

**Exploring Teachers' Perceptions of Literacy and Use of Technology in
Classroom Practice: Analysis of Self-Reported Practice in One School District**

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Abstract

This article uses literature on twenty-first century skills and survey data from 77, K-12 teachers to explore teachers' perceptions of literacy and use of technology in their classroom. The study revealed teachers have varying definitions of literacy that do not completely align with twenty-first century practices. The evidence also suggests disconnect between teachers' perceptions of literacy and their use of technology in secondary contexts. The findings from this study suggests teachers need to integrate technology as part of everyday practice in academic contexts so that new literacies are part of their repertoire and they can report how they are using technology to foster students' twenty-first century skills.

Keywords: technology integration, literacy, twenty-first century skills

Introduction

Although technology has proliferated our everyday experiences as twenty-first century citizens, in some instances, schools remain stagnant and disconnected from these practices. Friedman (2005) argued that content in classrooms is not keeping pace with increasing globalization and this is problematic because twenty-first century employees need to demonstrate mastery of new literacy skills—critical thinking, problem-solving, collaborating with peers, and using technology. Literacy researchers have propelled the discussion by highlighting the importance of literacy and technology in academic contexts (International Reading Association, 2009).

The study described in this article is framed by research on new literacies and twenty-first century skills (Leu, Kinzer, Coiro, & Cammack, 2004; Partnership for 21st Century Skills, 2004). As educators in the digital age, teachers are expected to support students' literacy development in these areas through their (teachers') own proficiencies with technology and their capacity to facilitate authentic, opportunities for students to collaborate (International Society of Technology and Education, 2007, 2008). The capacity to enact these practices suggests that teachers need a clear understanding of twenty-first century literacy, are able to articulate practices that foster these skills, and ground their pedagogy in ways that support students' literacy development while preparing students for twenty-first century careers. In this study, we explored if and how teachers were using technology. We were guided by one central question, how are teachers using technology in K-12 classrooms? We used this lens to provide us with further insights on the following sub-questions: how do teachers define literacy?, and what is the connection, if any, between the teachers' perceptions of literacy and how they use technology in the classroom?

New Literacies, Instructional Practices, and Technology Integration

Today, the notion of literacy and what it means to be literate is far more complex than ever before. Consequently, there has been a surge in research on twenty-first century skills and pedagogy needed to foster students' literacy development in the current context. The "new literacies" perspective

calls for us to position technology and the Internet in the classroom as a learning tool alongside traditional books so that students are better prepared for the skills, strategies, and dispositions needed to effectively use technology, web-based tools, and ICTs (Alvermann, Marshall, McLean, Huddleston, Joaquin, & Bishop, 2012; Leu, Kinzer, Coiro, & Cammack, 2004; Sweeny, 2007). From this stance, readiness for twenty-first century workplace is demonstrated through students' ability to master new literacy skills—critical thinking, problem-solving using various sources, collaborating with peers, and using technology (Leu, Kinzer, Coiro, & Cammack, 2004; Partnership for 21st Century Skills, 2004).

Over the past decade, some researchers have attempted to conceptualize, characterize, and redefine literacy through examination of students' inside- and outside-of-school practices and the implications of those practices on students' academic literacy development (Alvermann, 2004; Alvermann, Marshall, McLean, Huddleston, Joaquin, & Bishop, 2012; Gee, 2008; Hinchman, Alvermann, Boyd, Brozo, & Vacca, 2003/2004; Serifini, 2011, Steinkuehler, 2010; Leu, Kinzer, Coiro, & Cammack, 2004), some research has highlighted a wide range of skills characterized as twenty-first century literacy practices that are essential for building digital capital and readiness for twenty-first century workforce (Dickson, Astani, Eriksson, Lee-Partridge, & Adalakun, 2000; Gee, 2008; Huijser, 2006; Morgan, 2010; Voss, Blatt, Bos, Goy, Kraska, & Pfeifer, 2009). Others have examined strategies for engaging students in academic tasks while using technology-based or web-based experiences to foster literacy practices (Barone & Wright, 2008; Walsh, 2009, 2010). Research shows that effective technology integration in today's classroom is realized through "technology-enriched learning environments" where teachers and students learn together, use a wide range of digital tools and resources in face-to-face and virtual environments (International Society of Technology and Education, 2007, 2008). Despite the increasing demands for teachers to demonstrate their own efficacy as users of digital tools by adapting and using technology resources for teaching and learning (International Society of

Technology and Education, 2007, 2008; Morgan, 2010; O'Brien, & Scharber, 2008; Tan & Guo, 2009/2010), technology integration remains elusive in some contexts.

Method

This study draws on data from a survey completed by seventy-seven, K-12 teachers in 2008. All teachers in the study worked in a suburban school district in northeastern United States. The survey was part of a district-wide evaluation of the district's literacy program in 6 schools (4 elementary, 1 middle, 1 high school). The purpose of the survey was to capture demographic information about the respondents (e.g. subjects and grade level taught), determine their perceptions of literacy, and collect information about school-based and classroom practice, particularly the types of research-based literacy practices used in their classrooms (e.g. assessment, reading and writing, literature, technology). The survey, administered online using Survey Monkey, included open-ended questions where respondents had to respond to a prompt, and two types of multiple-choice: single answer and multiple options where respondents were prompted to "choose all that apply" or select "Other" and provide an answer. For the current inquiry only grade level and subject area information about teachers was extracted from the survey along with responses that reflected their reports on technology use in the classroom. This information was obtained from Questions #1, #2, #3, #4, #26 on the survey (see Appendix A).

We organized and analyzed the data using SPSS and Microsoft Excel. We initially labeled respondents using a nine-digit identifier automatically generated by Survey Monkey. These labels were simplified to numerical tags assigned according to input order. For example the first respondent entered was referred to as respondent "1," the second respondent entered was referred to as respondent "2," etc. This was the case for both open-ended questions and multiple-choice questions. To ensure readability and lessen the chances of mixing up questions in analysis, multiple-choice questions were entered one question per file and analyzed using SPSS. Then we used the data to generate frequency tables to further examine the data and determine relationships between the participants.

We organized the Excel spreadsheet into a format that enabled us to compare open-ended responses. First, open-ended questions were placed in a new Excel spreadsheet where it would be easier to see the responses side-by-side and make qualitative comparisons. Then content analysis was used to examine responses for Question #3 and #4 on the survey. The emerging themes from this analysis were coded to determine connections to practices identified in the literature as twenty-first century literacy skills: information literacy, multimodal texts, technology literacy, online research, creating digital texts such as PowerPoint, reading online (Dow, 2007; Honan, 2010; Partnership for Twenty-First Century Skills, 2004; Voss, Blatt, Bos, Goy, Kraska, & Pfeifer, 2009). These skills were placed into a spreadsheet under the category twenty-first century skills and other themes that emerged from analysis of the open-ended responses were used to identify additional categories. When revisiting the data we extracted examples from the survey responses that fit into each category. During the final phase of analysis, we created mini case studies (profiles) so we can track how specific respondents answered questions throughout the survey. These “cases” were given pseudonyms and used to provide a more detailed view of the self-reported practice in their classrooms.

Results and Discussion

Who are the teachers?

Questions #1 and #2 on the survey asked respondents to identify their grade level and subjects taught respectively. As shown on Table 1, the majority of the respondents to the online survey taught middle school (34.2%) and high school (38%). Most teachers identified themselves as Mathematics or Science teachers (84.8%). We acknowledge there was likely overlap with teachers’ selection of the subject areas they teach. However, it is difficult to determine where the overlap occurred in these categories because as noted above teachers were able to select multiple options on the survey to provide demographic data.

Table 1: Demographics of Survey Respondents

Respondent	Percentage of Responders
K-2	12.7
3-5	17.7
Middle school	34.2
High school	38.0
Special education	6.3
Basic skills	1.3
English as a Second Language (ESL)	3.8
Mathematics	43.0
Science	41.8
Social Studies/History	38.0
English Language Arts	39.2
Reading	29.1
Art	2.5

Physical Education	1.3
World Language	1.3
Music	6.3
Technology	13.9
Other	16.5

A few of the teachers indicated they worked with diverse learners; specifically Special Education students (6.3%), English as a Second Language learners (3.8%), or in Basic Skills (1.3%) contexts. It is important to note that 13.9% of the respondents identified themselves as technology teachers and 16.5% described themselves as “Other.” The fewest responses included the Basic Skills (1.3%), Physical Education (1.3%), and World Language (1.3%).

How do the teachers define literacy?

Question #3 on the survey used an open-ended format and prompted respondents to provide a definition of literacy. Most teachers (56%), defined literacy in traditional ways: reading, writing, listening, and/or speaking. There was some overlap between those who included “communication” along with other literacy practices in their definition. For instance, some respondents who defined literacy as “writing to communicate” or “speaking and discussing” were placed in more than one category. Only 7% of the survey respondents defined literacy in accordance with the literature; in terms of media, technology, digital tools, multimodal texts, technology, or information literacy (Figure 1). Some of the responses were vague because teachers gave no specific explanation of their perceptions of literacy. For example, one respondent defined literacy as “the process of becoming well-educated...knowing some about many topics; much about a few topics.” In contrast, an example of one respondent’s definition of

literacy that aligns with twenty-first century literacy skills is “the ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts.”

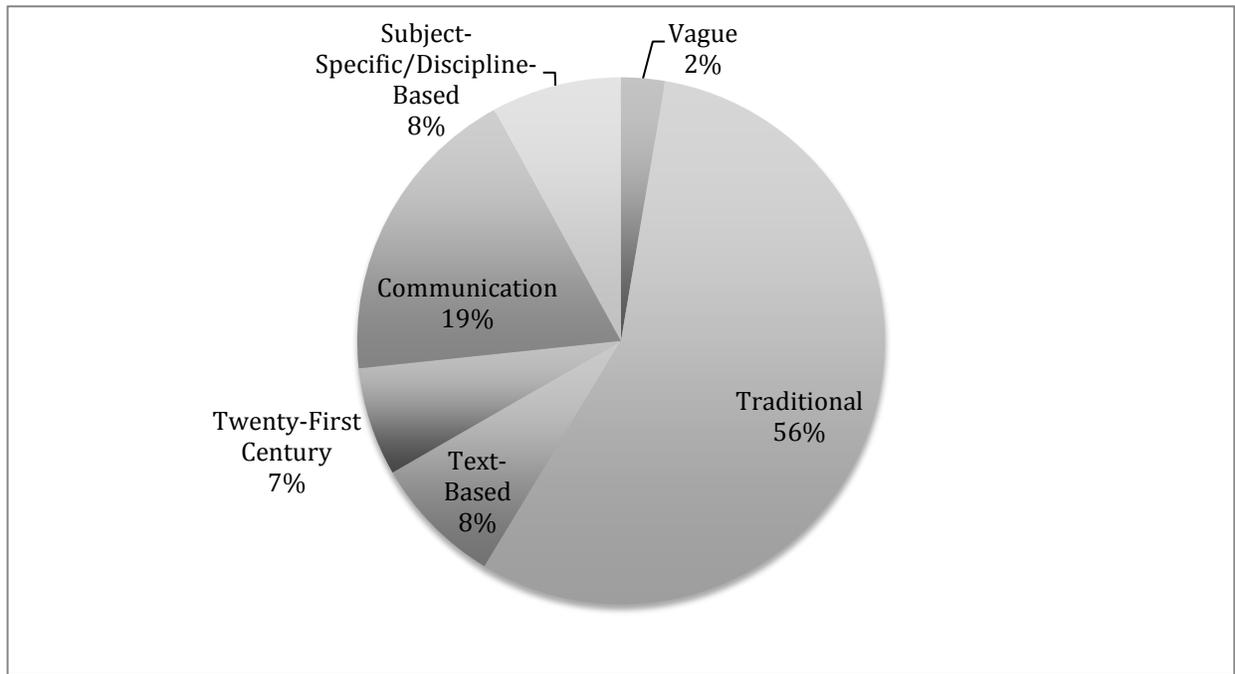


Figure 1: Categories for Teachers' Definition of Literacy

We noticed that of the respondents who defined literacy in terms of twenty-first century practices (n=5) most (4 out of 5) were middle and high school teachers (Table 2). Two of them, Adam and Edgar, both high school Science teachers, defined literacy in terms of their subject area—technical literacy, scientific method, and writing for a specific audience (Scientists)—or processes used: logical problem solving. One of these teachers, Adam indicated he also taught Mathematics.

Table 2: Content Area Teachers' Definition of Literacy

Case /	Definition of Literacy

Respondent	(Question #3)
1 Adam / HS, Math, Science	Technical literacy and open-ended logical problem solving and applied deductive reasoning [sic] skill sets in accordance with integrated learning strategies derived from the 6 step iterative do-loop scientific method.
2 Beth/ HS, Science	Ability to comprehend the written, verbal and visual, and convey ideas back in the same fashion
3 Charles/ K-2, all subjects	The ability to identify, understand, interpret, create, communicate, compute, and use printed and written materials associated with varying contexts.
4 Debra/ MS, English Language Arts	The ability to understand, interpret, and respond to text: written, oral (including conversation), and visual.
5 Edgar/ HS, Science	In my subject area, spoken and written communication is a key component of being a scientist, even a student scientist. The scientific method is not completed until the observations, hypothesis and experimental results are communicated to other investigators. Thus scientific literacy is first of all the ability to communicate scientific results; in the class room this is the task area of the "lab report". After science classs [sic] is long forgotten, scieintific [sic] literacy evolves to the ability to

	read and interpret technical literature, be this magazines, videos, blogs or TV shows.
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HS= High School (students ages 14-17); MS= Middle School (students ages 12-13)

How do Teachers' Use Technology?

Question #26 on the survey asked teachers to report how often they used technology. As shown on Table 3, more than half of the respondents (55.9%) said they used technology “daily” or “often” (more than twice per week).

Table 3: Percentage and Frequency of Respondents' Use of Technology

Frequency	Percentage
Daily	27.3
Often (more than twice per week)	28.6
Sometimes/Infrequently (once or twice per week)	28.6
Rarely (once or twice per month)	15.6

Two factors appear to impact how technology is positioned in these classrooms. First, despite the reported frequency of technology use, in some instances there appears to be disconnect between how often teachers used technology and how they defined literacy. Second, a closer look at one open-ended question, Question #4, which asked respondents to report strategies used in their classroom for literacy instruction (Table 4), shows little evidence that technology is integrated and used as a teaching or learning

strategy. In fact, only one of the teachers, Beth, indicated using technology daily and also made reference to technology or digital tools in her definition of literacy.

Table 4: Strategies Used in Teachers' Classrooms

Case / Respondent	Strategies Used (Question #4)	Use of Technology (Question #26)
1 Adam / HS, Math, Science	Scientific Method thinking like a scientist- 6 w questions, 2 Qs SQ3R SQW3R mandatory marking period scientific research paper optional presentation science projects engineering club	Rarely (once or twice per month)
2 Beth/ HS, Science	Use multimedia and visual aids/demo's regularly	Daily
3 Charles/ K-2, all subjects	Reading Strategies Writing Strategies	Sometimes/ Infrequently (once or twice per week)
4 Debra/ MS, English Language Arts	Reading comprehension strategies; book talks; strategies to develop written expression; strategies to develop oral communication skills; modeling oral and written language; pair-sharing; collaborative [sic] group work; specific strategies geared toward	Often (more than twice per week)

	preparing students for standardized testing (answering multiple choice questions, open-ended questions, responding to a prompt in a given time period, etc.)	
5 Edgar/ HS, Science	Students are routinely assigned to write lab reports following an accepted editorial style for science writers. Students work in small groups to discuss experiments, results and procedures. Reading assignments throughout the year gradually build up in the complexity of technical details and the levels of arguments presented. Students are assigned to do presentations two times a year on a research topic.	Daily

As shown in Table 4, Beth and Edgar reported using technology daily but only Beth explained that it's used for demonstration. Debra also indicated using technology "often," but like Edgar she does not describe how technology is used in the classroom. Although Beth, Charles, Debra, and Edgar described literacy in terms of visual, computing, and interpreting digital texts, much of the emphasis in these teachers' classrooms (as shown in the kinds of strategies used) appear to be on reading and writing strategies. The teachers indicated they placed emphasis on reading and writing strategies (Charles, Debra) or identified examples of strategies introduced.

Limitations

As mentioned above, there appears to be overlap in how teachers selected the demographic data to indicate their grade level and subject taught. Those teachers identifying themselves as Math and

Science teachers (84.8%) are likely to be elementary, middle, and high school teachers. Elementary teachers are responsible for teaching all subjects and it's likely that based on the wording of Question #2 (see Appendix A), they selected the subjects they teach more than 80% of the time. Another limitation is that self-reported data is limited to the perceptions of the participants. This survey data is useful to provide an overview of self-reported practice. But, corroboration with other data sources namely observations, or classroom artifacts, is needed to offer credibility to the survey results. Although classroom observations were conducted for the original school district evaluation, because the survey was anonymous, observation data was not included in this study because we could not connect results to specific teachers. Finally, this study was conducted with a small sample based on data from one school district. Therefore it is difficult to make generalizations about practice beyond the specific context.

Conclusion and Implications

Gee (2008) calls for students to attain traditional reading and literacy skills as well as necessary twenty-first century skills. He also believes literacy instruction should use digital tools and technologies to support multiple literacy skills, namely information literacy, reading online (multimodal) texts, media literacy, critical literacy, collaborative learning, visual literacy, discourse-specific vocabulary, and production of various texts (Gee, 2008); practices that should be evident across subject areas.

Unfortunately, we found that the teachers' reported use of technology did not reflect twenty-first century literacy practices. Additionally, there appears to be disconnect between how teachers perceive literacy in today's context and what they are doing in their classroom to foster students' literacy development as twenty-first century citizens. These results suggest that teachers are still not keeping pace with students' outside-of-school practice by using digital tools and technologies to enhance classroom practice.

Despite the limitation with the sample size and context used for this study, technology integration appears to be lacking in secondary content areas. More specifically, technology utilization in these classrooms does not reflect the everyday use of digital tools in our society. Daily technology-based

practice is needed across subject areas to ensure it is seamlessly incorporated into the teacher's repertoire.

We hypothesize that when teachers integrate daily technology-based practices into the classroom, it is

likely that they will be able to articulate how it's used in everyday practice for teaching and learning.

Professional development that facilitates reflective practices can be a mechanism for supporting teachers'

technology use as a pedagogical method and foster opportunities for them to articulate how they use

technology and other digital tools to support student learning. Professional development that is job-

embedded can help to foster teachers' efficacy with different digital tools and increasing their knowledge

of technology resources which can be effectively integrated into the classroom (Corio & Moore, 2012;

Jones & Moreland, 2004; Kay, 2006; Mims, Polly, Shepard, & Inan, 2006).

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Appendix A: Excerpted Survey Questions Used for the Study

Question #1

I teach __ grade(s)? Check one.

K-2

3-5

Middle School

High School

Question #2

I spend more than 80% of my time teaching the following content area(s). Check all that apply.

Mathematics

Science

Social Studies/History

English language arts

Reading

Art

Physical Education

World Language

Music

Question #3

I would define “literacy” as ____.

Question #4

The specific literacy strategies I incorporate into your classroom on a regular basis are ____.

Question #26

I use technology in my classroom to support teaching and learning.

Daily

Rarely (once or twice per month)

Sometimes/ infrequently (once or twice per week)

Often (more than twice per week)