

Preschool Children's Exposure to Media, Technology, and Screen Time: Perspectives of Caregivers from Three Early Childcare Settings

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Abstract Young children are being increasingly exposed to media, technology, and screen time (MeTS) at home and in instructional settings. Little is known about the long-term effects of MeTS and there is a lack of research concerning caregivers' opinions regarding young children's exposure to and utilization of MeTS. Therefore, this study explored the opinions of parents and teachers of preschool-aged children from three diverse centers and examined MeTS usage across the varying centers and sociodemographic strata. Principal Components and MANOVA analyses indicated differences across, as well as similarities between, the centers. Collectively, caregivers from the three centers concur that MeTS can expand children's knowledge, and that children's exposure to violent MeTS is harmful. Caregivers from the varying centers differ in opinion regarding linking children's MeTS exposure to harmful social and health outcomes, and teachers' responsibilities regarding the developmentally appropriate usage of MeTS. Recommendations are provided for administrators and teachers to consider regarding communication efforts with parents, and MeTS usage in the childcare setting.

Keywords Media, technology, and screen time · Young children · Early childhood education · Caregiver perspectives

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Introduction

Studies reveal that 41 % of parents give their children a tablet or handheld device to use while in a restaurant, and 78 % of parents approve of their children's use of technological devices and further report that their use has not created any problems (Nielsen 2012; Wartella et al. 2013). According to a national survey conducted by Common Sense Media (2011), 38 % of children under two have used a mobile device for media. From child development experts to teachers and parents, everyone has an opinion regarding young children and media, technology, and screen time (MeTS). The current discussion is centered not so much on should they or shouldn't they, but rather on how much is too much and for what purposes are MeTS used? There is limited research pertaining to young children's MeTS usage in the home and in the preschool setting; and fewer studies that compare MeTS exposure across socioeconomic groups. Therefore, the authors sought the opinions of varied groups of parents and teachers of children 3 to 5 years of age as a means to further the discussion with primary caregivers concerning MeTS and to examine MeTS usage across varying environments and socio-demographic strata.

Benefits Regarding Children and MeTS

In the same way that communication and creative expression are precursors to literacy, digital technologies such as computers, mobile phones, technological toys, and games have been found to contribute to young children's operational skills, knowledge, and increased understanding of the world (Devine 2012; Geist 2012; McPake et al. 2013). Research has shown that young children exhibit a sparked interest in MeTS and that their observations of siblings',

parents', and older children's interactions with technology facilitated exploration in content areas, such as reading. In this regard technology is perceived to enhance understanding and increase meaning through the use of symbols, pictures, and videos (McPake et al. 2013). This shared understanding through exploration and discovery can be compared to first interactions with any traditional tool of early childhood education such as paint, clay, and crayons (McPake et al. 2013). Whereas play and exploration in the early years enable children to become part of a small community, in today's "digital homes" children become part of a larger social community (McPake et al. 2013).

As digital technology usage becomes more widespread, its potential influence on young children's communication and creativity has important implications for the classroom (NAEYC 2012; Parette and Blum 2014; Wartella et al. 2013, 2014). Studies revealed that children as young as two will naturally interact with a touch screen in the same way they will use natural instincts to play with a new toy. Additionally, following co-engagement and guided exploration by their teachers, outcomes indicated that children became more engaged and gained new understandings through the utilization of tablets (Geist 2012). Regarding literacy development, pre-service teachers expressed that integrating computers in their teaching had positive outcomes in terms of instruction and enhancement of literacy skills (Al-Barakat and Bataineh 2008; Ihmeideh 2010). As teachers are called upon to build on what children already know, blending background knowledge with effective classroom practice is critical in the twentyfirst century preschool classroom (Parette and Blum 2014; Stockall et al. 2012).

Challenges Regarding Children and MeTS

Today's children and young adults are considered digital natives; growing up not only with television, but with ever advancing video games, high speed computers, laptops and tablets, cell phones, and easy access to the internet (Prensky 2001). In 2012, The Campaign for a Commercial-Free Childhood (CCFC) and the Alliance for Childhood estimated that 29 % of children under the age of one watched approximately 90 min of TV or videos daily and 23 % of children had a TV in their bedroom. In 2009, the American Academy of Pediatrics (AAP) estimated that children birth to 6 years of age consumed an average of 2 h of MeTS daily. Some studies caution that children's use of and exposure to MeTS can lead to decreases in executive functioning (ability to attend to tasks), academic performance, quality social interactions with parents and peers, and creative play. In addition, MeTS has been shown to increase obesity, aggressive and violent behavior, bullying, desensitization to violence, lack of empathy to victims,

fear, depression, nightmares and sleep disturbances (AAP 2009; AAP 2011; CCFC and the Alliance for Childhood 2012; Lillard and Peterson 2011). As the potential exists for the consumption of MeTS to have a significant impact on the lives of young children, parents and educators are increasingly challenged to guide children's exposure and monitor the types of MeTS in which children engage.

Guiding Principles Regarding Children and MeTS

With the outcomes of MeTS usage yet to be determined, especially in terms of effects on those from lower socioeconomic status, childhood experts from around the globe encourage families and educators to take caution and strive for balance (Ernest et al. 2014; Plowman 2014). Although one might expect there to be a "digital divide" between those of low, middle, and high socioeconomic status, the issue is not that simple (McPake et al. 2013). In their research McPake et al. (2013) discovered that families of varying socioeconomic status found ways for their children to explore digital technologies for purposes such as communicating and creating. Additionally, Plowman (2014) investigated the role MeTS played in families' environments that varied in socioeconomic status and levels of technology usage in their homes, and found that most families believed they had found a balance between play and technology usage.

Further research of children's use of screens focuses on effective, intentional, and guided interactions at home and in the classroom (Devine 2012; Geist 2012; Chen and Geist 2012; McPake et al. 2013; Parette and Blum 2014). Researchers have described the role of preschool teachers as guiding interactions with media and screens and extending what students can already do on their own to develop new skills and shared meanings (Couse and Chen 2010; Davidson et al. 2014; Parette and Blum 2014). In addition, Davidson et al. (2014) found from a review of the literature that current research trends focused only on children's skill acquisition with technology. In response, their study focused on meaning making and shared understandings through media such as YouTube videos. They determined young children's engagement with digital technologies should not be passive; rather, MeTS experiences should involve discussion and interaction with others such as parents, peers, and teachers. It is this shared understanding which underscores the interactive nature of digital technologies and their potential for positive outcomes (Couse and Chen 2010; Davidson et al. 2014; Parette and Blum 2014).

In 2011, the AAP reissued their position statement on the use of media and technology with young children based upon what is known about child development in general and brain development in particular stating that they

discourage “media use by children younger than 2 years” (AAP 2011, p. 4). Policy makers concur and assert that early childhood education teachers should ensure the intentional, appropriate, and effective use of MeTS in order to use these tools to extend learning and development that would not otherwise occur (NAEYC and Fred Rogers’ Center Position Statement on Technology and Interactive Media in Early Childhood Programs 2012). According to their position statement, technology is effective if it is active, hands-on, engaging, empowering, and child-controlled.

Prior research has established that, with computers the evidence is clear: computers help children learn specific skills (Clements and Sarama 2003). However, technology has changed dramatically in the past 15 years with a corresponding change in how media targets young children, and how people use technology and screens. As prior research has shown, there is little debate about whether MeTS can help young children with skill development, but the question of at what cost is yet to be determined (House 2012). Recent research findings show that early childhood experts have varying opinions representing the benefits and concerns about MeTS (Ernest et al. 2014). As educators work with parents to determine the potential benefits and risks of MeTS exposure, it is important to explore teachers’ and parents’ perceptions of MeTS with young children.

In light of the limited research regarding MeTS exposure and young children, and as a continuation of the dialogue on this topic that began with experts in the field, we sought to extend the conversation about MeTS usage to include the views of parents and teachers (caregivers) of 3- to 5-year-old children from diverse early childhood education and socioeconomic settings. Utilizing items that the previously mentioned early childhood education (ECE) experts deemed most significant regarding MeTS usage (Ernest et al. 2014) the purpose of this research was to gain insight regarding the views of parents and teachers from varying backgrounds regarding young children’s exposure to and usage of MeTS. Secondly, the personal usage by the caregivers and children’s type of exposure to MeTS was also assessed. The two research questions guiding the study were:

1. To what extent do caregivers of 3- to 5-year-old children from three varied groups have similar and differing views regarding MeTS usage with young children?
2. Given the current access and exposure of young children to MeTS, how do groups of caregivers compare in terms of personal usage and children’s exposure to MeTS?

Methods

Prior to the study, the authors received Institutional Review Board (IRB) approval. Letters of support were provided from each of the participating centers and participants were notified of voluntary participation and anonymity. Participants in this study included parents and teachers from three purposefully selected, diverse, childcare centers located in the southeastern area of the United States. The first center is a non-profit Head Start Program serving families in both rural and urban communities. All of the families participating in this program live at or below the federal poverty level; therefore in addition to developmentally appropriate early childhood educational experiences, the Head Start program concentrates on reducing the consequences of poverty in the lives of their families and communities. The second center provides developmentally appropriate early childhood educational experiences to a varied mix of children from families of middle and upper socioeconomic status, who reflect a university faculty/student population. The third center, consisting primarily of families of upper socioeconomic status, structures their developmentally appropriate early childhood educational services using a reverse integration model, as approximately half of the children in each classroom are on the Autism spectrum. In this setting, both typically developing children and those on the Autism spectrum have shared and integrated learning experiences.

Data Collection

An initial study was conducted with ECE experts from around the globe to ascertain their views on an array of 60 items pertaining to young children’s exposure to and usage of MeTS (Ernest et al. 2014). From this study, 17 items were identified as encompassing global views on this topic, thereby providing empirical justification for the inclusion of those items in the development of the survey for this study. The survey developed for this study utilized a 4-point Likert scale, ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*), to assess parents’ and teachers’ views concerning young children’s exposure to MeTS. The survey also included questions pertaining to type and amount of MeTS usage. Surveys were distributed to the parents and teachers of 3- to 5-year-old children in three selected early childcare education programs. Center 1 (a Head Start) had a 52 % return rate (73 out of 140 distributed surveys); Center 2 (university affiliate) had a 37 % return rate (44 out of 119 distributed surveys); and Center 3 (Autism integrated) had a 30 % return rate (13 out of 43 distributed surveys).

Data Analysis

In order to explore commonalities and differences across the three centers pertaining to parents' and teachers' perspectives regarding young children and MeTS, a Principal Components Analysis (PCA) was performed on the MeTS item statements of the returned surveys. Analysis of the data indicated a six component solution accounting for 66 % of the total variance. Components 4–6 were retained in the analysis as they were suggestive of items that need further exploration (see Table 1). Additionally, a Multivariate Analysis of Variance (MANOVA) was conducted to differentiate caregivers' usage and children's exposure to MeTS between the three centers. The three centers in this study were purposefully selected to reflect social, cultural, ethnic, and pedagogical diversity. The centers varied in size and therefore yielded varied returned survey sample sizes. Analysis of the data revealed that the homogeneity of variance assumption was not violated, therefore the results are considered relatively robust.

Results and Discussion

Interpretation of the data from the three centers was consistent with caregivers' perspectives regarding the MeTS usage of young children that the questionnaire was designed to measure. Principal Components Analysis of

caregiver responses to the MeTS survey statements revealed six significant components, as denoted in Table 1. The loadings of items on each component suggest the following themes: Component 1—MeTS exposure benefits young children; Component 2—early MeTS exposure is important; Component 3—violent MeTS influences are harmful to young children; Component 4—teacher responsibilities regarding MeTS; Component 5—non-violent MeTS exposure is acceptable regardless of age; and Component 6—MeTS exposure should be based upon developmentally appropriate practices (DAP). Further examination of each of the three centers yielded variations in ranking, or order of importance, of the six component themes (see Table 2). For example, Center 1 differs from both Center 2 and 3 pertaining to their views regarding MeTS exposure benefitting children. The Head Start Center 1 places the greatest value on this concept ranking it first, the university affiliated Center 2 ranks this concept as somewhat important (third out of sixth), and the Autism integration Center 3 considers it to be the least significant of the six themes.

Interestingly, caregivers from all three centers strongly agree on several survey statements: *Media can expand children's knowledge; A child is perceived as "behind" if they do not know how to use a mouse and are not familiar with a computer by the age of 3 1/2; Electronic books are not different from printed books; Media violence is not just a reflection of violent society; it is also a contributor, and;*

Table 1 Survey item summary and correlation to component themes

Survey item summary	Component number					
	1	2	3	4	5	6
Percentage of total variance explained	.22	.13	.10	.08	.07	.06
Cronbach's alpha values	.73	.7	.75	.52	.23	.25
MeTS creates socially stunted, unhealthy children	-.75					
Media can expand children's knowledge	.73					.30
Avoid MeTS with children under age 2					-.41	.32
Children spend a majority of their time with MeTS					.39	
Teachers have an obligation to incorporate MeTS	.48			.47		
MeTS prepares students for the workforce	.45					
A child is "behind" without early MeTS exposure		.79				
Young children should be exposed to MeTS		.69				
E-books are not different from printed books		.63				
The sooner children can use a computer the better	.53	.56				
Violent acts observed through MeTS harm children			.89			
MeTS violence contributes to a violent society			.88			
Young children are vulnerable to negative MeTS			.51			
Teachers should help students understand MeTS				.75		
Children's use of MeTS is cautioned				.68		
Without commercials, children's MeTS use is fine					.86	
Teachers should promote DAP use of MeTS						.89

Table 2 Component themes in order of importance by center

Component themes	Center 1	Center 2	Center 3
MeTS exposure benefits children	1	3	6
Early MeTS exposure is important	4	1	1
Violent MeTS influences are harmful to children	5	2	3
Teacher responsibilities regarding MeTS	2	6	5
Non-violent MeTS is ok regardless of age	6	4	2
MeTS exposure should be based on DAP	3	5	4

One of the most significant contributors to violent behavior in society is the increase in the amount of violent acts observed by children through media.

Though the parents and teachers from the three different centers agree on some of the pros and cons of children's early exposure to MeTS, three survey questions in particular help to highlight differences between the caregivers at each center. Regarding the statement: *Children using technology are becoming socially stunted, ungrateful, and ridden with health issues*; caregivers from Head Start Center 1 strongly agreed with this statement; in contrast, those from the university affiliated Center 2 and the Autism integrated Center 3 strongly disagreed. In regard to the statements: *Special considerations must be given to the use of technology with infants and toddlers*, and, *The most important measure that can be taken by teachers is the promotion of more developmentally appropriate educational programming*; Centers 1 and 2 (Head Start and university affiliate) strongly agreed with this statement, and Center 3 (Autism integrated) strongly disagreed.

As illustrated in Table 3, the parents and teachers differ demographically from each other in respect to education $F(2, 199) = 58.061, p < .001, \eta^2 = .494$, ethnicity $F(2, 119) = 4.751, p < .010, \eta^2 = .074$, and age range $F(2, 119) = 4.752, p < .010, \eta^2 = .074$.

MANOVA analyses comparing the three centers on measures of adult and child use of MeTS indicated further differences between the groups. For example, when comparing adult email, text, internet, tweeting, FaceTime and Instagram/Snapchat usage, results indicate that Center 1 differs significantly from both Center 2 and 3 regarding the amount of email $F(2, 115) = 29.671, p < .001, \eta^2 = .340$ and internet usage $F(2, 115) = 5.460, p < .005, \eta^2 = .087$. The differences noted in email and internet usage between caregivers at Center 1 versus Centers 2 and 3 may in part be related to caregivers' educational levels. At Center 1 approximately 20 % of the caregivers indicated they had college degrees; whereas, the percentage of caregivers at Centers 2 and 3 with college degrees were 95 and 85 % respectively; perhaps indicating that differences in levels of caregiver education denote career related email and internet practices. With regard to texting, tweeting, and using FaceTime or Instagram and

Table 3 Caregiver demographics by center

Demographics	Center 1 n = 73	Center 2 n = 44	Center 3 n = 13
Education*			
High school (%)	56.3	0	0
Some college (%)	23.9	4.7	15.4
College degree (%)	19.7	95.3	84.6
Ethnicity***			
Caucasian (%)	67.1	82.5	92.3
African American (%)	21.4	17.5	0
Hispanic (%)	11.4	0	0
Age range*			
19–25 years (%)	27.4	4.5	0
26–30 years (%)	34.2	15.9	7.7
31–35 years (%)	11	29.5	7.7
36–40 years (%)	5.5	22.7	61.5
41–45 years (%)	9.6	11.4	15.4
46–50 years (%)	1.4	6.8	7.7
51+ years (%)	11	9.1	0

* Significant differences between centers

** No response (n = 1)

Snapchat, no significant differences were found between the three centers. Survey results also reflect dynamics that can be readily observed in most settings, namely that texting has essentially become ubiquitous, crossing socioeconomic and educational barriers. Furthermore, although there was not a statistically significant difference, the data indicated that generally speaking, caregivers from Center 1 (Head Start) spent more time tweeting and FaceTiming than did caregivers from Centers 2 and 3 (university affiliate and Autism integrated).

Regarding personal environments, caregivers from all three centers did not differ in the number of TVs, iPads, or cell phones in their homes. Caregivers from Center 1 did differ significantly from those in Center 2 (but not Center 3) regarding number of computers in their home $F(2, 123) = 4.691, p < .011, \eta^2 = .071$. When the caregivers were asked the amount of time they spent watching TV or a movie, using a computer for personal and/or work/school

reasons, talking on the phone, playing video games, accessing Facebook and listening to music (radio/iPod), the only significant differences between the groups were related to work/school computer use and accessing Facebook. Caregivers at Center 1 differed significantly from those at Center 2 in their amount of work/school related computer use $F(2, 110) = 7.131, p < .001, \eta^2 = .115$, and they differed significantly from Center 3 regarding their Facebook practices $F(2, 110) = 3.490, p < .034, \eta^2 = .060$. There were no significant differences between the caregivers at Centers 2 and 3 (university affiliate and Autism integrated) on any of the measures of MeTS usage.

Caregivers were also asked to rate their comfort level related to their personal use of technology, as well as, their comfort level using technology with young children. Interestingly, caregivers at Center 1 were significantly less comfortable personally using technology than caregivers at Center 2 $F(2, 122) = 5.137, p < .007, \eta^2 = .078$; however, with respect to their comfort level regarding using technology with young children, there were no significant differences between caregivers at the three centers. The final survey question pertained to the caregivers' children's usage of MeTS. Although the length of time per day that children spent playing video games did not significantly vary across the centers, children who attended Center 1 (Head Start) were found to watch significantly more TV than children from both Centers 2 and 3 (university affiliate and Autism integrated) $F(2, 117) = 6.367, p < .002, \eta^2 = .098$. Figure 1 indicates a graphical representation of some of the adult and child MeTS usage differences found between the three centers.

Through the course of this study, participating parents and teachers from three intentionally selected childcare programs were found to share many similar views with experts in the field regarding young children's exposure to and usage of media, technology, and screen time. Whereas significant differences were identified between the caregivers' education levels, ethnicities, ages, and MeTS usage across the three centers, collectively the caregivers generally agree that children's interactions with MeTS, as well

as their early exposure to MeTS, are beneficial. They also strongly agree that exposure to violence via MeTS is harmful to children. They are not, however, in accord on the issue of MeTS contributing to the creation of socially stunted, ungrateful, and unhealthy children. Given some of the demographic differences between the three groups, the magnitude of their shared opinions on this subject, as evidenced by their agreement on six thematic topics, is both interesting and informative.

Recommendations and Implications for Practice

In today's technologically saturated society, parents and teachers, many of whom are digital immigrants, are both challenged and obligated to ensure that their children's (digital natives) interactions with MeTS are developmentally appropriate, interactive, and beneficial (Common Sense Media, 2011; NAEYC 2012; Prensky 2001). Thematically, the caregivers' beliefs in this study, namely that *MeTS exposure benefits young children* and that *Early MeTS exposure is important*, are congruent with ECE experts' opinions found in prior research (Ernest et al. 2014). Researchers also stress that MeTS integration should be seamless, functioning as a tool to assist in the learning process and utilized to enhance curricula and educational experiences (Dodd-Nufrio 2011; Hong and Trepanier-Street 2004). The current study revealed that caregivers of young children across varied socioeconomic groups concur as indicated by their thematic responses that *Teachers have a responsibility regarding MeTS*, and *MeTS exposure should be based upon developmentally appropriate practices*. Finally, as strongly emphasized in the research (Common Sense Media 2011; NAEYC 2012) caregivers also concur with researchers regarding the following statements: *Non-violent MeTS exposure is acceptable regardless of age*, and *Violent MeTS influences are harmful to young children*.

Although technology can be utilized as a cognitive tool to enhance both home and childcare educational experiences (Hong and Trepanier-Street 2004), there are some indications that issues of equity and access to MeTS may exist across family, school, and community settings (McPake et al. 2013; NAEYC 2012). As demonstrated in this study, parents and teachers from varied backgrounds are in agreement on many issues pertaining to young children's MeTS experiences; however, there appears to be a range of in-home adult and child MeTS usage, implying that children's MeTS exposure is not universal across environments of varied incomes. It is recommended, therefore, that teachers make concerted efforts to assess the appropriateness of the types of MeTS that the children in their care are exposed to, and facilitate, when necessary,

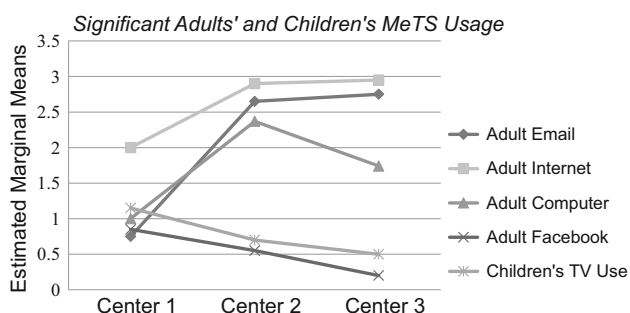


Fig. 1 Comparisons of MeTS usage across centers

the education of parents regarding the critical benefits of parent–child interactive MeTS engagement. The results of this study indicated varying levels of caregiver computer and email usage; therefore, administrators and teachers are also encouraged to discover parents' preferred methods of communication in order to augment their direct one-to-one communication efforts. Furthermore, as MeTS usage has become more pervasive, the early childhood community has a collective responsibility to educate caregivers regarding potential benefits and challenges of technology, as well as, developmentally appropriate practices surrounding apps created for children's use. A limitation of the research was that the participating caregivers in this study were from three socio-culturally diverse early childcare education centers purposefully chosen for their contrasting missions. It is recommended that further research be conducted with larger samples to test the replicability of the findings in similar and differing settings.

In summation, the most appropriate and beneficial use of MeTS encompasses the interactive engagement between a child and a caring adult. In the same vein as the promotion of shared book experiences and guided reading, current research about best practices with MeTS calls for shared understandings and meaning making between children, caregivers, and educators encouraging bonding and enhanced creative learning in the gold standard tradition of crayons, markers, and paint.

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