relation to DAP. Despite attempts to combine DAP and technology integration (Parette et al ., 2010; Rosen & Jaruszewicz, 2009) many early childhood teachers consider technology use incompatible with play-based and child-initiated pedagogies (eg, Palaiologou, 2016). One explanation would be that curricula fail short in combining play and technology use in a meaningful and explicit manner (Edwards, 2013). This shortage is present in Chinese documents as well because they do not provide specific guidance, examples and support for early childhood teachers to integrate technology into classrooms (Ministry of Education, 2012a, 2012b) which means that teachers have to "make their own decisions about the nature and extent of ICT use in children's learning" (Bolstad, 2004, p. ix). In cases like this early childhood teachers tend to value strong traditions over ambiguous reforms and/or fall back on their traditional training and practices (Dong & Newman, 2018; Lindahl & Folkesson, 2012). Indeed,

although Chinese EC teachers generally have positive attitudes towards and perceptions about technology role and potential in ECE (Dong, 2016), the technology integration in China's ECE field is still at a low level (Weng & Li, 2018). In ECE settings, technology is mainly used as teachers' resources (eg, displaying tool) for instructing and delivering knowledge to young children (Dong & Newman, 2018)—a technology-mediated form of traditional transmissive pedagogy.

In addition, what educators understand by play, inquiry orientation and child-initiated learning and how these conceptions relate with their perceptions of affordances and constraints of technology use play a role in shaping their perception of appropriate technology use. Early childhood teachers typically connotate play with motoric and tactile activities (eg, rough-and-tumble play) and imagination (eg, make-believe play) (Ranz-Smith, 2007; Sherwood & Reifel, 2010), whereas technology use is connoted with physical passivity and seen as a threat to children's creativity and imagination (Starčič, Cotic, Solomonides, & Volk, 2016). Such views are often derived from teachers' personal experiences and observations regarding young children and technology, which can be rather anecdotal by nature (Mertala, 2019).

Lastly, what teachers understand by technology shapes their perceptions of appropriate technology use. Research implies, that teachers tend to conceptualize technology as screen-based technologies, such as tablets, computers and mobile phones (Dong & Mertala, 2019) and this conceptualization affects the affordances and restrictions teachers perceive from technologies: On the one hand, the use of screen-based technologies is considered to capture children's attention better than traditional methods (Mertala, 2019). On the other hand, screen-based technologies are simultaneously thought to restrict direct hands-on learning experiences (Dong & Mertala, 2019) and even open-ended applications such as Minecraft are seen inferior to traditional methods like crafts and drawing (Palaiologou, 2016).

The heavy emphasis on screen-based technologies can be interpreted to reflect the prevailing screen-filled technological landscape as well as the public discussions around technology and children (Laidlaw, O'Mara, & Wong, 2019). As argued by Daugherty, Dossani, Johnson, and Wright (2014, p. 1) conversations about what constitutes developmentally appropriate use of technology in ECE "have focused largely on a single blunt measure—screen time." To conclude, these notions highlight the relational nature of perceptions where teachers' perception of appropriateness is constructed in relation to curricular alignments, pedagogical traditions, their understanding of technology, experiences, observations, values and beliefs.

Methods

The objective of the present study was to understand PSTs' perceptions of appropriate technology use in ECE in relation to Chinese educational traditions and Western pedagogical influences which form the hybrid model of contemporary Chinese ECE. Due to the novelty of the research approach, the study was guided by an interpretive research paradigm which "begin[s] with individuals and set[s] out to understand their interpretations of the world around them" (Cohen & Manion, 1994, p. 37). In order to collect rich and thick data (Fusch & Ness, 2015) we opted for semi-structured qualitative research interviews: They are argued to be the "best technique to use when conducting intensive case studies of a few selected individuals" (Merriam, 2009, p. 88) because they provide insight into the experiences of the subjects, their personal understanding, interests, values, concerns and knowledge (Creswell, 2012).

The participants were selected from a pool of 410 PSTs who participated in a quantitative survey study (Dong & Xu, 2020). Twenty-one PSTs informed, that they would like to take part in the present qualitative study and among them, a total of eight PSTs were recruited to avoid self-selection bias (Heckman, 2010). The selection was done via purposeful sampling (Patton, 2002), which emphasize the similarity (Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood, 2015) and judgment-based representativity (Marshall, 1996) of the participants. Table 1 summarizes the background information of the participants and provides the rationale for sampling.

Table 1. Background information of the participants and rationale for sampling

Background information	Participants	Notes
Gender	All female	Representative as most preservice and in-service early childhood teachers in China are female (Xu & Wangangayake, 2017)
Age	20–22	Representative as the vast majority of PSTs begin their initial training straight after high school (Zhu, 2008).
Stage of studies	Final year in a 4-year bachelors-degree program	Information-rich cases as they had completed their required practicums and were close to obtaining their degrees.
ICT training	As part of their early childhood degree program, the participants were required to complete foundational technology courses in their teacher education institution to learn basic computer skills. No pedagogical themes and aspects were included in these courses.	Representative as the common approach to developing teachers' technology competency in Chinese teacher education institutions is to offer foundational computer training courses which teach the basic computer knowledge and skills such as using Word and Excel (Han & Wang, 2010)

Personal ICT use	All owned a personal laptop and mobile phone. All used social media and some played digital games.	Representative as the national survey reveals most teenagers and young adolescents own PCs and mobile phones, as well as having internet access (Li & Ranieri, 2009)
Geographical location	North-western regions	Socioeconomic status and technology infrastructure in this region are lower than in other coastal areas (Sun 2013), but represent the main inland areas.

The first author, who was responsible for conducting the individual interviews, was located in Australia and the interviewees were in China. The semi-structured interviews with guiding questions (see Table 2) were therefore conducted via Skype™, a telecommunications application for video conferences and voice calls. Online interviews allow researchers to tackle problems typical for conventional face-to-face interviews, such as financial and time constraints, and geographical dispersion (Cater, 2011) as they transcend geographical boundaries and break down the barrier of "time and space" which also provides the opportunity of widening the range of research samples by involving participants wherever they are in the world (Iacono, Symonds, & Brown, 2016). During the past years, Skype™ has been used successfully to conduct research interviews in various fields including technology integration studies (Deakin & Wakefield, 2014; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Seitz, 2016).

Table 2. Interview questions

	Interview questions
1	What are important learning experiences or activities for young children in ECE settings?
2	How do you see the place of information and communivations technolgy ICT[1] in these important experiences or activities?
3	What are the effects of young children's use of ICT?
4	What is your opinion on young children's use of ICT at home?
5	From your point of view, what is the appropriate use of ICT in early childhood education?
6	In your opinion, how can ICT be used effectively for supporting children's learning and development?
7	What are your experiences with the use of ICT in your daily life or professional practices?

[1] The term 'ICT' was used, being the term used in Chinese pedagogical documents and curriculum guidelines

The skype calls to China were tested with a good sound quality prior to the study. The participants were made aware that online interview data might be accessed and stored by a third party (in China, Skype's Terms of Use state that personal information is subject to government use), therefore all the interviews were strictly centered on the research topic without revealing any privacy information or discussing any sensitive topics. The participants were given the opportunity to choose their preferred place, day and time for their interviews.

Translations into the participants' mother tongue, Mandarin, were carefully prepared in advance and piloted with four PSTs to avoid errors or misinterpretation of translation. Drawing from the feedback, the interview questions were re-read, discussed and modified in collaboration with a local Chinese ECE lecturer.

The participants were informed about the nature of the study and what would be expected of them. They were clearly advised that participation in this study was voluntary and they could withdraw from the study at any time without giving any reasons. All the interviews were audio recorded with the permission of the participants to facilitate data transcription and analysis. The length of the interviews ranged from 50 to 65 minutes.

Analysis

The data were fully transcribed in Chinese and consisted of 72 pages. Since the participants and the first author spoke the same language, the initial coding—which usually stays close to the data (van Nes, Abma, Jonsson, & Deeg, 2010)—was done by using Mandarin. The codes and selections of data were then translated from Mandarin to English, involving a process of checks and reviews, which involved the assistance of a native Chinese-speaking lecturer at an Australian university and a professional translator. The original audio recordings and transcription were often re-examined to increase understanding of the participants' intended meanings and culture-specific words and their meanings were reviewed many times to avoid potential loss of meaning.

The initial codes for the data analysis were mainly descriptive, which summarizes the data segments and in turn, provides the basis for high-order coding and searching for themes and patterns (Punch, 2000). Using the NVivo software, the interview data were coded into several meaningful broad categories, based on the interview questions and the participants' responses. For instance, the PSTs' high emphasis on the aims of using technology was categorized under the theme—the objective of technology use as a determinant. Further analysis of their stated aims (eg, using technology to teach science to children) reveals a strong link between the appropriate aims perceived by the PSTs and Chinese educational traditions (eg, subject-diving teaching approach), as exemplified in Table 3. More extracts from the data are presented in the findings section to improve the reliability and clarity of the research.

Table 3. Examples of data analysis

	Example 1
Data extract	The class is for children, for example, knowing each component of computer and being able to operate it with basic operational skills. It has learning purposes, not just using computers as a new thing to stimuli children and to have fun without learning. Computer use in childhood educational settings is [about] learning.
Determinant of approriateness	Using technology to learn about subjects (e.g. computer science) was viewed as appropriate
Links to pedagogical traditions	Subject-dividing teaching approach has long been practiced in Chinese ECE.
Abstraction	Technology is not integrated into the whole curriculum, but used fragmentally for individual subject teaching.

Findings and discussion

Appropriateness appeared as a fluid and ambiguous concept/phenomenon in the data. Some of the participants found it extremely difficult to put appropriateness into words and commented that they "do not know how to explain appropriate means [to use technology]" (Fan). Others, however, were able to provide detailed accounts on what makes appropriateness such a difficult concept to grasp. The quote below is an illustrative example of how the participants reflected the challenge of defining appropriateness.

> I can't explain appropriateness in detail. This means differently across persons, depending on teachers' professionalism and their recognition of technologies. Whether teachers feel necessary or unnecessary to use relates to their daily teaching and every aspect [of their work]. I think it is hard to judge the appropriateness specifically. (Yi)

The above comment highlights the situational and relational nature of appropriateness: every teacher approaches technology use from varying professional and personal perspectives thus, appropriateness means different things for different teachers.

Initially, such a notion may sound more relativistic than relational/situational. That said, it needs to be acknowledged, that saying that it is difficult to define appropriateness in an all-encompassing manner does not mean it would be impossible to provide some kind of criterion or value to judge whether technology practices are appropriate. In fact, all the participants were able to articulate what they considered either good or bad examples of technology use. A close reading of these portions of

data revealed three intertwined themes that can be considered as the determinants of appropriateness. These themes are (1) objectives of technology use, (2) time spent on technology use and (3) context of technology use. These themes are summarized in Figure 1 and discussed in detail in the following section.
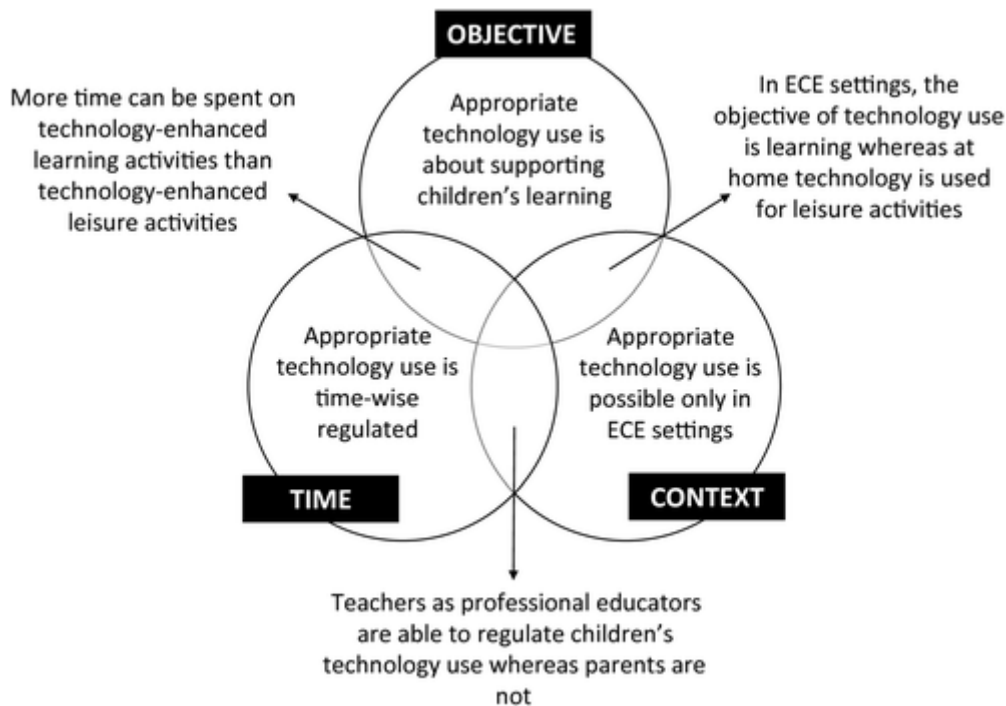

Figure 1: The interplay between objective, time and context as determinants of appropriate technology use

Objective, time and context as intertwining determinants of appropriate technology use

The intertwining nature of the three determinants—objective, time, and context—is perhaps best illustrated by using the data from an individual participant as a thread. The following extract from Ji conveys examples of all three determinants and provides insight into the ways how the determinants are related to each other.

> First, the appropriateness needs to be judged based on the purpose of activities or the aim of using technologies. For example, if they are used to deliver and teach knowledge, I think it is fine. If children are given too much video watching without restriction and teachers are relaxed, this is definitely not ok. Second, the way of using media such as the time duration of using it needs to be adjusted based on children's age…. I think it is good that kindergartens are introducing those technologies and there are many benefits such as displaying effects… However, this can lead families to believe that

> kindergartens encourage children to use technologies. If children also use technologies at home I think this is not good for them

By stating that "appropriateness needs to be judged based on the purpose of the activities " Ji argues that the pedagogical objective determines the level of appropriateness as she prefers technology use with learning objectives over other forms of technology use. This theme was present in other PSTs data too. Fan, for instance, commented that:

> if a video game is for children to play, I think this should be learning-oriented….The fundamental purpose of playing games is to let children acquire a certain ability or substantial development, not just relaxing .

Time-wise, the last sentence from Ji, in turn, implies that there is a connection between time devoted to technology use and children's age as she states that the time duration of technology use should be "adjusted based on children's age." This view was shared by others too like Du, who commented that

> Daily time for using technologies could be divided based on children's age … For instance, 10-15 mins for xiao'ban [3–4 year-olds], 15-20 mins for zhong'ban [4–5 year-olds] and 20-25 mins for da'ban [5–6 year-olds]. They can have some time to explore technologies, but only two days a week, not every day. The time can't be too much .

One explanation for the age-based time limits is, that teachers typically approach ECE for the youngest of children from more care—than education-oriented frame and, thus, they see that technology use is neither important nor beneficial to this age group (Mertala, 2019). The view, that technology use is not necessary with the youngest ones is common among Chinese in-service teachers as well (Weng & Li, 2018). That said, the ending of Du's extract also implies, that even though appropriate technology use is time-wise adjustable, there is also an absolute maximum for time spent with technology. The following extract from Fan provides another look at this perception as she argues, that:

> First, time should be appropriate…. Young children using screen devices for 30 minutes or more have a big problem… Their eyes are developing. I think spending too much time is not good.

The extract above also serves as an example of the worries relating to the negative health-issues of technology use—a concern shared by many early childhood teachers, internationally (Hatzigianni & Kalaitzidis, 2018). As Fan's comment suggests, the participants were especially anxious about the negative effects of technology use on children's eyes. Ai, for instance, commented that extensive

technology use "will be harmful to their [children's] eyes and spine," and supported her argument with an observation of how "nowadays very young children are wearing glasses; I think this also relates to their technology use." Putting the focus on vision implies, that technology is approached mainly as screen-based technologies and the appropriateness is evaluated based on a "single blunt measure" of screen time (Dougherty et al ., 2014, p. 1). Indeed, in urban China, various forms of bad eyesight have been growing rapidly among children and adolescents (Ku et al ., 2019) and the increased screen time has been offered as the main cause in public discussions (Guarino, 2018).

Lastly, the participants commented, that appropriate technology use can only take place in ECE settings as some had a rather negative view on what technology use at children's home would be like, as revealed by Du:

> I think it is better not to let children use technologies at home. In the center [teachers] can organize some collective activities such as teaching how to use them and then play some meaningful programs. I think this is fine. At home, I do not think it is very necessary [to use technologies] because parents do not understand [appropriate technology use]. However, in childcare settings, technology is integrated into teaching and learning and creates an environment where children know technologies are used for learning, not for entertainment.

The above extract is an example of an interplay of objective and context as determinants of technology use; unlike in ECE settings, technology use at home is for leisure activities such as gaming, not for learning. Accordingly, the participants were doubtful whether the time children spent with (screen-based) technologies is guided by parents whereas teachers are capable of doing this as Du's earlier suggestion about different timeframes of technology use for children of various ages suggests. To conclude, the themes of objective, time and context entangle tightly with each other: If leisure-based technology use at home exceeds the sufficient time frame, health-related concerns would make learning-oriented technology use in ECE difficult or even impossible. Thus, it would be better not to use technology at home at all.

The role of Chinese cultural traditions and Western educational ideas

The participants' perceptions of appropriate technology use were shaped by Chinese cultural traditions and western educational ideas. As an example of the former, Yi used the outcomes of knowledge delivery to evaluate the appropriateness of using technologies. When technology is used to enhance children's memorization of learning content, she considered it as appropriate.

> The appropriateness is finally judged based on the outcomes presented…. In a lesson children watched a video about a scientific experiment of oxygen. After a few days they were asked what oxygen is and the importance of oxygen in our life. Children were only focused on watching the video and did not remember much. This is a failure. The feedback you receive from children after a few days or months is the most important. Using this as a criterion to judge I think is relatively fair . (Yi)

Using such a method for assessing the appropriateness of technology use is in line with the Chinese traditional approach to education, emphasising teaching knowledge and skills to children and value memorization and rote-learning as good learning (OECD, 2011). Accordingly, the method Yi refers to—having the whole class to watch a presentation—reflects the traditional pedagogical methods of Chinese ECE which highlight unified content and collectivism (Zhu & Zhang, 2008). Having children to use the technology was seen as a potential disrupter; as put by one participant, "in group teaching, every child having a device will disturb normal teaching" (Ma).

One more example of the presence of Chinese traditions is the participants' prevalent view, that technology should be used for subject-based teaching. In the data, this phenomenon took form as a type of argumentation where PSTs' framed appropriate technology use through different stand-alone subjects: (eg, Technologies can be best used for science [Ma]; For music education, it is fine to use technologies [Yang]). In the Chinese context, the subject-dividing teaching approach has a pedagogical root in following the former Soviet Union model of curriculum, focusing on lesson planning and instructing, which has a profound influence on ECE practices in China (Tobin et al ., 2009). Influenced by this model, early childhood programs specified unified content and schedules and required teachers to teach individual subjects (Zhu, 2002). Lastly, the participants' distrust towards parents' educational capabilities can be interpreted to signal Chinese traditions, especially ECE teachers' professional identity as social representatives who have the right and responsibility to correct the deficiencies of overindulgent parents (Tobin, Wu, & Davidson, 1989). This tradition draws from the communist educational ideology, where the child is seen to belong primarily to the state whose delegates the teachers are (Buharin & Preobrazhenski, 1921).

In addition to the traditional approaches, some Western pedagogical influences were identified. One participant, Zhang, commented that the use of cartoons would be a sound method to teach children English, because "though the child may not be interested in English, they must be interested in cartoons ." Another participant, Ai, commented, that to judge appropriateness of technology use she needs to recognize "children's experiences and their understanding after their play with technologies." Respecting children's perspectives and initiatives is highlighted in Western ECE

philosophy (Georgeson et al ., 2015; Robertson et al ., 2015). Accordingly, the use of media texts—such as cartoons—as pedagogical material in ECE has been highlighted by Western media education advocates (Salomaa & Mertala, 2019). Thus, initially, Zhangs' and Ai's comments can be understood as examples of how western educational ideas such as "respecting children's interest" and "active learning" have been disseminated in Chinese ECE (Liu & Feng, 2005; Zhu, 2008).

That said, we argue that the Chinese traditions are present underneath the seemingly Western surface. This becomes clear when Ai's and Zhang's extracts are read a bit further. To Zhang, children's initial interest in cartoons was not pedagogically valuable in itself but she reasoned that children's "interests in cartoons could have subtle effects and they probably will learn something." Put differently, she suggested that children's (media cultural) interests are important and should be given space only if they can be "pedagogized" to meet teacher-initiated objectives. This view is in contrast to child-centered ECE which emphasizes, that the child and her/his ways to be should be at the very core of educational choices and decisions (Georgeson et al., 2015). Ai's reasoning followed the same logic: For her, understanding children's experiences meant monitoring that children are learning teacher-initiated objectives when using technology. She operationalized this view into an idea, that she would have children to play an instructional game around marine wildlife and later show them wildlife pictures to monitor whether the children had learned something while playing the game. If the outcome would be positive, then

> these technologies can be used as an auxiliary means. They can become their unconscious learning resources and media, which can support their unconscious learning, as well as planned learning . (Ai)

It is important to acknowledge, that what Ai was saying here does not differ from Yi's views (presented at the beginning of the section) at the content level. Even though Ai talked about "play with technologies" and relating to "children's experiences," she meant teacher-designed activities and assessment of children's learning. In other words, even though Ai had—at some level—internalized the vocabulary of Western ECE, her pedagogical thinking and reasoning are still strongly affected by Chinese traditions. This notion is supported by Huang et al. (2019, p. 88) who after analyzing 4320 turns of dialogue between teachers and children concluded, that the Chinese hybrid model "looks like participatory but works like transmissive pedagogy." By this, they meant, that the dialogic form of interaction was similar to participatory pedagogy, but the function of the dialogue was transmissive; it only focused on the curriculum content and motivating children to identify the information in the learning materials.

The strong emphasis on Chinese traditions supports Bullock's (2011) argument that preservice teachers socialize into the pedagogical culture they were raised in. This notion does not only challenge the high expectations put on the disruptive power of technology integration (Selwyn, 2015) but also confronts the presumption that being born into technology-saturated world would automatically lead to favorable and pedagogically appropriate dispositions towards technology use in institutional education (see, Szeto et al ., 2016; Zaranis, Oikonomidis, & Linardakis, 2016).

Conclusions

This qualitative study explored how Chinese PSTs interpret and construct 'appropriateness' when emphasizing appropriate technology use in ECE. Acknowledging the hybrid nature of Chinese ECE (Zhu & Zhang, 2008), the second research question investigated the influences from Chinese cultural traditions and western pedagogical ideas. The participants' understanding of appropriateness was centered on three intertwining determinants: objective, time and context of technology use.

What comes to the framing of the influences, both Chinese and Western inspiration were identified. However, a closer inspection suggested, that Western influences were rather superficial. The strong emphasis of Chinese traditions is in correspondence with Dong and Newman's (2016) study on Chinese in-service teachers' perceptions on technology integration in ECE as well with more general ECE studies (eg, Huang et al ., 2019; Weng & Li, 2018). Huang et al . (2019) propose, that Chinese traditions are emphasized due to teachers' superficial understanding of Western influences such as participatory pedagogies. This can be interpreted to reflect the fact, that the integration of Western pedagogy has been implemented as top-down curricular reforms (Zhu & Zhang, 2008), which may not be the most effective method to achieve a change especially since the reform has not affected on the contents of initial or continuing teacher education (Yang & Li, 2019).

The findings of the present paper also contribute to the body of empirical research (Dong & Newman, 2016; Koster, Juiper, & Volman, 2012) challenging the prevalent and popular idea, that technology could act as vehicle of change in educational contexts (Selwyn, 2015). Lastly, the findings contest the decontextualized image of PSTs as "digital-native teachers" who "can ride on the wave of potential pedagogical affordances" of new technologies (Szeto et al ., 2016, p. 36): Instead of reformers they appeared as successors of traditions in the data. Since some PSTs explicitly referred to their teaching practicums as a source of inspiration, it appears, that tradition-centeredness is tacit knowledge that older teacher-generation pass to the younger ones, a hypothesis supported by previous research (Hu & Yelland, 2017; Lindahl & Folkesson, 2012).

Limitations of the study and future implications

The main limitation relates to the use of the concept "ICT" in the interview. While the use of the term can be justified by the fact, that it is the one used in Chinese curricular documents, we are aware that it connotates to traditional classroom technologies that may have had a role in shaping the participants' perceptions. One task for future research would be to study the kinds connotations teachers link to the various concepts (i.e, digital media, digital technology, ICT and technology) used in the field of educational technology integration.

The findings have also several implications for educational policies and teacher training. First, given the fast advance of technological development and the presence of technology in children's lives, it is important for policymakers to develop specific policies and curriculum guidelines to support educators to build a clear understanding of appropriate technology use in their own sociocultural context. Second, due to the important role teachers play in supporting children's appropriate technology use, it is crucial to broaden teachers' knowledge and skills for appropriate technology use through initial and continuing teacher training programs, such as exploring pedagogical possibilities of incorporating technology into the curriculum. This would require updating the traditionally oriented teacher education as a whole (Yang & Li, 2019) as well as by broadening the range of introduced technologies to include tangible digital manipulatives such as robotics.

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