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What Are Preadolescent Readers Doing Online? A Survey of Upper Elementary Students' Digital Reading, Writing, and Communication

by Amy C. Hutchison, Lindsay Woodward, and Jamie Colwell

Digital technology provides increasingly unique and versatile opportunities and contexts for reading, writing, and communicating. Thus, teachers need to be supported to integrate digital technology into literacy instruction to support students' development of the full range of literacy skills, build on students' knowledge and skills, and prepare students to be digitally literate.

The purpose of this study was to learn more about preadolescent students' digital literacy skills practices and preferences, including:

- how preadolescent students read, write, and communicate with digital tools, both in school and outside of school, and how skilled they are at these activities; and
- gender differences in students' online literacy activities and skills.

By better understanding preadolescent students' digital literacy practices and preferences, we can better determine how digital technology can be integrated into instruction to meet their needs and help them develop the skills needed to be literate in a 21st-century world.

Technology Use Inside and Outside of School

Students often have rich and active digitally literate lives outside of school (Alvermann et al., 2012; Stewart, 2014), regularly engaging in a wide variety of online reading and writing activities in their leisure time. However, digital

Recommendations for Teachers

(see pp. 4 and 7 for more details)

- ◆ Provide students opportunities to participate in online activities in which they provide information or create content.
- ◆ Provide students with social media experience in school settings.
- ◆ Begin instruction in Internet navigation, reading, and writing in earlier grades.
- ◆ Help students become informed and critical consumers of online images and videos.
- ◆ Encourage girls to see themselves as more capable technology users.
- ◆ Use digital technology to get male students more interested in reading.

technology is integrated into literacy instruction less often than expected, given its ubiquity (Hutchison & Reinking, 2011). Teachers should consider students' out-of-school uses of digital technology as viable literacy practices that should be brought into the classroom (Hutchison & Henry, 2010).

Gender Differences in Technology Use

Multiple studies have demonstrated that among secondary and college students, females *perceive* themselves as less able than males to use computers fluently and expertly. However, no significant differences have been reported between males' and females' *actual* computer skills (e.g., Bunz, Curry, & Voon, 2007; Koch, Müller, & Sieverding, 2008). Examining whether this gender discrepancy in perceived digital skills exists among preadolescents may reveal when it emerges and provide an opportunity to change classroom practices accordingly.

RESEARCH QUESTIONS

This study had three research questions:

1. How skilled are preadolescent students at reading and writing online?
2. What types of Internet activities do preadolescents engage in inside and outside of school?
3. Are there gender differences in preadolescent students' Internet activities and skills?

METHODS

A survey was conducted in five schools in a suburban Midwestern district, which was selected because it had a one-to-one technology program in which students received a Chromebook for both in-school and out-of-school use. The survey was administered to fourth- and fifth-grade students in the district ($n = 1,262$) in fall 2014. **Table 1** provides a profile of the participants.

An updated version of the Survey of Internet Use and Online Reading (Hutchison & Henry, 2010) was used in this study. It assesses both the types of tools students use to read, write, and communicate online; and students' abilities to navigate digital environments and

locate, evaluate, synthesize, and communicate digital information.

RESULTS

How Skilled are Preadolescent Students at Reading and Writing Online?

Students were asked to rate themselves from 1 (*beginner*) to 7 (*expert*) on a range of digital literacy activities (see **Table 2**). Overall, students perceived themselves to be most skilled at using a computer in general and least skilled at typing homework assignments. Males felt they were more skilled at searching for information online and telling someone else about something that they read on the Internet; females felt they were more skilled at typing homework assignments.

Students were also asked to complete digital tasks gauging their knowledge of digital terms and their Internet search, evaluation, and communication skills (see **Table 3**).

Scores from each item in Table 3 were totaled to create a composite score to represent each student's overall level of digital skills. A total score of 27 was possible. The mean score for all students was 13.61, indicating that these students were moderately skilled at navigating, reading, and writing online. The mean score was 14.43 for females and 12.69 for males; the mean score for females was significantly higher.

What Types of Internet Activities Do Preadolescents Engage in Inside and Outside of School?

Students were asked how often they use the Internet for a variety of literacy activities both inside and outside of school: 0 (*never*), 1 (*less than once a week*), 2 (*once a week*), 3 (*2-3 times a week*), 4 (*once a day*), and 5 (*several times a day*) (see **Table 4**). For all but 4 of the 23 activities, there was a statistically significant difference in the extent to which students participated in each activity in school and outside of school; they participated in 12 of the 19 significantly different activities more frequently at school.

Text continued on p. 4

Table 1. Profile of Participants ($n = 1,262$)

		Number of respondents	Percentage of all respondents
Gender	Male	614	48.7%
	Female	648	51.3%
Grade	4	565	44.8%
	5	697	55.2%
Race/ethnicity	White (European American)	1,031	81.6%
	African American	32	2.5%
	Latino	26	2.1%
	Asian/Pacific Islander	26	2.1%
	Multiracial	38	3.0%
	Other	109	8.7%
Digital device in the home	Yes	1,247	99.0%
	No	15	1.0%
Has a digital device of their own	Yes	1,121	88.8%
	No	141	11.2%
Where they use the Internet	School	1,147	87.1%
	Home	1,203	91.6%
	Public library	359	27.1%
	Relative's house	729	56.0%
	Friend's house	712	55.4%
	Other	124	9.4%
Amount of time using digital device in the past year	Has increased	532	42.4%
	Has decreased	206	16.3%
	Has stayed the same	505	40.0%
	Unknown	19	1.3%

Table 2. Students' Self-Perceptions of Digital Skills

Digital activity	Mean (standard deviation)
Using a computer, tablet, or smartphone in general	5.99 (1.71)
Using the Internet in general	5.85 (1.67)
Reading information online	5.24 (1.70)
Searching for information online	5.22 (1.61) ^a
Using the Internet to answer a question	4.92 (1.89)
Writing and sending text messages	4.62 (2.28)
Telling someone else about something you read on the Internet	4.33 (2.10) ^a
Typing homework assignments	4.12 (2.14) ^b

^a Males perceived themselves as more skilled at this activity, $p < .01$.

^b Females perceived themselves as more skilled at this activity, $p < .01$.

DISCUSSION & RECOMMENDATIONS

Technology Use In and Outside of School

These students participated in many digital activities in school, and they participated in more than half of the activities significantly more often in school than out of school. However, many of the activities in which students engaged most frequently at school involved consumption of information rather than engagement in creative media production. (Students also did not frequently engage in such activities outside of school.)

⇒ **Provide opportunities for students to participate in online activities in which they are themselves sources of information or creators of content.**

Social network activities were among the least common activities reported. Certainly, this makes sense since many social network sites require that users be 13. However, engaging preadolescents in social media in the school environment might help them develop useful skills and behaviors for navigating social media in the future.

⇒ **Provide students with social media experience by using education-based sites such as Edmodo in school settings.**

These students were somewhat skilled at navigating, reading, and writing online. Even when they did not know formal procedures for these types of Internet activities, they invented alternative methods for locating and sharing information online.

⇒ **Since preadolescents may be more likely than adolescents to seek guidance and help from teachers and parents, begin instruction in Internet navigation, reading, and writing in earlier grades to promote students' development of Internet skills and prevent the development of improvised Internet practices.**

Students were not highly skilled at gathering information from images, but they frequently watched videos online when out-of-school. These skills are included in the Common Core State Standards (i.e., Reading Anchor Standard 7: "Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words"; NGA Center & CCSSO, 2010, p. 10) but have historically received little attention in the classroom.

⇒ **Help students become informed and critical consumers of online images and videos.**

Male and Female Use of Digital Tools

This survey consistently found male and female differences in use of digital tools.

Males reported that they engage in more kinds of digital activities than females both in and out of school, favoring digital activities that required the Internet and that were visually and graphically oriented. Males watched and created online videos and read fanfiction significantly more than females both in and out of school. (Although

Table 3. Items and Scores for Students' Knowledge of Digital Terms and Internet Search, Evaluation, and Communication Skills

	Question	Percentage answering correctly	Range of possible scores	Mean score (standard deviation)	Example of a student response
Knowledge of digital terms	1. "You are reading on this website and want to get back to the main starting page. Where would you click?" (accompanied by an image with keywords)	84.0%	0–1	0.89 (0.32)	NA (multiple choice)
	2. "You find this great website and your teacher asks, 'What is the URL?'" (accompanied by an image)	28.0%	0–1	0.30 (0.46)	NA (multiple choice)
	3. "Select the best definition for the word 'plugin' as it is used in this message:" (accompanied by an image of a message stating that a plugin is required)	31.7%	0–1	0.34 (0.47)	NA (multiple choice)
	4. "What will you need on your computer to read this file?" (accompanied by an image referring to a PDF reader)	12.4%	0–1	0.13 (0.34)	NA (multiple choice)
Internet search, evaluation, and communication skills	5. "Your teacher asks you to use the Internet for a research project about Ancient Egypt. Please write one question about what you'd like to discover about Ancient Egypt."	NA (rubric score)	0–3	1.66 (1.02)	"Why did the ancient Egyptians wrap up the dead and make mummies?"
	6. "Then, list two different keyword or search phrases you might use to help locate an answer to that question."	NA (rubric score)	0–3	1.47 (1.16)	"Ancient Egypt King Tut; History of Ancient Egypt"
	7. "If you were looking for information about Ancient Egypt to write a report in Social Studies, which website would be likely to give you the most useful and reliable information?" (accompanied by an image of website descriptions)	37.8%	0–1	0.40 (0.50)	NA (multiple choice)
	8. "Please rate the reliability of the following websites for information about the rainforest." (accompanied by a variety of URLs)	NA (multiple correct answers)	0–4	2.37 (0.91)	NA (multiple choice)
	9. "After searching, you found a lot of interesting information about Ancient Egypt on the Internet. Your teacher wants you to make a report to share with the class. What are some ways you could use your digital device to present your information and the sources you used?" (accompanied by an image showing options for sharing)	NA (rubric score)	0–3	1.09 (0.95)	"Make an Animoto Video with info on how many kings & queens of Egypt there were & who they were & at least 3 pics to make it interesting & educational."
	10. "What steps would you take to check if the information on this webpage is correct?" (accompanied by an image of a website)	NA (rubric score)	0–3	1.06 (1.00)	"See when it is published; copyright; Go to another website you know has true info to check & see if this page is false; WHO published it; Use your background knowledge"
	11. "You come across this screen when working in an app. What do the icons on this screen allow you to do?" (accompanied by an image showing options for sharing information from an app)	NA (rubric score)	0–3	0.88 (0.91)	"Mail it to someone through the internet. Tweet it. Send it through a message. Facebook."
	12. "Explain how you could share information from the app in the picture above with your teacher. Which method would you choose and what steps would you take to share the information?" (accompanied by an image showing options for sharing information from an app)	NA (rubric score)	0–3	0.72 (0.99)	"Mail; Click Mail; Type in your teachers email address/click her contact; click send"

NA = not applicable.

Table 4. Means and Standard Deviations of Frequency of Students' Digital Activities Inside and Outside of School

Digital activity	In-school frequency Mean (Standard Deviation)	Out-of-school frequency M (SD)	Difference between Ms
Creating a document (e.g., Word, Google Doc)	2.27 (1.60)	0.88 (1.33) ^a	1.39**
Gathering images online	1.61 (1.37)	1.28 (1.54)	0.32**
Creating images (e.g., drawing, using digital programs)	1.04 (1.25)	0.87 (1.41)	0.17**
Reading a digital book or story (e.g., online, on a Kindle, with a reading app)	1.23 (1.44)	1.19 (1.54)	0.05**
Watching a video online	2.11 (1.69) ^b	2.96 (1.81) ^b	-0.86**
Creating a video (e.g., to post on YouTube, with Jing)	0.47 (1.08) ^b	0.62 (1.32) ^b	-0.14**
Listening to information online (e.g., podcast)	1.32 (1.35)	0.94 (1.43) ^b	0.38**
Creating a multimedia presentation with images, sound, and text (e.g., with VoiceThread or Prezi)	0.99 (1.18) ^a	0.57 (1.17)	0.41**
Publishing information to social networking sites (e.g., Facebook, Edmodo)	0.49 (1.17)	0.67 (1.40)	-0.18**
Gathering information through social media (e.g., finding something out by searching Twitter or posting to Facebook)	0.57 (1.21)	0.60 (1.26)	-0.03
Posting or gathering resources through social bookmarking sites (e.g., Diigo, Pinterest)	0.63 (1.15)	0.56 (1.21) ^b	0.06
Using reference sites online (e.g., Dictionary.com, Wikipedia)	1.68 (1.46)	1.09 (1.43)	0.60**
Using a graphic organizer tool (e.g., Popplet, Inspiration)	0.90 (1.22)	0.43 (0.97)	0.48**
Writing or drawing on digital text (e.g., highlighting or making notes using Evernote or Diigo)	1.04 (1.39)	0.66 (1.23)	0.39**
Submitting work online (e.g., using Google Drive or Dropbox)	1.69 (1.63)	0.79 (1.33)	0.90**
Reading fanfiction	0.59 (1.18) ^b	0.53 (1.18) ^b	0.07
Writing and publishing fanfiction	0.54 (1.14)	0.34 (0.97) ^b	0.22**
Using iPad apps to practice a lesson (e.g., spelling, math)	1.10 (1.47)	1.01 (1.44)	0.12**
Using iPad apps to create products that use images	0.51 (1.12)	0.62 (1.30)	-0.10**
Using iPad apps to create products that use sound recordings	0.50 (1.10)	0.65 (1.31)	-0.15**
Using iPad apps to create products that use text, images, video, and/or audio together	0.62 (1.19)	0.76 (1.39)	-0.14**
Searching for information online	2.70 (1.55)	2.05 (1.67)	0.66**
Collaborating or chatting online with students from other classes	0.60 (1.23)	1.53 (1.91)	-0.92**

^a Females reported a significantly higher *M* frequency than males for that activity, $p = .05$.

^b Males reported a significantly higher *M* frequency than females for that activity, $p = .05$.

** $p < .01$.

fanfiction is often prose-based, it can also include graphic representations of text.) Males were also more likely to engage in online activity that required searching for or reading information.

Females engaged in school-associated tasks, even in out-of-school settings, more often than males, creating multimedia presentations and documents more often than males and engaging in activities that were more traditional in their use of prose and traditional text. Girls perceived themselves as less skilled at digital reading activities. Although males more perceived themselves as skilled at searching for and communicating information online, females were actually more skilled.

This study indicates the need for continued attention to the equitable treatment of males and females in the classroom.

- ⇒ **Encourage girls to assess their digital skills more accurately, helping them see themselves as more capable users of technology and making them more likely to pursue digital activities.**
- ⇒ **Recognize that digital technology may serve as a gateway to get boys more interested in reading.**
- ⇒ **Provide opportunities for girls to see females engaging with technology competently and encourage girls to explore digital tools in collaborative, noncompetitive ways.**

By becoming aware of the ways in which preadolescent students are already using digital technology and the gender differences in these uses, teachers can design their instruction to support all students in developing essential literacy skills.

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