

Rural High School Students' Digital Literacy

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Abstract

The influence of technology and digital resources on students' literacy continues to grow along with the increased prevalence of technology in the world today. Although elementary and middle year students' literacy has been examined, a gap exists in the literature regarding high school students' literacy, especially their digital literacy. This research examined the literacy habits and activities of Grade 10 and 12 students from 16 composite and high schools within a Rural Canadian School division. 424 students ($M_{age}=16$ years) completed a survey regarding the frequency of their literacy activities with a focus on their digital literacy habits. Results of the research show potential for increased use of digital technologies and literacy texts in and out of classrooms. Recommendations include supporting digital literacy for rural high school students by increasing opportunities to use new technologies in the classroom and encouraging teachers to use a variety of print and digital literary texts.

Keywords: digital literacy, literacy, technology, rural, education, teacher education

Learning what students are doing with technology is important for many reasons. It helps us create curriculum, resources, and learning environments where all learners can find success. Developing these three areas is important at all ages and grade levels. Research activity into students' literacy in elementary and middle years as it is at these stages of school where learners are in their earliest development. Far less literacy research on high school students has been conducted and even less research has examined rural students' high school literacy. The limited amount of research in high school settings may be based on the belief that students know all they have to about reading and interacting with information when they are in their upper years. Such a research imbalance negatively impacts a comprehensive approach to literacy and technology in the rural pre-kindergarten to Grade 12 learning environment. At the high school level there is still a need to have thorough knowledge and understanding of students' literacy for administrators, teachers, and students to discover what these groups are reading and learning. Radical changes in technology have created a significant new area in high school literacy. To investigate high school digital literacy, a survey was designed and conducted in a rural Saskatchewan school division. The findings generated from the survey are designed to share a snapshot of current rural high school students' literacy and technology preference and practices. It is hoped that teachers, administrators, and parents will find the results useful in charting an effective future course for students in rural high school settings. Specifically, the purpose of this research was to: (a) examine the digital literacy choices of rural adolescents; (b) uncover how technology is a part of their lives both in and out of school and, (c) provide teachers and administrators with information to improve the learning experience for high school students. Studying the results will support a better understanding of high school students' habits and daily activities related to literacy and the use of technology. Knowing more about high school

students' literacy and technology activities is a key part of long term planning for Rural School Divisions in regards to best serving the needs of their students.

Theoretical Foundation

This research is driven by an understanding that learning options for students are changing at a rate faster than ever before. Students are studying in more flexible environments with a variety of different literary texts and communication tools (e.g., smart phone, tablets, social media). Students are learning in a way that is mobile and they are working and learning outside of traditional educational contexts. They are growing up in a world that is constantly connected through many different systems and strategies. To keep pace with this change, now and in the future, senior students need to further develop what people are calling “21st Century Skills” (Binkley et al., 2012). Not only do learners need to develop reading and writing skills but they also need to learn to manage technology, cooperate, and prepare for more flexibility in their learning (Glaus, 2014).

A new generation of Canadians is engaging with literacy and learning on an individual and societal level. Reading technologies, other than traditional printed material, such as smart phones, iPads, and tablets are becoming part of radical changes to how young Canadians interact with information inside and outside of schools. Along with the change in students, “advances in technology are having a profound impact on Canada’s educational system” (Industry Canada, 2014, para. 1), impacting traditional structures and opening up new channels for learning. Despite a view that this generation is Canada’s best hope for a successful future, some believe that a skills divide is emerging in young people’s new digital reading processes where standards of comprehension and critical thinking are being lost (Eaton, 2011; Employment and Social Development Canada, 2014; HRSDC, 2003). It is vital, then, to understand the impact of digital

technologies on young Canadians' reading literacy and the current study aims to provide a foundation of understanding of rural students' literacy.

This new generation of Canadian students is entering a world in which more and more people are connected through various digital technologies (Palfrey & Gasser, 2008). Canada is one of the most wired country in the world, embracing digital technologies in all of their most recent manifestations (Chambers, 2003; Peterson & McClay, 2007). Digital media and associated devices are part of this new generation's daily fabric of learning, play, and socialization (Ito et al., 2008). Characterized as the "born digital" generation (Palfrey & Gasser, 2008), "Today's graduating students face technological competencies that emphasize the capacity for innovation, leadership, multi-disciplinary collaboration, collective problem identification, resolution in a dynamic, digital environment" (Greenhow, Robelia, & Hughes, 2009, p.248). Bolter (2001) writes that our wireless networked culture, with its varied forms of digital text, gives readers the opportunity to "redefine cultural ideals inherited from printed genres and forms" (p. 208). As a result, young Canadians have more choices about how and where they spend their learning time; constructing meaning "in ways that are increasingly multi-modal – in which written-linguistic modes of meaning are part and parcel of visual, audio, and spatial patterns of meaning" (Cope & Kalantzis, 2000, p. 5). Students have increased opportunities to employ new technologies that are deemed important for future economic productivity, while teachers are increasingly pressed to evaluate how and when to use new technologies within the curriculum and learning activities of the classroom. Indeed, the past decade has witnessed tremendous changes to communication technologies that have brought about important shifts in understanding what it means to be literate (Cope & Kalantzis 2000, 2009; Lankshear & Knobel, 2006), as well as young people's

reading and learning practices (Chandler-Olcott & Mahar, 2003; Moje, Overby, Tysvaer & Morris, 2008).

Traditionally, *literacy* has been viewed as a set of discrete skills, such as decoding print on a page, that can be key to realizing one's full economic and social potential. *Literacy*, then, may be broadly defined as:

“The ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society” (UNESCO, 2004, p. 13).

Reading literacy, as defined by the OECD (2010), includes a wide range of cognitive competencies, from basic decoding, to knowledge of words, grammar and larger linguistic and textual structures and features, to knowledge about the world. It also includes meta-cognitive competencies; the awareness of and ability to use a variety of appropriate strategies when processing texts. Supplementing these definitions of what it means to be literate, the *multiliteracies* framework (Cope & Kalantzis, 2000; New London Group, 1996) that this study employs, acknowledges an emerging cultural, institutional and global order that engages through a range of technologies, increased mobility, and global interconnectedness. It forwards that meaning is constructed socially through increasingly multimodal texts and emphasizes the affordances of critical stances for transformative purposes (Cope & Kalantzis, 2000; New London Group, 1996). Within this theoretical framework, the participating researchers acknowledge not only the cognitive, affective, and psychomotor competencies, but also the

social-constructive, multi-modal, and critical nature of young people's emergent *reading literacy*.

Schools are being challenged to keep up with these many changes in youth's literacy practices (Dobson, 2007; Peterson & McClay, 2007). The issue is especially important in rural settings where access to information can be difficult and resources are more limited than urban centers. Peterson (2011) points out a need for more research to find ways to support rural writing development in middle years and high school (Barter, 2013). Providing reading choice for students will also encourage and support literacy development (Morgan & Wagner, 2013). Taking the opportunity to connect what adolescent students are doing outside of regular classroom time may also help strengthen classroom practice (Skerrett & Bomer, 2011). The current research samples students' literacy activities both in and outside of school to elucidate those activities that might be implemented or utilized in the classroom to support student learning.

An understanding of young peoples' reading literacy is particularly vital in a digital economy organized and managed primarily by digital immigrants. *Digital immigrants* are those individuals who were born before 1990 and who have had to adapt to, rather than be born into, a digital-based society (Prensky, 2001). Literacy and educational researchers, such as Merchant (2008), recognize that it is therefore difficult for contemporary institutions to decide "... which dispositions, values, and practices will remain important and which new ones may be required... a struggle between the valorization of traditional routines and the lure of radically different futures" (p. 751). By examining the emerging literacy of Canadian youth, researchers and practitioners will be better informed regarding the literacy practices that youth deem important,

and will be better able to make decisions regarding the use of technology and digital texts both in and outside of the classroom.

Some worry that new technologies are part of a generational rift, and a dangerous turn away from accepted standards for knowledge, literacy, and civic engagement (Ito et al., 2008). This is troubling for those of an older generation of educators and employers who have invested much of their understandings of the word and the world through the page. As Striphas (2009) suggests in *The Late Age of Print* "... digital texts appear to some as harbingers of loss—of knowledge, authority, history, artistry, and meaning" (p. 22).

Revised language and literacy curricula across Canada have also included expanded notions of text and *multiliteracies* (Cope & Kalantzis, 2000) within their considerations for delivery and prescribed learning outcomes throughout the past decade. The term *multiliteracies* refers to the multiple means of communication available both personally (e.g., text messaging) and through media (e.g., social networking), as well as the increased prominence of cultural and linguistic diversity that also affects literacy. A number of studies have examined new literacy and multiliterate practices within elementary and middle years classrooms. Such studies include: Peterson and McClay's (2007) pan-Canadian inquiry into middle years students' and teachers' classroom writing practices; Siemens, Warwick, Cunningham, Dobson, Galey, Ruecker, and the INKE Team's (2009) international and interdisciplinary collaborative research project that examined user/reader experiences with a wide range of digital and non-digital textual artefacts; and Rowsell and Burke's (2009) case-studies which examined the situated digital reading practices of three selected middle school literacy learners. Yet, the impact of digital technologies on young Canadians' reading literacy - what changes are occurring to students' cognitive, affective, psychomotor and social reading competencies - have yet to be investigated at the

secondary level. There is a pressing need for empirically-based insights into the impact of digital reading technologies on literacy and learning as the next generation of young Canadians enters into post-secondary studies.

This research approaches the many possibilities of literacy learning for adolescents. This topic has not attracted much research attention until now, in contrast to the reading processes and instruction of younger students (Graham, McKeown, Kihara & Harris, 2012; Marinak, 2013; Pressley & Allington, 2014; Roe, Smith & Burns, 2011). It is an important topic because reading and literacy development do not stop at the age of 12, and the changes that adolescent and young adult students go through have important implications for the approaches taken in education. This research examines one aspect of the digital communications revolution with the ultimate aim to have the knowledge gained from this study result in recommendations for educational policy, teacher education, and developments in the publishing industry.

Method

A total of 430 surveys were returned for analysis. Six participants' data were excluded from entry due to failure to follow instructions.

Participants

All grade 10 and 12 students ($n = 850$) from the 16 high- and composite schools within Sun West School Division (Saskatchewan, Canada) were invited to participate in the survey. Of the 424 ($M_{age} = 16.13$ years, $SD = 1.09$) participants in the sample, 173 (40.8%) were males. The majority (90.6%, $n = 384$) reported *English* as their first language with 6% ($n = 28$) of participants indicating that they speak a second language at home ($n = 9$ speak French).

Design

This research examined Grade 10 and 12 rural Saskatchewan students' perception of the importance of various digital technologies as well as their use of those technologies. Students' print and digital literacy practices were also examined along with general demographic variables. The survey consisted of a total of 119 questions encompassing the following areas of literacy: (a) *literacy self-perception* (e.g., self-assessed reading ability and enjoyment), (b) *exposure to technology* (e.g., access to digital technologies), (c) *technology use* (e.g., use and length of time spent using various digital technologies), (d) *literacy activity in school and outside of school* (e.g., digital and print reading choices in and outside of school), (e) *literacy control or influence* (e.g., who selects school reading, how much influence students should have in selections), and (f) *demographics* (e.g., age, grade, school).

Materials and Procedure

Following a pilot test of the measure ($n = 10$ Grade 10; $n = 10$ Grade 12 students), the survey was revised for clarity and understanding. In 2013, information for parents of prospective participants was provided that outlined the purpose and time commitment involved with their child's participation in the study. Older students consented to their participation independently while parents of younger children were free to decline their child's involvement; five parents opted their child out of participation. The revised survey was then provided to all of the high- and composite schools within the Sun West School Division in Saskatchewan, SK, Canada. Participants completed the survey independently during the school day and all anonymous responses were returned to the researcher. Each section of the survey is described in detail next.

(a) Literacy self-perceptions. The first section of the survey examined students' perceptions of their own reading and what mediums they use to complete their reading. Using a

series of 7-point Likert scales, participants provided self-report ratings of *reading ability* (1 = I do not read; 7 = I am an exceptional reader) and *enjoyment in reading for school and outside of school* (1 = I never enjoy reading for school/outside of school, 7 = I always enjoy reading for school/outside of school). Participants also indicated if they completed most of their reading using a computer, mobile device (e.g., cellular phone, iPod, tablets), or printed materials (e.g., books, magazines) and were then asked to rank order up to 10 of 20 different sources of material that they read the most (e.g., emails, text messages, magazines, poetry, etc.).

(b) Exposure to and use of technology. The second section of the survey examined students' exposure and accessibility to technology and the value that they placed on the use of technology. Participants were first asked how important the Internet was to them as a means of accessing information (1 = Not important at all, 7 = Extremely important) and then indicated which digital devices they (or their family) owned and/or had access to (e.g., desktop and laptop computers, cell phones, e-readers, tablets, iPods) and whether the devices were connected to the internet or not. Estimates of the daily time spent using each device was also provided by the students. Participants were asked to indicate whether these different devices were *brought to school*, if devices were *allowed in school*, and whether or not they *desired to bring* those devices to school. Participants also indicated what their top five activities to complete on their computers. This section of the survey ended by asking participants to self-rate their ability to use a list of digital devices (1 = No ability, 7 = Expert ability).

(d) Literacy activity inside and outside of school and outside of school. The next two sections inquired about students' literacy activity both in and out of school. Participants were to select from a list of items what they read and then to rank order their most important sources of information and reading material. Participants were asked to indicate if their most important

choice was more important than traditional books and to provided an open-ended response as to why they were or were not more important. Participants provided a self-report rating from 1 (Not important at all) to 7 (extremely important) regarding the importance of traditional books and digital resources.

The section involving literacy activities in school also asked participants to rate how important each of ten items in a list of digital devices was in supporting their understanding or learning of school content. Participants also provided an open-ended statement regarding how their selected digital devices support their learning, whether students were allowed to look up additional information on digital devices during lectures and whether or not such activities help or hurt understanding.

(e) Literacy control and influence. This section of the survey sought to evaluate a number of areas of participants' choice and control over their literacy practices both in and out of school. Participants were asked to indicate which sources of information they used, as well as to rank order the items according to frequency of use, both in and out of school. Participants' opinions regarding why the items they deemed as most important to them were also sought through open-ended responses by asking "Why are [items] more important?"

The next section of this part of the survey required participants to indicate how important various technological devices were as a tool for supporting their learning/understanding of school content (1 = Not at all important, 7 = Extremely important) and how those devices supported their learning in an open-ended response question. Participants also indicated whether or not they used technological devices to look up information during classroom lectures, whether or not, and how this helped or hurt their understanding of classroom content.

A set of four questions then aimed to evaluate who (self, teacher, self & teacher together) selects classroom reading material, how much influence students should have in such selections (1 = None at all, 7 = Most possible), how important various individuals (classmates, friends, family, teachers, others) are in helping participants understand classroom concepts (1 = Not important at all, 7 = Most important)

(f) Demographics. The survey concluded with a number of demographic questions to help describe the participants in the study.

Results

Data were screened for completeness, outliers (scores $> \pm 2$ SD around the mean) those with $> 20\%$ missing data on any given section of the survey were excluded from analysis for that section. Outliers were excluded from descriptive analyses as they related to each section and six participants' data was removed from all analyses due to failure to follow the survey instructions.

(a) Literacy Self-Perceptions

On the 7-point scale, participants rated themselves as being relatively good readers overall, $M = 5.14$, $SD = 1.31$. The majority of participants indicated that they were *good* (5) to *exceptional* (7) readers ($n = 306$, 72.2%) while very few ($n = 8$, 1.9%) consider themselves to be *non-readers*.

The majority of participants ($n = 283$, 66.8%) reported that they sometimes, rarely, or never enjoy reading for school ($n = 170$, 40.1%, $n = 77$, 18.2%, and $n = 36$, 8.5%, respectively), while few ($n = 140$, 32.7%) reported enjoying school reading most of the time ($n = 118$, 27.8%) or always ($n = 22$, 5.2%). With regards to reading enjoyment outside of school, most students ($n = 261$, 61.6%) reported that they sometimes, rarely, or never enjoying such reading ($n = 108$, 25.5%, $n = 100$, 23.6%, and $n = 53$, 12.5%, respectively). Just over a third of the sample ($n =$

162, 38.2%) reported that they enjoyed reading outside of school either always ($n = 79$, 18.6%) or most of the ($n = 83$, 19.6%).

Table 1 summarizes the data regarding participants' top five reading material preferences as well as where those choices fit within participants' top three choices. Of the 15 choices listed, the formats with the fewest endorsements were e-zines (>1%), electronic newspaper articles (1%), graphic novels/comics (1%), e-graphic novels/comics (1%), and blogs (1%).

Table 1. Top five self-selected reading material outside of school. The total percentage of participants selecting each type of material as their "Top" (#1) choice, and among their top 3 choices are provided.

Content	As top choice (%)	In the top 3 (%)
Text messages	60	83
Books, printed material	18	44
Social networking sites	15	62
Online video	9	35
Instant Messaging	8	31

The number one literary activity for participants outside of school was clearly text messaging. Reading books and printed material was a distant second and social networking, although more commonly reported in the students' top three choices, was ranked third.

Technology Use, Exposure, and Access

On the 7 point scale, 88.3% ($n = 374$) of the sample reported that they found the internet to be an *important* (5) to *extremely important* (7) means of accessing information, $M = 5.80$, $SD = 1.16$. The devices that participants reported having access to and bringing with them to school are summarized in Table 2 along with the average reported daily use (hh:mm) and average self-rated proficiency of each device.

Table 2. Percentage of endorsements for each technological device that participants reported having access to (own it, have access to it), the connectivity of the devices, if the devices were allowed to be brought to school, whether participants brought allowable devices to school with them, participants average daily use, and participants' average reported proficiency using each device. Standard deviations are in parentheses.

Device	Own it (%)	No Access to it (%)	Connected to the Internet (%)	Bring it to School (%)	Not Allowed In School (%)	Average Daily Use (hh:mm)	Average Proficiency
Cell Phone	87.3	5.9	57.1	83.0	7.3	7:17 (6.21)	6.40 (1.07)
iPod	78.3	9.2	47.2	67.2	2.1	3:45 (5:06)	6.42 (1.23)
Windows Laptop	69.1	13.9	54.2	10.8	4.0	1:44 (1:43)	5.65 (1.55)
Windows computer	67.0	13.7	56.4	-	-	1:41 (2:30)	5.67 (1.46)
Tablet	35.6	35.4	29.2	7.8	2.4	1:40 (2:43)	6.31 (1.91)
E-reader	22.4	45.5	13.0	6.6	0.9	1:05 (0:54)	6.23 (2.37)
Mac Laptop	11.1	48.3	12.5	2.8	2.1	1:22 (1:22)	6.50 (2.15)
Mac Computer	9.2	50.2	8.3	-	-	0:48 (0:58)	6.50 (2.18)

The data showed definite trends related to student use of technologies and digital devices.

There are a variety of different technologies that large numbers of respondents owned or had access to. Most reported access to cell phones; windows based computers and laptops; iPads and iPods but little or no use of Mac desktops or laptops. Students overwhelmingly identified cell phones and iPods as the devices they most own and use.

Cell phone use was the most intensive with 30% of respondents saying they used their phone 8 hours or more a day with 6% reporting that they always had their phone on and with them. Forty-two percent said they used their iPod for two or more hours per day followed by Windows Laptop at 23% for two hours or more.

Participants' favourite activities to do on technological devices are provided in Table 3. Social networking (e.g., Facebook, Twitter) and watching various video media (e.g., YouTube, Netflix) were within the top three places for over 70% of the sample.

Table 3. Participants' favourite activities to do on technological devices.

Activity	Top 3 Total (%)
Social Networking, Facebook, Twitter	75
YouTube, Netflix, Watching videos	72
Finding information	22
Downloading/Listening to music	39
Gaming	21
Shopping	14
Communicating	13
Creative tasks	10
Reading	2

There were three activities which were clearly more popular than others: social networking, online video and music. Three quarters of students were engaged in activities related to Facebook, twitter, and YouTube. The other selections were made as participants' top choice but the responses were very low compared to the first five activities listed above.

Specific technologies were rated for how important they are for supporting student understanding of learning school content. Table 4 provides a summary of responses to the importance of different literacy material to students' learning in school.

Table 4. How important materials are for supporting student learning and understanding.

Material	Mean	Standard Deviation
Traditional Books	4.64	1.60
Desktop Computer (no internet access)	2.41	1.71
Desktop Computer (with internet access)	5.96	1.38
Laptop Computer (no internet access)	2.42	1.70
Laptop Computer (with internet access)	5.66	1.69
Cell Phone (no data package)	2.97	1.91
Cell Phone (with data package)	5.60	1.75
E-reader (no internet access)	2.51	1.87

Tablet Computer (no internet access)	2.94	2.08
Tablet Computer (with internet access)	4.49	2.19
iPod	4.26	2.15

range: 1 – 7 for all responses.

Participants were also asked if there was anything else to add about devices and how useful they were to them. Here is a selection of the thoughts they shared:

Without the Internet the devices are really useless.

Cell phones allow us to be contacted, look up info and find people.

If I did not have Internet access, I would not be able to do many of the required projects.

When asked how the device they rated as most important supports their learning they shared the following thoughts:

... my cell phone is always with me so if I need to know something outside of school I can look it up where ever I am.

With classes I'm taking online they are extremely important because if I don't have them I can't learn anything.

I use them for majority of the homework and research I do.

Literacy Activity

To examine trends and opportunities of literacy activity, students in the next section were asked two similar sets of questions. One set had them focus on what they did with reading and technology outside of school time while the second had them focus on what they did during their time in school. Table 5 provides a summary of the percentage of participants that endorsed using each material both in and outside of school.

Table 5. Literacy Activity Outside and Inside School.

Literacy Activity	Outside of School (%)	In School (%)
TV	86	9
Movies	85	34
Magazines	62	40
Online Movies (e.g., Netflix)	58	7
Books	58	81
Other Internet Content	39	39
Online TV Shows (e.g., CTV.ca)	30	11
Newspaper Articles	25	36
Blogs	15	16
Comics	14	7
E-Books (Electronic Books)	11	8
Online Newspaper Articles	9	34
Graphic Novels	9	13
Online/Electronic Comics	6	3
Online/Electronic Graphic Novels	3	2
E-Zines (Electronic Magazines)	2	3

When they were asked to rate the importance of a variety of sources of information outside of school the more traditional literary and multimedia texts were rated the highest. Television and movies were rated as the most popular literacy activities outside of school time by a considerable margin. Out of school students also spent time with magazines and books. When it came to activity outside of school there was little variety. Many of the traditional or most obvious choices were present. In school students are still using traditional texts including books. There was no one form of text that was a clear second choice.

Other Internet content represented a wide variety of websites and specific sources. Gaming was the only response that occurred more than once and made up an insignificant percentage. When asked if the most important choice they made in the previous list was more important than traditional books 42% reported that their choice was ‘more important’ whereas

35% said it was ‘equally important’ as traditional books. The following text is a sample of the reasons they gave to support their answers to the previous question:

I learn and remember things better when I observe rather than reading.

[More important] Because I have no access to printed informative materials outside of school.

It has easier access, more information, and is easier to understand than traditional printed materials.

I like the feel of books and magazines, but the Internet can get you more info faster.

When asked if they use their devices to look up information or images while the teacher is lecturing, most participants reported both benefits and drawbacks to such practices. Refer to Table 6 for a summary of the data and supporting open-ended responses.

Table 6. Use of Technology in School.

Use of technology during lectures	%	Examples of Participants’ Responses
I am not allowed to but would like to	25.2	<i>I think that phones are somewhat of a distraction, but all in all it comes down to a person knowing when it's appropriate to use it or when to pay attention to the teacher.</i>
Not allowed to and don’t want to	25.2	<i>Because if you are looking stuff up on a phone you are not listening to the lecture.</i>
Rarely	21.2	<i>It does not help because you could just start texting instead of learning. It does help because you can look up information if you need it.</i>
Sometimes	14.6	<i>It helps if I am getting the topic and then I am able to take it to the next level. But if I am confused it will only lose my concentration and make me more confused.</i>
Allowed to but don’t	7.5	<i>It helps sometimes but it’s easier to ask your teacher.</i>
Always	2.6	<i>If I see something like a picture it helps me remember what was taught at the time for better understanding.</i>

When participants were asked if this helped, hurt or sometimes helped and sometimes hurt their understanding of classroom content, 32.1% reported that it helps their understanding, 10.4% reported that it hurts their understanding, while 50.5% indicated that it sometimes helps and sometimes hurts their understanding.

Importance of digital resources. Participants deemed digital resources as relatively important to their learning both outside ($M = 5.19$, $SD = 1.36$) and inside of school ($M = 5.25$, $SD = 1.36$), $t(411) < 1$, $p = .554$. Traditional books however were deemed significantly less important to their learning outside of school ($M = 3.84$, $SD = 1.65$) than inside of school ($M = 4.65$, $SD = 1.60$), $t(405) = 1-.72$, $p < .001$. The range of responses was wide however, for both questions (*range*: 1 = not at all important to 7 = Extremely important).

To help qualify these results, participants' responses regarding why they felt that digital resources were or were not important both in and out of school were separated and entered into separate word clouds. Figures 1 and 2 provide summary of responses regarding the importance of digital materials in school and out of school, respectively. Figures 3 and 4 summarize responses that indicated that digital materials were not important both in and out of school, respectively.

Figure 1: Importance of digital resources in school.



Figure 2: Importance of digital resources outside of school



Figure 3: Why digital resources are not important in school

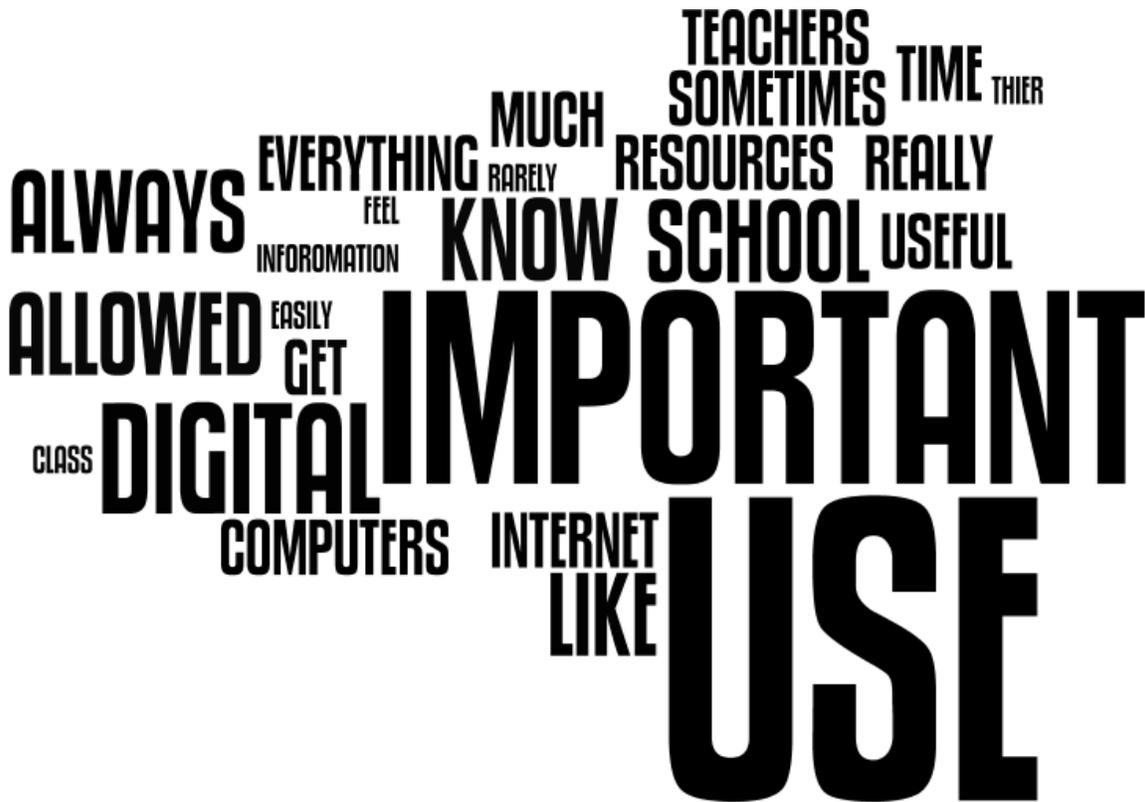


Figure 4: Why digital resources are not important outside of school.



Importance of traditional books. When asked how important traditional books were outside of school the results were more evenly distributed. Sixty-one percent reported books being ‘important to extremely’ important. 24% placed themselves in the middle of the scale while 22% were in the bottom two categories on the scale. When asked how important traditional books were inside school the results were more evenly distributed with 66% reporting very to extremely important. Ninety percent of participants felt traditional books were important for learning in school. The following word clouds provide a sample of the reasons students gave to support their answers regarding why traditional books are important both in (Figure 5) and outside of school (Figure 6). Figures 7 and 8 provide a summary of responses regarding the lack of importance of traditional books both in and out of school, respectively.

Figure 5: Why books are important in school.

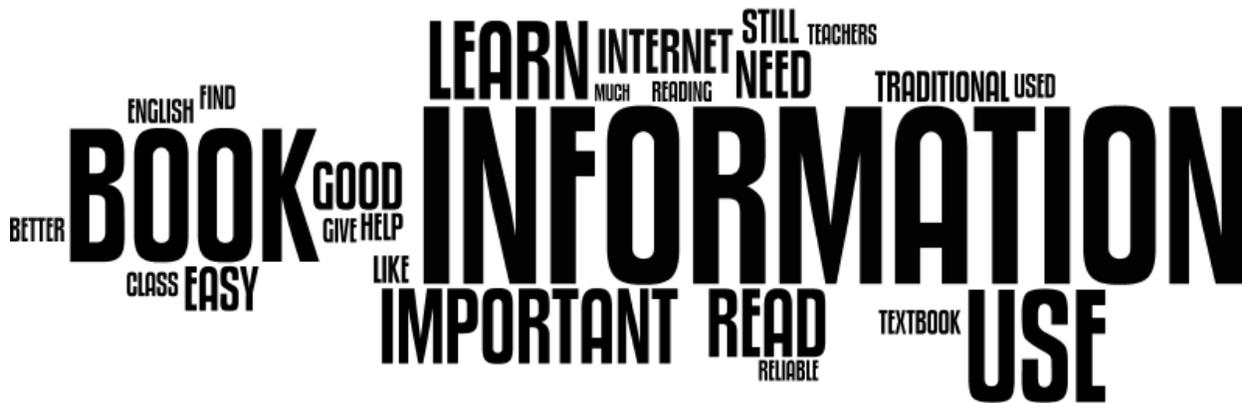


Figure 6: Why books are important out of school.

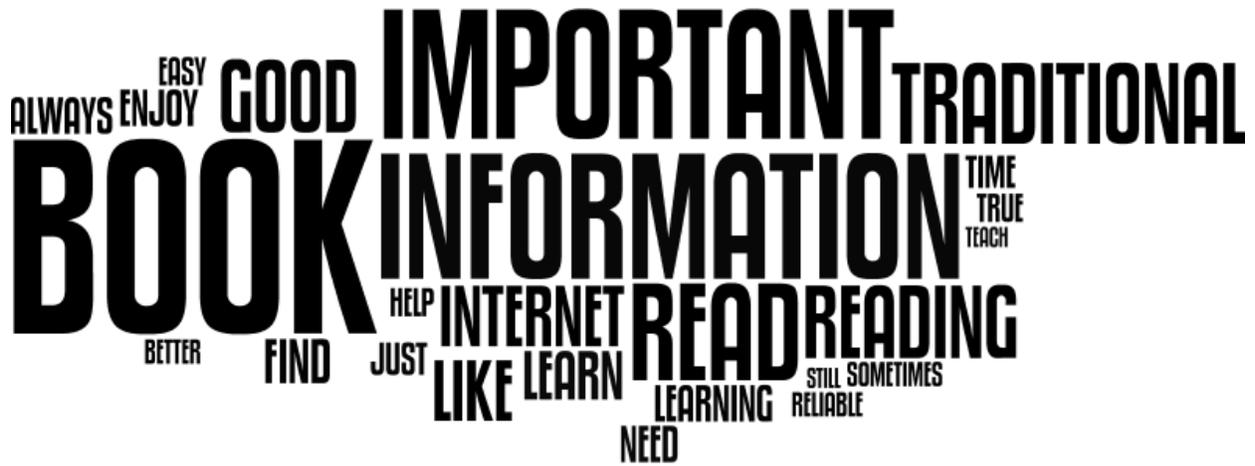
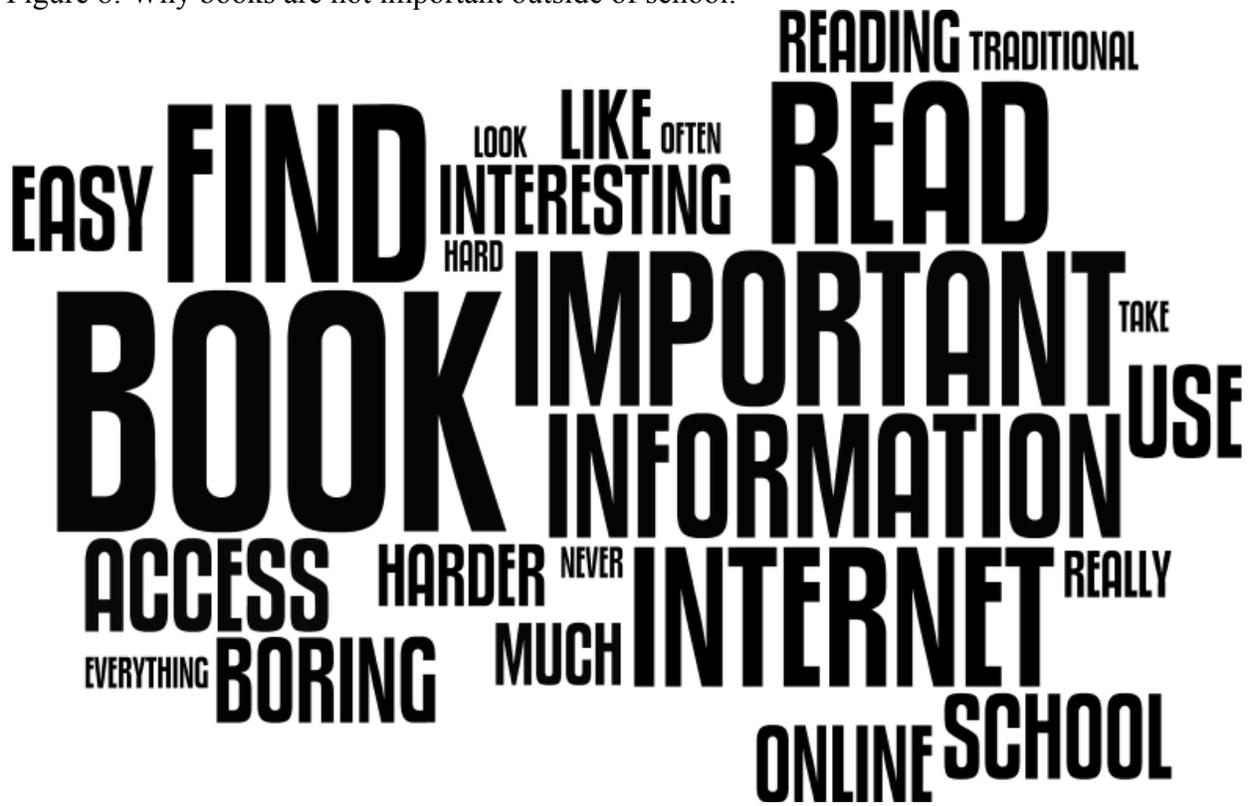


Figure 7: Why books are not important in school



Figure 8: Why books are not important outside of school.



When asked if the most important choice was more important than traditional books, 32% reported that their choice was more important. 38% said it was equally important as traditional books. 11% said printed materials were the most important choice. The following is a sample of the reasons they gave for their answer to the previous question:

Using Internet it's easier to find and access updated info on a wide range of topics.

Because it is faster, easier to work with and all the information is there you don't have to get another book.

As long as I am getting the correct info it doesn't matter.

The teacher should always be the primary source of information.

They may not personally be important to me, but they are the resources we're expected to use (books).

Literacy Control and Influence

With regards to who selects material to read for school, the majority of selections were done by the teacher (68%), followed by participants themselves (16.9%) and then the student and teacher together (14.9%). On a scale from 1 (none at all) to 7 (most possible), students indicated that they should have relatively equal input as the teacher in choosing what should be read for school, $M = 4.79$, $SD = 1.51$. To follow up these questions the participants were then asked how much input students should have in what is read in school. Thirty percent of respondents said 'very or most' possible. If you include 'occasionally and possible' the response goes up to 85%.

When asked who had the greatest impact on understanding classroom concepts participants ranked teachers as 'important to extremely important' 84% of the time. Friends ranked next at 65% followed by classmates (57%), family (54%), followed by others at (35%).

When asked who they share, comment or discuss course content with online friends was reported as the highest at 72%, classmates 51%, family 50%, teachers 33%, and students from other grades 32%. In this question online experts were ranked lowest at 4%.

Discussion

Research into the multiliteracies of the youth of today is a necessary step towards integrating and advancing technology in educational contexts. To help elucidate the literacy practices of high school students, the current study surveyed a large sample of rural Saskatchewan Grade 10 and Grade 12 students. Specifically, the research aims were (a) to examine the digital literacy choices of adolescents, (b) uncover how technology is a part of their lives both in and out of school, and (c) use the findings to provide teachers and administrators with information and options to improve the learning experiences for students.

Summary and Recommendations

The results of the research point to many clear themes connected to the original research questions. The overall response rate within each survey item was high. Students who completed the survey answered almost every question. When asked to provide qualitative feedback they shared thoughtful and personally relevant answers. The data shows us definite trends and choices made by the high school students. We see a group that is reading both at home and in school and who rate themselves as good to excellent readers. Despite the positive self-perceptions of technology ability they report that they are not using them intensively for traditional reading. At home they are connected to reading and literacy primarily through books and mobile devices. At home four of the top five reported literacy behaviours involved electronic or digital content. Reading text messages was the number one reported reading activity outside of school. The participants firmly supported the importance of being connected to the Internet.

Even with access to these technologies and belief that the Internet is important, reported home connectivity was not high as expected. When students accessed the Internet at school it was mostly through cell phones and iPods. When asked to report on their ability to use specific devices cell phones and iPods were the devices that they claimed to have the highest skill levels at using. Although they reported the ability to bring devices to school there is a sense from their responses that they are not embracing the full extent of 'bring your own device' (BYOD). They identified desktop computers, laptops and cell phones connected as the most important devices for supporting student understanding of content but only if the technologies were connected to the Internet. During classroom lectures they reported advantages to using technology to support their understanding but only if it did not act as a distraction.

Students reported an even distribution when asked how much time each day they spent on various devices. Cel phones topped the list with iPods also being popular. Some students were spending a minimum of eight hours a day with their phones on and at the ready. iPods were also a constant companion both in school and at home. They rated their technology skills quite high with the devices that they had access to and used regularly.

Facebook was the number one choice for close to half of the respondents when students were asked to rank their favourite online activity. Watching online video primarily through YouTube ranked as their second choice and finding information was third. Collectively, social networking was a top three choice for a large majority of the students. Watching online video and movies were also highly rated. The students' reported activities did not include high number of students using technology to read or complete creative tasks inside or outside of school

When asked about the types of content they used out of school, TV, movies, magazines, books, and online movies were all rated highly. These choices were also highly ranked for their

importance in contributing to student learning. When asked about what contributed to their learning in school, the traditional printed book was the choice with the strongest support. Other literary texts received below average scores. Overall students regarded digital resources and books as important for supporting instruction and learning both at school and at home.

Teachers still have an important role in the daily literacy of students. Participants reported that teachers determine what is being read in school most of the time but they also thought students should have more say. Teachers are also rated as the most important when it comes to assisting students in school. Online, friends become the most important form of support with teachers falling out of favour.

Recommendations

The findings from this research yield a variety of potential recommendations for administrators and teachers to enhance student learning. First, we recommend the development of policy related to devices in school use and expectations. If students are welcome to bring technology into the school how is it used? When is it used? What are the expectations around privacy? Participating students reported a welcome environment to bring in resources but are there any guidelines related to use of these devices?

Second, teachers need to incorporate ways to use technology to support communication and course content delivery. There is plenty of potential to embrace new opportunities through the creation of mobile content and reformatting existing content to work on mobile devices. Part of this strategy should include the creation text-messaging plans for emergencies and for school to home communication to improve overall school efficiency. Along with the promotion of technology use there needs to be development of programming that promotes healthy uses of technology. Raising student awareness related to healthy uses of technology contributes to the

overall positive lifestyle for students. Information and training around digital citizenship is important. Students need to be aware of the strengths and weaknesses of traditional and evolving technologies. School divisions must develop and offer professional development opportunities for teachers to explore the variety of literacy texts available both in traditional print and electronic format. Instead of the regular 'book fair,' this event may include an online publisher fair or connection with commercial organizations to display and promote their material. This work cannot take place unless schools provide teachers with appropriate technologies and other resources so they may find ways to innovatively integrate them into their classrooms. Schools should also ensure that libraries and learning commons have a variety of printed and electronic texts available both inside and outside the school. Keeping up with information means having a well-resourced library. Resources specifically designed for mobile devices can be used by students in classrooms and at home to support their learning. Connecting to educational online databases also provide a wealth of readily available information for students.

Promoting a variety of literacies to students through the activities of classroom teachers, librarians, and technology leaders would also be a good course of action. To accomplish this, a mix of traditional and non-traditional literacy texts should be used. This includes promotion of reading in general, regardless of the type of reading material, to help students find joy in all types of literature. A final recommendation in light of the current results would be to expose students to both Mac and PC platforms in order to broaden their skill set and enhance multimedia and visual arts creativity. For reasons of cost or lack of exposure, students have shown a low connection to and ability with Apple computers. Providing them with more exposure to the Apple platform, as well as supporting their skills on PCs, will allow them to take control of developing content instead of only consuming it on their phones and iPods.

Conclusions

The analysis of the data demonstrates many encouraging signs related to students' literacy and technology for teachers and administrators. Most students report a positive attitude towards technology and connecting with information through the technology. A significant majority of students have access to a form of technology both at home and in school. A lack of consistency exists in their sense of self in that they rate their skills and abilities as strong in some technologies but low in others.

Based on the reported solid foundation opportunities exist for teachers to make increased use of the technology students are bringing to the school. This opportunity may take the form of supplementing resources found in the library or connecting to the online services offered by school divisions and other providers. Before efforts related to technology and literacy are expanded it will be important to create policy so that technologies students are using can be integrated into their schoolwork. The data shows that schools are welcoming students to bring technology to school. What they are bringing to school may not be part of an organized bring your own device (BYOD) program but there is evidence that there are opportunities to create a BYOD program as students are informally taking advantage of the opportunities technology provides in the classroom. The feedback from students shows that there exists little opposition to bringing their own technology devices to school sends a positive message. There is still no evidence that teachers are making an effort to use smartphones and other mobile devices as part of instruction.

There is an opportunity to expose learners to a wider variety of sources of information to assist them both in and out of school. In particular more time could be spent exploring blogs, electronic newspaper and electronic novels, graphic novels and other online literature. An

awareness of these forms of literacy will help connect them to new concepts of reading, literacy, and textural forms.

Students are primarily reading text messages outside of school. This may be an important change to the communication that takes place between the school and students. It may also be an opportunity to create community between students. This finding also presents an opportunity to look at communication in general and how text messaging is and is not effective. By extension it may be safe to say that they are also reading text messages in school. Texting may be an innovative method to bridge learners into creative ways of sharing their work.

The survey of the technologies the students use or have access to also shows very definite outcomes. There is a definite divide between types of computer operating systems. Those who have access to desktop and laptop computers are mostly PC-based. There is very little Mac ownership or use. This changes when it comes to iPods and iPads where access and use are much higher. Use of iOS devices is high and almost all of the students reported possessing skills in using these mobile devices. This skillset shows there may be opportunities to incorporate more mobile technologies into the classroom for innovation and instruction. Providing equipment for in-school use would build on the skills the students are developing outside of existing formal technology programming. It also shows that it may be an opportunity to take advantage of content management systems such as iTunesU or YouTube to distribute content to students.

Students have access to hardware but reported access to the Internet at home appears to be lower than expected in rural areas. This may be a reason to modify requiring students to work online at home or flipping the classroom. A yearly survey of student home Internet access would be an important consideration for the division to help with communication and planning around digital homework or access to information outside of the schools. Information from local Internet

providers may help people to recognize the benefits of home Internet access for their students and families.

A majority of students report 'okay to excellent' technology skills but there is still a small but significant section that reported not being competent with using technology. As more and more information is available online and computers are found in most work environments it would be a goal to move that number closer to 100% when it comes to computer skills. There may be a need to develop more technology confidence and provide skill opportunities for these students.

Students reported spending many hours actively using their mobile devices and having these devices with them most of the time. Inside school the connection between what they value and what they are doing was not as strong. This outcome indicates that they need freedom to pursue the tasks that interest them when they are in school. The pervasiveness of the technology in students' daily lives also illustrates an need to develop information on healthy uses of technology and digital citizenship.

This survey does not look at the skills and habits of the teachers or specifically what they are doing in their classroom. A survey of teachers' technology initiatives may be a logical next step. With teachers having such a major influence on what students read in class and providing a valuable role in assisting learners, teachers also need to be exposed to a broader scope of resources such as electronic texts. There are plenty of opportunities to expose students to working with others online based on their top activity being social networking. Also there is the potential to create lectures and other video resources to share as online video and build these technology options in teaching and learning. Participants in this study report being very much in tune with a variety of social networking sites and online video outside of the classroom.

However, they reported few instances where they used video in school. With the changes in Canadian copyright legislation there are more opportunities to legally use video in the classroom to support learning. These patterns are further evidence of the opportunities that exist to integrate familiar literary experiences into instruction.

One of the startling findings was that student report not much communication, reading or involvement in creative tasks at school or at home. Activities that were strictly communication such as email and instant messaging were selected less than 2%. Creative activities such editing images and video, and word processing were also low at just over 1%. Reading was chosen as the top activity by only 1%. The low response rates as first choice increased somewhat as a third choice. They may not identify the work they are doing online as communication or reading. Creating a mash-up or editing pictures for Instagram or Pinterest are creative tasks and students need to see that these can be important ways to share schoolwork as well as their personal stories. Making them aware of the expanded definition of what reading is and what literacy can be has the potential to add value to what they may see as simply socializing. Promotion of creativity and creation through technology will also be important. Learners need to go beyond being merely consumers of content to become creators to share their thoughts ideas and learning in various ways.

From the responses and the written comments it is very clear that students see advantages to having access to technology during course lectures but were equally concerned about becoming distracted by the technology. It is not clear if they have developed this line of thinking on their own or have had the directive from their teachers. They are also not aware of the importance of working online with their teachers or accessing the support of experts from an online environment.

This research shows that there is potential to support a new form of literacy but currently that potential is not being realized. Clearly a shift in high school literacy habits is taking place. High school students have a definite opinion but this research points to a disconnect between what the students are doing as part of their daily lives and what schools expect of them. To engage learners and assist their literacy development schools must take advantage of a new wave of texts and ways to access them. Motivating students and keeping them motivated can happen with a shift to what students are already doing with technology. Creating within this group a heightened awareness that they can use technology to read, create, and learn will make them more successful now and in the future.

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