The Displacement Effect of Screen Time among In-School Adolescents in Anambra State, Nigeria

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Abstract
The general purpose of the study was to establish the need for awareness of health concerns associated with prolonged exposure to devices with screens and the impact on the academic performance of adolescents in Nigeria. The survey research method was adopted for this study. Data was collected in Anambra state by administering questionnaire to a sample of 392 respondents from four secondary schools in the State. The study found that on the average, the respondents' had access to and owned screen devices; 68% among them spent an average of two hours and less on these electronic devices with screens. It was also found that in-school adolescents' increased screen media usage, especially TV, interfered with other activities, promoted sedentary behavior, increased the likelihood of poor food choices, and affected, to an appreciable degree, the students' reading and study time.

Keyword: *Screen time; Displacement effect; Academic performance; Screen media usage*

1 Introduction

The contemporary youth are surrounded with innovations that influence the way they live. Electronic devices like smart phones, video games, PCs, Ipads, palmtops, laptops and the TV are readily available to them. This development affords the youth the opportunity to spend a lot of time viewing the screen when they are watching movies, playing games, or browsing the internet.

Although screen time can be a worthwhile engagement, too much of it could have some health consequences like obesity, irregular sleep, behavioural problems, violence and less time for play; and could further lead to negative academic performance like poor reading, study and writing ability.

There is a high rate of digitization usage among the youth population across the globe. A report by the American Academy of Pediatrics in 2013 reveals that the average 8-year-old spends eight hours a day using various media forms, while teenagers often surpass 11 hours of media consumption daily. More than three quarters of teenagers have cell phones, and teenagers ages 13 to 17 send an average of 3,364 texts per month. Pew Internet Project (2018), shows how immersed teens and young adults are in the tech environment and how tied they are to the mobile and social sides of it. Some 95% of teenager's ages 12-17 are online; 76% use social networking sites, and 77% have cell phones. Moreover, 96% of those ages 18-29 are internet users; 84% use social networking sites, and 97% have cell phones. While over half of those in that age range have smart phones and 23% own tablet computers like iPads. All these result into spending enormous time on glowing screens which is of little good to its users.

Excessive screen time has been blamed for the cause of metabolism reduction in young people, cardiovascular disease and type 2 diabetes. [2] The Spanish National Research Council also has found a link between 'TV viewing and Cardiovascular Disease Risk Factors in Adolescents. After analysing blood tests, those adolescents watching more than 3 hours per day were found to have 'significantly less favourable' levels of HDL-cholesterol, glucose,

apolipoprotein A1, and overall cardiovascular disease risk scores. The researchers also observed a 'negative influence of TV viewing on waist circumference.' [3] In addition to obesity, irregular sleep, behavioural problems, impaired academic performance, violence and less time for play, too much screen time it has been observed makes adolescents eat more and is seen as the major cause of obesity and overweight among adolescents. A recent US study found that even children who watched a below average amount of television (less than three hours a day for an average of 2.7 days a week) ate roughly the equivalent of an extra meal a day more than those who watched none. [4]

For the present study, the concern centered on whether adolescents' exposure to screen devices could affect their academic performance; and whether they are cognizant of the precautions that could help stave off health issues that might arise as a result of over exposure to screens.

In order to ascertain how conscious in-school adolescents are of the health hazards associated with prolonged exposure to devices with screens and if there existed any association between the amount of time spent on devices with screens and these students' academic performance in and out of school, answers were sought to these research questions:

1. Which of the screen devices do In-School adolescents in Anambra State own or have access to?
2. At what rate do these students engage in screen-related activities?
3. What are the factors that influence the use of screen media among these adolescents?
4. How does these adolescents' exposure to screen devices affect their academic focus?

2 Literature Review

We reviewed existing literature along the lines of conceptualization of screen time, adolescents' access to devices with screens, rate of screen media usage among adolescents', variables that affect screen media use, health implications of too much screen time and the impact of screen technology on adolescents' educational pursuit.

Conceptualization of Screen Time

Screen time, is a term often used to describe activities that involve screens like watching TV, playing video games, texting and chatting with friends online with mobile devices and working on a computer. In the last few years, there has been an increase both in the time spent on screens and in the number of adolescents who use screen devices. Among the most widely used electronic devices are television, computer, video game, smart phone and ipad, which engage adolescents for increasing amount of time. Beginning at a young age, screen time continues to grow among young people especially in developed countries. [5]; and, once established in adolescents as a behaviour, screen time has been shown to continue into adulthood. The American Academy of Pediatrics estimates that the average child spends seven hours of their day looking at a screen, be it a video game, computer, cell phone or television.

Adolescents Use and Access to Screen Devices

Adolescents engage in a wide range of activities with screen devices. They can download violent videos, send text messages or chat with their friends, play video games, watch movies and advertisements on TV. Yet, across all ages, television remains the predominant medium with an all-time high viewing across the globe. But at the same time, devices with screens have become an important source of information, and sometimes misinformation, about health problems. Increasingly, people, particularly, adolescents, multi-task to engage in multiple electronic media forms simultaneously, spending increasing amounts of time with screens. [6]

A study of multiple types of technology use among high school students found that among 156 high school boys and 155 high school girls, about 72% of the females and 54% of the males reported using a cell phone for daily communication. In addition, about 36% of males and 55% of females reported using text messaging for daily communication. [7] A pilot survey administered to 200 high school students (mean age: 16.7 years old) found that about 90% of adolescents own a cell phone. Between 2005 and 2006, adolescent self-reports of cell phone ownership increased at a rapid rate (from 57% in 2005 to 90% in 2006). The study also found that about 95% of adolescents who own a cell phone have the capacity to send and receive text messages, in addition to the traditional calling capabilities. [8]

There are very good reasons to give attention to young people's use of screen media. There is ample evidence that, for some young people, either the amount viewed or what is viewed may have adverse consequences. [9]

Adolescents' Rate of Screen Media Usage

Adolescents' tend to use many different types of information and communication technology on a daily or weekly basis. The rate at which adolescents' use various screen technology, including, video games, cell phones, the internet, television and computer, is alarming. Recent estimates place TV viewing alone, which is preeminent among the screen devices, at almost 5 hours a day for those 8 to 18 years, with 7 hours and 38 minutes devoted to all entertainment media, in the United States of America. Screen media accounts for almost half of their media exposure, with television preeminent, with about 95% of screen media use. [10]

Factors That Affect Screen Media Use among Adolescents

Media effects are dependent upon the context in which the use takes place; among other variables which contribute to both the physical and psychosocial health consequences of screen media use on adolescents are time spent with screen devices, age, gender, parental oversight, socio-economic status, content and context. [11]

With regard to gender, research has shown that girls tend to own mobile devices more than boys. Research through the Pew Internet and American Life Project (2005) indicated that 45% of adolescents own a cell phone. Regardless of age, girls tend to be more likely than boys to own a cell phone (49% of girls owned a cell phone, compared to 40% of boys). Younger adolescents are much less likely to have a cell phone than older adolescents (32% of adolescents ages 12 to 14 owned a cell phone, compared to 57% of adolescents ages 15 to 17); boys devote more time to video game play than girls, because in most games the main character is male and the activities are also male oriented. [12]

Parental characteristics and behaviour may moderate the effects of media, because children are dependent upon them for both media and control over their subsequent behavior. But it seems that despite research findings regarding the placement of technology and the supervision of technology use in the home; the presence of technology in American adolescents' bedrooms is prevalent. [13] Another study found that adolescents aged 11 to 18 reported the presence of a variety of media technology in their bedrooms. About 30% had a computer, 20%-30% had Internet access, and 15-25% had an instant messaging program in their bedroom. Furthermore, children ages 8 to 18 who reported having a television in their bedroom tended to spend more time using technology each day. They tended to watch an additional hour of television each day (3.5 hours compared to 2 hours for adolescents without a television in their bedroom), spend an additional 30 minutes watching videos and movies each day (1.25 hours compared to 50 minutes for those who do not have a television in their bedroom), and they spent an extra

25 minutes playing video games daily (40 minutes compared to 15 minutes for those who did not have a television in their bedroom). [14]

Socio-economic factors also contribute to the amount of time adolescents' spend on screen technology. It was found that adolescents whose parents have less education and whose families have lower incomes have been shown to have less access to computers than their more advantaged peers curtailing their screen time. The relationship between socio-economic status, education and technology show that, generally, families headed by highly educated parents were more likely to have access to modern information technology, than the illiterate or less educated parents. [15]

Health Implications of Too Much Screen Time

The implications of too much screen time on adolescent's health are enormous. Screen time is considered a major public health issue that requires immediate address, though some evidence suggests that there may also be beneficial health effects. [16] TV viewing for long hours for instance, may contribute to overweight and obesity in adolescents through electronic media displacing other activities such as free play and structured physical activity, increased snacking, [17] or increased demand for energy dense foods which are heavily advertised. [18] Excessive TV viewing has been linked to other negative outcomes such as poor cognitive performance, antisocial behaviour and reduced sleep time. [19]

Impact of Screen Technology on Adolescents' Education Pursuit

Over the years, research evidence has suggested there may be a relationship between screen time, and academic performance among adolescents. Early exposure to, and increasing time spent watching screen technology has been strongly linked to a significant continuing decline in time spent reading books as a regular pastime. Research has shown that Screen Media Usage interferes with academic activities, such as studying and reading books, hence having negative consequences on academic performance, [20] like displacing homework and learning. This may be because screen media usage involves intermediate processes that negatively affect academic processes. [21] However, screen media usage could be beneficial to adolescent's academics with particular reference to computer use. According to a North American study, [22] computer use, even for fun and moderate levels of playing games, is positively related to cross-sectional reading and mathematics, and academic achievement. Studies have shown that 14 year olds who spent more than 3 hours per day with media correlated with greater academic failure and negative school attitudes. Also, these studies found an association between increased video game play and academic failure. [23]

A survey by Britain's National Literacy Trust found that a third of children did not now enjoy reading and found it 'boring'. And less than half of children aged 9–14 read fiction more than once a month; websites were far more popular. [24] The rapid decline in reading has led to the recent 'million book giveaway' launched in Britain on 'World Book Night', intended to entice people to read again. A European based study of 15-year-old students in 31 countries concluded that those using computers at school several times a week performed 'sizably and statistically significantly worse' in both maths and reading than those who used them less often. [25]

Literature reveals that constant and repeated exposure to screen technology like the television, video game, phone and the internet could possibly lead to a culture of unhealthy behavior and the displacement of studying and reading for less beneficial endeavours among adolescents. This is the primary proposition of cultivation theory which states that the more time people spend 'living' in the television world, the more likely they are to believe social reality portrayed on television.

3 Method

The survey method was used to collect data among adolescents from four randomly selected private and government-owned secondary schools in Anambra State, Nigeria. The survey questions posed to the respondents were in regard to their accessibility and ownership of devices with screens; screen media usage; awareness of the health implications of excessive screen time; and their knowledge on the effects of screen time on sleep time and academic performance. All the students in all government owned and private-owned secondary schools formed the population for this study, estimated at about 127,700. A sample size of 400 was drawn from this population, using the Yamane Formula: $n = N/(1 + N[e]^{2})$.

Multistage sampling was used in this study. The first stage involved the selection of Secondary schools. Two private and two government-owned Secondary schools were randomly selected from about, 384 government-owned and about 200 private-owned secondary schools in Anambra state. Winners' International college, Onitsha; St. Augustine de hippo secondary school, Nkpor; Community secondary school, Amansea and Capital city secondary school, Awka, were randomly selected. The second stage involved selecting the number of students from the Junior and Senior secondary categories of each Secondary school and 50 students were randomly selected from each category, making a total of 100 students from each school.

Overall, one hundred students per school were selected from each of the four selected secondary schools, giving a total of 400 students. These had the questionnaire administered to them.

4 Results

Answers to the research questions were deduced from data generated from a 26-item pre-coded questionnaire and presented in tabular format.

Screen Media Ownership and Accessibility

Question items 5-8 in the questionnaire were analyzed to find answers to research question 1 which was to determine adolescents' ownership of and access to screen devices. The data were presented in tables.

Table 1: Respondents' Phone Ownership

	Variable	Frequency	Percent
1	Yes	143	37
2	No	249	63
	Total	**392**	**100**

Table 1 shows that 143 of the respondents' have phones i.e. 37% of the sample, while 249 respondents do not have phones; represented by 63% of the sample. This reveals that most of the respondents' do not own phones, while 37% of the sample owns either a smart phone or any other kind of phone with screen.

Table 2: Respondents' TV Accessibility

	Variable	Frequency	Percent
1	No	12	3
2	Yes	380	97
	Total	**392**	**100**

Table 2 indicates that 12 of the respondents representing 3% of the sample do not have Television in their homes. On the other hand, a greater number of the sample 380 (97%) of the respondents' have Television in their homes. This goes a long way to show the affordability of TV sets and also indicates to a great extent the living condition of most Nigerian homes, which is relatively average.

Table 3: Respondents' Ownership of Video Games

	Variable	Frequency	Percent
1	No	215	55
2	Yes	177	45
	Total	**392**	**100**

Table 3 shows that majority of the respondents' (55%) do not own video games. About 177 respondents, 45% were affirmative when asked about their ownership of video games.

Table 4: Respondents' Internet Accessibility

	Variable	Frequency	Percent
1	No	219	56
2	Yes	173	44
	Total	**392**	**100**

According to data on Table 4, 44% of the sample had access to the Internet either through their phones or computers, while a greater number 56% did not have access to the Internet.

Rate of Adolescents' Daily Screen Media Usage

The attempt was made to examine the amount of time these adolescents spent on electronic devices with screens daily and for what purpose they usually spent time with these devices. The questions on this issue were measured using question items 9-12 in the questionnaire.

Table 5: Respondents' Daily Video Game Usage

	Variable	Frequency	Percent
1	Two hours and less	22	23
2	Two to four hours	126	68
3	Four hours and above	4	9
	Total	**177**	**100**

Data on Table 5 show that 23% of those that owned videogames spent two hours and less in a day playing videogames, 68% of them were heavy video-gamers, spending two to four hours daily playing videogames, while 9% spent about four hours and above.

Table 6: Respondents' Daily TV Usage

	Variable	Frequency	Percent
1	Two hours and less	256	68
2	Two to four hours	22	23
3	Four hours and above	4	9
	Total	**382**	**100**

Table 6 indicates that 68% of the respondents spent lesser hours on TV as a screen device; 23% spent about two to four hours and 9% spent about four hours and above.

Table 7: Respondents' Daily Internet Usage

	Variable	Frequency	Percent
1	Two hours and less	95	55
2	Two to four hours	63	36
3	Four hours and above	15	9
	Total	**173**	**100**

From the data on Table 7, the respondents' daily internet usage was portrayed. It was revealed that 55% of the sample size spent two hours and less on the internet; 36% spent two to four hours, while 9% spent four hours and above accessing the internet with a phone or a computer daily.

Table 8: Respondents' Daily Phone Usage

	Variable	Frequency	Percent
1	Two hours and less	86	60
2	Two to four hours	41	29
3	Four hours and above	16	11
	Total	**143**	**100**

Table 8 reveals that 60% of the respondents spent two hours and less accessing their phones; 29% spent two to four hours and 11% spent four hours and above using their phones on a daily basis.

Table 9: Respondents' Daily Screen Media Use for Social and Communication Purposes

	Variable	Frequency	Percent
1	Several times daily	182	46
2	One or two times a day	166	42
3	Never	44	11
	Total	**392**	**100**

Table 9 presents the daily screen media usage for social and communication purposes of the respondents, with 46% often using them several times in a day; 42% rarely doing so, while 44% did not use them for social or communication purposes on a daily basis.

Table 10: Respondents' Daily Screen Media Use for Entertainment Purposes

	Variable	Frequency	Percent
1	Several times daily	142	36
2	One or two times a day	174	45
3	Never	75	19
	Total	**392**	**100**

Table 10 shows that 36% of the respondents used these screen devices often times in a day for entertainment purposes; 45% used them once or two times in a day, while 19% did not use these devices on a daily basis for entertainment purposes.

Respondents' Academic Performance

Items 15-18 in the questionnaire were used to determine the respondents' academic performance. The findings are presented in the following tables:

Table 11: Respondents' Screen Media Use for Academic Purposes

	Variable	Frequency	Percent
1	Several times a day	26	33
2	One or two times a day	237	60
3	Never	129	7
	Total	**392**	**100**

The data in Table 11 shows that 60% of the respondents used these screen devices frequently for academic purposes, 33% used them occasionally, while 7% did not use them for academic purposes on a daily basis.

Table 12: Respondents' Daily Study Time

	Variable	Frequency	Percent
1	Two hours and less	249	64
2	Two to four hours	102	26
3	Four hours and above	37	10
	Total	**392**	**100**

Table 12 reveals that 64% of the respondents' spent two hours or less, studying their books; 26% spent two to four hours, while 10% spent four hours and more on their daily studies.

Table 13: Respondents' Daily Reading Time

	Variable	Frequency	Percent
1	Two hours and less	117	30
2	Two to four hours	199	51
3	Four hours and above	76	19
	Total	**392**	**100**

Table 13 shows that 30% of the respondents spent two hours and less reading in a day; 51% spent two hours and more; and, 19% spent four hours and above reading on a daily basis.

Table 14: Respondents' Grade in School

	Variable	Frequency	Percent
1	Average	122	31
2	Above average	214	55
3	Below average	56	14
	Total	**392**	**100**

In Table 14, 31% of the respondents' were on an average grade point in school; 55% were above average, while 14% were below average.

Parental Restriction of Adolescents' Screen Time

Question items 19 and 20 were employed to verify if parents curtailed adolescents' screen time and at what rate they did so. The findings are as presented below:

Table 15: Respondents' Parental Restriction of Screen Time

	Variable	Frequency	Percent
1	Yes	122	31
2	No	270	69
	Total	**392**	**100**

Table 15, highlights that 31% of the respondents' parents or guardians restricted the screen media usage of their children and wards while 69% did not.

Table 16: Rate of Parental Restriction of Adolescents' Screen Time

	Variable	Frequency	Percent
1	Always	22	22
2	Sometimes	92	71
3	Never	8	7
	Total	**122**	**100**

In Table 16 shows that, 22% of the respondents were often curtailed by their parents while engaging in screen activities; 71% were occasionally curtailed, while 7% were never restricted by their parents or guardians during screen time.

Awareness of and Possible Health Implications of Too Much Screen Time

The In-School adolescents' awareness of screen related health concerns the health implications that come from excessive screen time were measured using question items 21-26 in the questionnaire. The data generated are as presented below.

Table 17: Respondents' Awareness of Screen Related Health Concerns

	Variable	Frequency	Percent
1	No	173	44
2	Yes	219	56
	Total	**392**	**100**

Data in Table 17 show that 44% of the respondents were aware that excessive time spent on screen devices could possibly lead to health issues like obesity; 56% were not aware.

Table 18: Respondents' Food/Substance Intake While Screening

	Variable	Frequency	Percent
1	No	93	24
2	Yes	299	66
	Total	**392**	**100**

Table 18 shows that, when asked if they ate food or drank while engaging in screen activities, 24% of the respondents said "No", while 66% were affirmative.

Table 19: Respondents' Type of Food and Substance Intake While Screening

	Variable	Frequency	Percent
1	Snacks	138	46
2	Cooked food	57	20
3	Sweetened beverages	104	34
	Total	**299**	**100**

Table 19 reveals that 46% of the respondents took snacks while engaging in screen activities; 20% ate cooked food, while 34% took sweetened beverages. This indicates that the respondents that ate snacks and took sweetened beverages are at a higher risk of being obese or overweight.

Table 20: Respondents' Eye Condition after Exposing Them to Screen Devices

	Variable	Frequency	Percent
1	Yes	196	50
2	No	196	50
	Total	**392**	**100**

Table 20 highlighted an equal representation of the respondents that encountered itchy eyes during or after engaging in screen activities and those that did not. Thus, 50% experienced itchy eyes while 50% did not.

Table 21: Respondents' Experience of Weakness after Engaging in Screen Activities

	Variable	Frequency	Percent
1	Yes	247	63
2	No	145	37
	Total	**392**	**100**

In respondents' experience of weakness after engaging in screen activities, Table 21 shows that 37% felt weak, while 63% did not feel weak after engaging in screen activities.

Table 22: Rate at Which Respondents' Experience Weakness after Engaging in Screen Activities

	Variable	Frequency	Percent
1	Always	186	20
2	Sometimes	62	71
3	Rarely	28	9
	Total	**247**	**100**

Table 22 indicates that 20% of the respondents regularly felt weak after playing video games, chatting with their phones or watching TV; 71% occasionally felt weak, while a handful, 9% rarely felt weak after engaging in screen activities.

Discussion of Findings

This study had four specific objectives: 1) to assess in-school adolescents' ownership of and access to electronic devices with screens; 2) to determine the rate of adolescents' daily screen media usage; 3) to determine variables that affect screen media usage among adolescents; 4) to ascertain if adolescents' exposure to screen devices could influence their

health and academic pursuit. The four research questions posed in this study revolved around these objectives.

The first research question of this study was to determine the electronic devices with screens, which In-School adolescents' owned and could easily access. This was relevant in the quest to determine adolescents' screen time.

From the analyses in Tables 1, 2, 3 and 4, it was evident that adolescents' ownership of screen devices like phones and video games was relatively low, though their access to the Internet was moderate, except for TV that had a high viewing rate at 97%. This could be linked to the socio-economic status of their parents/ guardians which was high with 70% response. This is contrary to the findings of the study which reported that about 86% of the high school students they surveyed had Internet access at home, while 75% reported having speed Internet access. [7]

Varying cultural beliefs and the socio-economic status of both the parents and students could account for the disparity between the findings of this present study and the findings reported in the foregoing cited study.

The second research question of this study sought to find out the rate at which secondary school adolescents' used screen technology i.e. videogame, TV, phone and the internet and at what rate they used them for various purposes on a daily basis. The secondary school adolescents' daily exposure to TV screens for two hours and less was 68% based on the findings of this study; 23% agreed to spending more than two hours on TV screens, while 9% of those that had access to television spent huge amount of four hours above on a daily basis. Table 5 revealed that 55% of the respondents' accessed the internet for a minimum amount of time. For the adolescents' daily phone usage, 60% spent two hours and less, while Table 7 revealed that 68% of those that played videogame on a daily basis spent a maximum amount of two to four hours on videogame consoles.

Table 8 shows that a relative number of the respondents'46% spent time on screen devices severally in a day for social purpose, 42% occasionally spent time on these screens, while 11% did not. Table 14 shows that 60% spent time on screens for education purpose several times daily. And in Table 9, 45% spent a minimum time on screens, 36% spent time severally, while 19% rarely spent time in a day on these screen devices for engaging in entertainment activities.

The third research question was to determine if there were variables that influenced the respondents' choice and use of screen media. . From the analysis in Figure 1, 2, 3 and Table 4, it was clearly indicated that the socio-economic status of parents or guardians of the respondents', which is mostly average contributed to in-school adolescents' screen media ownership and accessibility, this explains the 97% ownership and accessibility to TV sets in their homes. Also, parental restriction of the respondents' screen time which is of utmost importance in curtailing adolescents' daily screen time was examined and the findings as presented in Tables 14 and 15 reveals that only a handful(31%) of the parents restricted their children's screen time, and 71% of them did so occasionally.

Finally, the fourth research question sought to find out if secondary school students screen exposure could impact their health and academic pursuit in negative ways. The analyses of the health consequences of excessive screen time on the respondents, show they often encountered some unhealthy health behaviour while engaging in screen time activities that could possibly result in serious health issues; 66% of the respondents, for instance, either ate or drank during screen time, 46% and 34% of which are snacks and sweetened beverages, respectively; high in calories and sugar content. An average number 50% also recorded encountering itchy eyes during screen time and this could lead to serious eye defects like eye strain. Prominent among

the respondents' was the occasional encounter of fatigue and weakness during and after screen time among 63% of the respondents while 71% regularly experienced this challenge.

In relation to the respondents' study time, reading time and overall grade in school, Table 11, 12 and 13 highlight that 64% of the respondents' spent a moderate time of two hours and less studying in a day; 51% spent maximum time of two to four hours reading in a day. Fifty-five percent, 31% and 14% of the respondents' had above average, average and below average as their overall grade in school.

Conclusion

This study used selected survey questions to establish whether in-school adolescents' constant exposure to screen technology could result into health issues like childhood obesity, digital eye strain and insomnia.

The major finding of the study suggests that the target audience was moderately exposed to screen devices and they often encountered some health symptoms that could lead to serious health concerns like obesity, though majority of the respondents are aware of constant screen exposure's health implications.

This leads to the conclusion that for the target audience studied, excessive screen time when not restricted by parents, guardians, educators and even the adolescents' themselves could lead to the displacement of more important developmental activities like studying, reading and non screen play, which are of greater benefit.

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