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Is Educational Media an Oxymoron?

Jessica Taylor Piotrowski

In his now classic 1998 piece, Daniel Anderson, one of the leading academicians of youth and media research, posed the question—“is educational television an oxymoron?” At the time, children’s educational television—defined as television explicitly designed with the intention to support the academic or social skills of its viewers—was receiving increased attention with American shows such as *Sesame Street* and *Mister Roger’s Neighborhood* making their mark in young children’s lives. Yet, at the same time, these and other similar shows were coming under increased criticism from individuals who believed that, rather than support children’s healthy development, this content was “inimical to the intellectual development of children” (Anderson, 1998, p. 25). Indeed, in two popular trade books of the time (*The Plug-In Drug* and *Unplugging the Plug-In Drug*), Marie Winn argued that television was problematic for young viewers and a detriment to children’s healthy cognitive development (Winn, 1985, 1987). She argued that television’s (particularly *Sesame Street*’s) constant movement and scene changes induced a form of addiction which ultimately would induce passivity and produced shortened attention spans among young viewers. These concerns, and others like them, were similarly echoed in other trade publications of the time including *Four Arguments for the Elimination of Television* (Mander, 1978), *Growing Up on Television* (Moody, 1980), *Amusing Ourselves to Death* (Postman, 2006), and *Endangered Minds: Why Our Children Don’t Think* (Healy, 1990). Healy’s book, in particular, provided a rather damning attack against *Sesame Street*—arguing that television provides experiences inappropriate for healthy brain development during the formative years and, as a result, the language skills of the so-called “TV generation” had deteriorated along with children’s ability to follow or produce argumentation (Anderson, 1998).

Anderson, in his 1998 article, questioned the sentiment that television was uniformly harmful for children not only because such argumentation was based largely on anecdotal data,

but because his scholarship and the work of others suggested an alternative view. Rather than showing that children were cognitively-inactive television zombies, his work and other emerging scholarship demonstrated that young children are “intellectually active when they watch television; they selectively attend to aspects of the program content that they find potentially comprehensible and interesting, ignoring those parts of programs that are uninteresting” (p. 28). Moreover, Anderson highlighted a bulk of empirical evidence showing that young children who consumed a diet of *Sesame Street* and other similar programs performed *better* on school readiness and vocabulary assessments than children who watched other kinds of television content. In other words, contrary to the fearful rhetoric propagated by Healy and others, Anderson argued that children are active television viewers who, when confronted with well-designed developmentally-appropriate educational television, can experience both cognitive and social-emotional benefits. Far from an oxymoron, his review demonstrated that educational television may be, as Linebarger and Wainwright (2007) suggest, a “dream come true” wherein the highly-popular entertainment medium of television can be successfully harnessed to support children’s healthy development.

Anderson’s piece focused specifically on educational television, particularly on *Sesame Street*. At its time, this focus was a reasonable one as television was amongst the only media form available for children. Video-on-demand services, computers, touchscreen technology, video chat, social media, interactive toys, and other developments from the digital revolution were just beginning to enter the media sphere, and there was certainly little (if any) research on their potential for educational outcomes. Yet today we are working in a far different space. While television continues to reign supreme, there have been significant advancements in the quality and format of this media content. The television landscape is a cluttered one with options far exceeding those of the 1990s. Alongside this, children not only have access to this media content on-demand, but they also have access to a host of games that can be played on the family computer or on their (parents’) iPads or iPhones. And through all of this change, educational media has evolved too. It is no longer limited to a host of publicly-funded television shows, but instead can be found across today’s diverse media landscape in a range of formats and styles for a range of audiences. With such change, it seems high time to revisit Anderson’s original question, focusing not only on television but the wide array of media content now available.

As such, the aim of this chapter is to answer the question *is educational media an oxymoron?* To answer the question, the chapter takes a three-fold approach beginning with a brief history. It then summarizes two key theories used to explain how educational media effects occur, followed by the review of key findings on educational media effects. Following Anderson, this chapter defines educational media as that which has been developed with the *explicit intent* to support the academic or social development of children. Moreover, this chapter focuses on the use of such media in the home context as a tool for informal learning.

The Historical Landscape

Educational media secured its place in history with the arrival of *Sesame Street* in 1969. At its time revolutionary, *Sesame Street* was developed to help prepare young children for school by focusing on developmentally-appropriate academic and social-emotional curricula. While there were other educational programs available for children at the time, *Sesame*’s reliance on empirical research throughout the production process helped distinguish it from other programs. Specifi-

cally, throughout the design process, developers relied on the input of experts who understand children's developmental and pedagogical needs. Rather than separating creatives from child development experts, these individuals work together to develop content—testing this content throughout its development (formative research) and after its completion (summative research) in order to ensure that the content meets its intended goals (see also Fisch & Truglio, 2001). To this day, *Sesame Street* continues to rely on this approach and has become one of the leading exemplars of how to effectively bridge research with practice.

The popularity and success of *Sesame Street* and other similar shows (e.g., *Mister Roger's Neighborhood*, *Barney & Friends*) began to create quite a stir by the late 1990s, particularly in the United States. Not only were these programs experiencing reasonable financial success, but they were regarded positively by parents, teachers, and practitioners, enjoyed by children, and most excitingly, empirical research was converging to support the short *and* long-term benefits of well-developed educational media (namely, educational television). As a result, this approach of embedding academic and social-emotional curricula into media content began to catch on and, by 1996, educational media (specifically, television) was not only a mainstay in the children's media landscape but became a public mandate, at least in the United States. Specifically, in 1996, the Children's Television Act (CTA) in the United States was launched—a law that the Federal Communication Commission (FCC) implemented requiring broadcast stations to air three hours of Educational/Information (E/I) children's programming weekly. (See Chapter 2 for more details.) And while the CTA often lead to efforts which met the letter more than the spirit of the law (Jordan, 2004), the fact that public policy was encouraging the proliferation of children's educational television made a clear statement that children can and do benefit from such content (Anderson, 1998).

Today, educational media are firmly entrenched in children's media diets. Estimates show that American children between two and ten years of age spend about an hour per day with educational media—with similar estimates in other industrialized countries around the world (Rideout, 2014; Szybist, 2011). And, more than ever before, even the youngest "diaper demographic" is getting in on the action with the littlest eyes using screen media (primarily educational screen media) for nearly one hour per day (Wartella, Rideout, Lauricella, & Connell, 2013). Yet, this use tends to be unequally distributed with nearly 78% of children two to four years of age using educational media daily compared with only 27% of eight to ten year olds (Rideout, 2014).

While some argue these differences may reflect the fact that as children enter formal schooling they have less discretionary time for media use, the more likely argument is that there are fewer educational media options for children as they get older. Thanks in part to the regulatory climate, a growth in niche media, and a realization that educational media can make money, the educational media market for young children is a crowded one (Hendershot, 2004; Lemish, 1987; Piotrowski, 2014b; Valkenburg & Vroone, 2004). This is particularly true for the very youngest demographic. Yet, at the same time, the available options for children in middle childhood and adolescence are markedly smaller, and when available, tend to fall into the category of "chocolate-covered broccoli" (i.e., they are interpreted as *too* educational and not sufficiently entertaining by the intended audience). This trend highlights a missed opportunity as well as the challenges that developers face in creating content which is equally entertaining *and* educational for an audience that is increasingly critical of media content. Related to this downtrend in use, it is equally possible that this change reflects the "spinach syndrome"—a

period of time starting around five years of age when children begin to reject anything that is supposed to be good for them (Valkenburg & Piotrowski, 2017). Nonetheless, it is clear that educational media continues to find its way into children's everyday lives.

The Theoretical Landscape

Of course, knowing that educational media is accessible and used by young people is only a first step in answering the question as to whether educational media is any oxymoron. It is also necessary to understand how educational media are expected to teach. Several scholars have attempted to explain educational media effects, most notably Albert Bandura with his social cognitive theory and Shalom Fisch with his capacity model.

Social Cognitive Theory

Social cognitive theory (SCT) (Bandura, 2009) is one of the most commonly used theories to explain why and how media can influence the behavior of children (also see Chapter 6). Often referred to as observational learning theory, SCT goes beyond mere imitation and instead argues that, by observing behavior, audiences learn more abstract rules about behavior which can then be applied in future situations.

In order to learn these abstract rules, Bandura posits that four cognitive processes must occur. First, *attention* to the model and the model's behavior is critical. Different characteristics of models can elicit differing levels of attention. In the case of educational television, for example, television characters such as *Dora the Explorer's* Boots (an animated monkey) have distinctive and engaging features which easily attract attention (e.g., animation, animal, wacky voice). Attention is also influenced by characteristics of the child, such as their own needs and interests. As such, SCT predicts that that most effective educational content will be content that attracts and sustains attention to the key lessons in the content *while* mapping onto the child's own needs and interests.

Once a child attends to the educational content, SCT argues the next step is *retention*. In terms of educational media, it is often the case that there is a significant time lag between media exposure and the performance of the behavior. For example, children may be watching a television program that aims to teach inclusivity, yet it may be a significant period of time until the child is faced with a situation in which s/he is called upon to use this information in practice. SCT acknowledges that the observer can only model the behavior if s/he has retained the information. While such retention is difficult to guarantee, retention is generally superior when it connects well to the background knowledge of the audience and when it is repeated frequently, giving the user time to encode the content in his/her knowledge structures.

Assuming the observer has retained the information, SCT explains that the child must then be able to engage in *motoric reproduction*. In other words, the child must be able to convert the stored information into behaviors that s/he can actually do. Thus, the messages that children receive in educational media must be ones that they can actually enact. Finally, even if the observer is able to do the behavior, s/he needs to be *motivated* to do so. While children's own motivation helps here, this motivation can also come from external reinforcement in his/her environment. This is where adult caregivers can play a role in helping ensure that children are motivated to use what they have learned.

Capacity Model

The capacity model (CM) (Fisch, 2004), with its roots in information processing research, is a model designed to explain how children extract and comprehend educational content from educational television. Central to the model is the supposition that working memory is limited and, for content to be processed effectively, the demands of the viewing task cannot exceed the resources available in the working memory. The CM focuses on children's allocation of cognitive resources during television viewing, with specific attention to the degree to which working memory resources are allocated to the narrative versus educational content.

Narrative content is defined as content which presents the story in the program whereas educational content is the underlying concept or message which the program is intended to convey. For example, in an episode of *Dora the Explorer*, a character (Benny the Bull) experiences distress as his hot air balloon develops a hole and, without help, he will soon crash into Crocodile River. During the narrative, Benny's friends (Dora and Boots) set out to rescue Benny before he crashes. In order to rescue Benny, Dora and Boots must navigate several tricky situations, all of which require numeracy and color recognition skills to solve (the educational content embedded within the narrative).

According to the CM, cognitive demands are said to come from three basic elements: (1) processing the narrative, (2) processing the educational content, and (3) the distance between the two. Distance refers to the relationship between the narrative and educational content. The CM predicts that educational media will be most effective when the distance between content types is minimized so that, rather than being seemingly unrelated to one another, the narrative and educational content are so complementary that neither can exist on their own. The CM further predicts that factors that allow for improved processing of either content type will reduce cognitive resources and subsequently increase comprehension. These factors may be viewer characteristics (e.g., story understanding can improve narrative comprehension, resulting in greater resources for educational content; Piotrowski, 2014b) or programmatic characteristics (e.g., participatory cues can encourage greater engagement with educational television content; Piotrowski, 2014a).

In total, the capacity model predicts five ways that learning from educational media can be increased: (a) by increasing the total amount of working memory resources devoted to understanding the television program as a whole, (b) by reducing the demands of processing the narrative, (c) by reducing the demands of the educational content, (d) by minimizing the distance between narrative and educational content in the program, and (e) via viewers' voluntary allocation of a greater proportion of working memory resources to the processing of educational content. While evidence to support the CM is not as robust as that of SCT, recently, researchers have demonstrated the accuracy of these predictions with young children's learning from educational television (e.g., Piotrowski, 2014a, 2014b).

Importantly, however, one must acknowledge that this capacity model was developed explicitly for television. While researchers (e.g., Kirkorian & Anderson, 2009) do argue it can easily be applied to other educational media as well (e.g., videogames), it remains unclear at this time how well this application works. In response to the new educational media environment Fisch has introduced the Capacity Model 2.0, a model designed to understand learning from educational games (Fisch, 2016). Like its predecessor, the model pays careful attention to the relationship between narrative and educational content in determining allocation of working memory. However, the 2.0 version also notes that the *gameplay* (i.e., defined as usability, game

design, and player characteristics) of digital-based educational media *also* influences working memory allocation. This new model highlights the importance of ensuring minimal distance between educational content and gameplay so that gaming elements work to support educational content rather than drain valuable cognitive resources. While as of this writing there exists no empirical evaluation of the CM 2.0, it is certainly an important theoretical advancement to help explain how children can learn from educational media in the 21st century.

The Empirical Landscape

Guided by predictions of theories such as SCT and the CM, researchers have been conducting investigations to evaluate whether, when, and if educational media meets its intended goals. This work has primarily focused on television, although in recent years there has been influx of empirical studies on digital content as well. Importantly, there are key developmental trends in the availability of empirical scholarship on educational media. In particular, work with children under two takes on a decidedly different tone and focus than work with older children.

Infants and Toddlers

For the very youngest children (under the age of two), the great majority of existing scholarship has focused on whether they can learn academic skills from media and how this learning compares to learning from adult role models (Courage & Setliff, 2009). All told, there is robust evidence to suggest that very young children are better able to learn from adult role models compared to media models (a phenomenon often referred to as a “video-deficit”). However, this does not mean they do not benefit from educational media. In fact, they do. Not only can very young children learn from media, but this video deficit can be reduced or even neutralized when the educational content is repeated (Barr, Muentener, Garcia, Fujimoto, & Chávez, 2007), when the child is familiar with media models delivering the content (Lauricella, Gola, & Calvert, 2011), or when parents discuss this content during and beyond the media experience (often referred to as scaffolding; Linebarger & Vaala, 2010).

The question as to whether children under two years of age learn from media has emerged in response to a long-standing debate as to whether screen media should even be a part of very young children’s lives. Initially, many public policy organizations suggested that children under two should not be exposed to any screen media content because of the potential detrimental effects on development (see, for example, American Academy of Pediatrics Committee on Public Education, 2001). These statements were more of a cautionary tale, however, as there was limited evidence to support this recommendation. Recent recommendations have softened this stance. For example, the AAP now suggests that, for very young children (under 18 months), screen media use should be avoided except in the case of video-chatting (Reid Chassiakos *et al.*, 2016). Starting around 18 months of age, the AAP supports the occasional use of developmentally-appropriate high-quality media content, particularly when co-viewed or co-played with parents, while continuing to emphasize the importance of media-free time (e.g. during dinner, driving, or playtime) and media-free locations (e.g., bedrooms). This revised stance has been informed by newer scholarship which suggests that, rather than passive experiences, well-developed media (particularly digital games and apps) can provide very young children with experiences that echo traditional active play patterns and, in doing so, promote rather than hinder development (Christakis, 2014; see also Kirkorian, Choi, & Pempek, 2016).

Preschoolers and Older Children

The majority of existing research on educational media has concentrated on early to middle children (three to ten years of age), with only a handful of studies looking at the effects of such media during the (pre-) teen years. These studies have generally clustered around the effects of educational media on academic skills and social-emotional skills.

Academic Skills. Evidence in support of educational media on academic skills is substantial. More than 1,000 studies, for example, have examined the influence of *Sesame Street* on children's early academic skills, with the vast majority demonstrating its ability to support young children's learning (Fisch, 2004). The longest-ranging evidence for the impact of *Sesame Street* comes from a longitudinal study in which researchers found that children who watched the program as a youngster spent more time reading and in educational activities during childhood, and impressively, these effects seemed to carry over to school performance in adolescence (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001). Moreover, just recently, scholars evaluated data from what they referred to as a "natural experiment" in which American children with access to *Sesame Street* during the preschool years were compared with peers who did not have such access. Results indicated that children with access performed better in school than their counterparts without access, particularly among boys, non-Hispanic Black children, and children growing up in low-economic environments (Kearney & Levine, 2015). Importantly, these findings are not relegated to the American context. A recent meta-analysis on the effects of the international co-productions of *Sesame Street* in 15 countries revealed significant positive effects of the program on children's school readiness skills (Mares & Pan, 2013).

Sesame Street is not the only program that has been shown to support early academic skills. Experimental research with *Super Why!*, an animated literacy-based television show, also found that children aged three to six outperformed their non-viewing peers on nearly all literacy outcomes (Linebarger, 2015) while experimental research with the literacy program *Between the Lions* demonstrated similar literacy gains for children six-to-eight years of age (particularly among those moderately at-risk for literacy deficits) (Linebarger, Kosanic, Greenwood, & Doku, 2004). Moreover, programs such as *Barney and Friends*, *Dragon Tales*, *Blue's Clues*, and *Pinky Dinky Doo* (Fisch, 2004) and, more recently literacy-focused educational apps (Neuman, 2015), have also been linked with positive gains.

The few studies investing the effects of educational media on the academic skills of older children and teens have also found positive effects. Experimental research with the math-focused program *Cyberchase*, for example, showed that viewers of the program demonstrated improved problem-solving skills after only four weeks of viewing of the show (Fisch, 2003). These findings were particularly robust when the program content was combined with the ancillary website content (Fisch, Lesh, Motoki, Crespo, & Melfi, 2010). Similarly, evaluations of *Bill Nye the Science Guy* and *The Magic School Bus* (i.e., science programs targeting older children) showed that viewers had improved understanding of scientific concepts and the process of scientific discovery when compared to non-viewers (Fisch, 2004).

Social-emotional skills. When people use the term "educational media," it is common to think of content that supports traditional academic skills. However, as the founders of *Sesame Street* noted in the 1970s, academic skills are only one portion of the lessons that media can teach. Educational media are equally suited to teach social-emotional skills. That said, research on this topic is more limited, particularly amongst young children, and has thus far focused primarily on prosocial behavior, self-regulation, and emotion recognition.

Prosocial behavior refers to a range of positive behaviors including positive interactions, altruism, and behaviors that reduce stereotypes (Mares, Palmer, & Sullivan, 2011; see also Chapter 13). More than thirty studies have been conducted to identify whether and how prosocial media content (primarily television) might contribute to children's prosocial behavior. A 2007 meta-analysis of this work revealed that children who watched more prosocial television do indeed exhibit more prosocial behavior, particularly when prosocial behaviors were explicitly modeled in the shows (Mares & Woodard, 2007). Moreover, children's age influenced this relationship. The effects of prosocial media seem to increase sharply during early childhood, peak in middle childhood (age seven), and then decline throughout the tween and teen years.

Mares and Woodard (2007) believe that the peak around age seven implies that younger children may not yet fully understand the prosocial content on television, and may especially have difficulty extracting the prosocial messages from media content. However, why would the effect decline during the tween and teen years? A possible explanation might be that the programs included in the meta-analysis were less appealing to older children. If more age appropriate and appealing programs were available, the effects of might have held equally among older children. Several newer studies confirm that appealing developmentally-appropriate prosocial content can lead to prosocial behavior among older children and teens. For example, tweens' and teens' who watched of an episode of a teen-targeted news program featuring prosocial action for UNICEF were more likely to donate to UNICEF than watching an episode without prosocial action modeled (de Leeuw, Kleemans, Rozendaal, Anschütz, & Buijzen, 2015). Similarly, Gentile and colleagues found robust evidence to support the argument that playing video games in which characters model prosocial behavior increases players' short and long-term prosocial behaviors (Gentile *et al.*, 2009).

While prosocial behavior is perhaps the most frequently studied in the context of social-emotional benefits of educational media, there are other expressions of social-emotional learning which media may also support. Indeed, in recent years we have seen an influx of media content designed to support other aspects of social-emotional development. For example, there are numerous apps which purport to teach children about emotions (e.g., *Daniel Tiger's Grr-ific Feelings*, *Inside Out: Storybook Deluxe*) or even empathy (e.g., *Peppy Pals*). New television shows have also been added to the children's television landscape which focus on emotional development (e.g., *Daniel Tiger's Neighborhood*), and we have seen Disney opt to focus on emotions in its movie *Inside Out*—an animated film focusing on a young girl's emotions as she moves with her parents across the country. And, in recent years, we have seen the American version of *Sesame Street* place a key emphasis on the development of self-regulatory skills (Season 44) and kindness (Season 47).

Although empirical work is limited to support these initiatives, early findings are promising. For example, an experimental study investigated whether *Sesame Street's* efforts to teach self-regulation via the loveable Cookie Monster (a poster child for teaching self-regulation!) were effective. Using the classic marshmallow task to assess gratification delay, results showed that viewers of the Cookie Monster content were able to wait on average nearly four minutes longer than non-viewers before enjoying their marshmallow treat (Linebarger, 2014). Similarly, Rasmussen and colleagues, in their experimental study, investigated the effects of *Daniel Tiger's Neighborhood* on a range of social-emotional outcomes. Results revealed that viewers of the program who are accustomed to active parental media mediation, compared to their non-viewing peers, exhibited higher levels of empathy, self-efficacy, and emotional recognition

(Rasmussen *et al.*, 2016). And, more generally, researchers have found that a media diet which consists primarily of prosocial media content led to increased social and emotional competence for children three to five years old (Christakis *et al.*, 2013).

Is Educational Media an Oxymoron?

So, is educational media an oxymoron? When Dan Anderson wrote his 1998 manuscript, he was confronting a myriad of publications which suggested that television was harmful for children. He countered this rhetoric by showing that children are active television consumers (not passive zombies!) and that developmentally-appropriate television content designed with the explicit intent to support academic or social-emotional outcomes exists. Rather than an oxymoron, he demonstrated that educational television is a powerful tool that can support healthy development of youngsters. Nearly two decades later, the naysayers still abound. We increasingly hear arguments that the new media environment is making all of us, children included, mentally lazier and leading to what some call *digital dementia* (Spitzer, 2012). We hear commentators lament that media is making children more violent, sexualizing them too soon, and increasing their narcissism. And while it is absolutely fair to assert that some media does have negative consequences for its users, this is not true of all media. As this chapter shows, developmentally-appropriate media designed with the explicit intent to support academic and social-emotional skills exists. This does not mean that all educational media is equally effective for all users. Instead, as the predictions of both SCT and the CM make clear, these effects are dependent on the successful merging of content and audience characteristics. Creating developmentally-appropriate educational media content is not easy. Finding the sweet spot between entertainment and educational content is complicated, and this is made only more complicated when factoring in individual audience differences. But it is possible to create media content, whether it be analogue or digital, that supports children's academic and social-emotional development. Far from being an oxymoron, educational media is a promising and powerful educational opportunity for millions of children worldwide.

Discussion Questions

1. Reflect on the age findings in the meta-analysis by Mares & Woodard related to prosocial media content. Are these findings (or the interpretations of these findings) in line with either of the theories discussed in this chapter? Explain.
2. The chapter concludes by noting that educational media is not easy to create. Why? Consider your answer within the context of "chocolate-covered broccoli" and "spinach-syndrome".
3. Is educational media an oxymoron? Why or why not?

Exercises

1. Find and download an educational app that targets a child under the age of five from the AppStore. Along with this, download the document “Best Practices: Designing Touch Tablet Experiences for Preschoolers” created by Sesame Workshop <<http://bit.ly/SesameTabletBestPractices>>. Analyze the app within the context of this document. Which aspects of the app do you think, based on these best practices, are effective? What could be improved, and how?
2. Visit YouTube and watch recent episode from Sesame Street’s Season 47 (kindness). Design a study to test whether this kindness curriculum will work. What will your design look like? Who is your audience? What will you measure? How will you measure it?
3. You have been asked to develop a new television show to encourage empathy skills in teens. Reflecting on what you know from Social Cognitive Theory and the Capacity Model, as well as what you know about the importance of bridging entertaining and educational content, what should this content look like? What should be avoided?
4. You have been asked by a local news media organization to write a 300 word article, for parents, on the potential benefits of media and provide them advice on selecting media for their child(ren). Your article should be succinct, clear, and accessibly written (jargon-free).

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