From Literacy to Literacies: One Teacher’s Journey

QUINN BURKE

Abstract
From the perspective of the classroom instructor, this paper investigates the potential to introduce basic programming concepts to middle school children within the context of a classroom writing workshop. Students drafted, revised, and published their own unique digital stories and in the process learned fundamental concepts characteristic of object-oriented programming. The paper reports on the genesis and promise of a writing-workshop as a means to make coding a more intuitive process for children, as well as practitioner reflections on the pedagogical nature of the writing workshop to make composition—regardless of the medium—more personal, authentic, and socially interactive in nature.

Introduction: The Myth of the “Digital Native”

A year ago at a family party, my father mentioned that kids’ use of technology struck him as nothing short of remarkable. The plethora of applications and pocket-sized devices that kids used with seemingly total ease was literally mind-boggling to him. He, meanwhile, had recently sat through a long series of classes at a local community college in a course entitled “Getting to Know Your Computer” but still had trouble turning his laptop on. “They (the kids),” he concluded, “really can do it on their own—they don’t even need the classes.”

My father is not alone in such a sentiment. That kids “can do it on their own” is an attitude many adults have when it comes to children’s adoption of technology. As the so-called “digital natives” (Prensky, 2001), children’s fluency with web-based technologies is often assumed to be the natural and inevitable extension of living on a “new digital frontier”. However, this popular sentiment is seemingly now developing cracks at its foundation. A recent, nationally-representative study sponsored by the Kaiser Family Foundation (2010) indicates that while children may have the digital devices themselves, they do not necessarily know how to optimally use them creatively nor critically, resulting in a dominant paradigm that keeps many children only on the receiving end of corporate media. While some still tout Web 2.0 entirely in terms of the “wonders of technology”, others are growing increasingly cautious about children’s capacity to participate meaningfully in digital realms, pointing to a deep divide in what the public assumes children to be capable of technologically and what they actually are doing with their cell phones, laptops, and iPads. Media theorist and New York Times columnist Douglas Rushkoff (2010b) recants on some of his previous beliefs about the inherent power of Web 2.0 technologies. “The kids,” he writes “I celebrated in my early books as ‘digital natives’ capable of seeing through all efforts of big media and marketing have actually proven less capable of discerning the integrity of the sources they read and the intentions of the programs they use. If they don't know what the programs they are using are even for, they don't stand a chance to use them effectively. They are less likely to become power users than the used. (¶ 2)”
Computer programming—long considered to be the erudite pastime of techies—is increasingly being recognized by educators as a potential pathway by which to get youth more engaged in the workings of the web-based media that surrounds them (Resnick et al., 2009; Wing, 2006). As a basic set of grammatical rules for instructing computers to perform tasks, programming languages universally rely upon fundamental concepts such as “loops” to repeat behaviour, “conditionals” to alternate behavior based on input, and “event-handling” to manage the shifting relationship between input and output. More than simply managing a machine, these concepts underpin an algorithmic way to process and organize information—essentially a way to think, according to Rushkoff (2010a), who names programming as nothing less than the new literacy of the 21st century. Understanding the computational concepts upon which countless digital applications run offers children the opportunity to no longer simply “read” such media but to become more discerning end users and potentially innovative “writers” of new media themselves (Resnick, 2010).

Yet what exactly is K-12 schooling’s role in ensuring this new “literacy” of programming is introduced to a wide range of children from an early age onward? From the perspective of the classroom instructor, this paper investigates the potential to introduce basic programming concepts to middle school children within the context of a classroom writing workshop. Building upon previous research teaching programming in terms of storytelling (Burke & Kafai, 2010; Kelleher & Pausch, 2007), my exploratory study has two purposes. The first is to develop a workable framework for literacy instructors to align children’s digital storytelling in the introductory programming language Scratch with the composition process as outlined by corresponding state standards for English language arts curricula (in my case, Pennsylvania, available at http://www.pdesas.org). Building upon my previous use of Scratch with four groups of students, I have designed a series of lesson plans aligned to state standards introducing middle school students to Scratch in terms of traditional ELA tropes, including storyboards, character and plot analyses, and genre, among other benchmark indicators characteristic of grade-level standards. The second component of the study is a two-month empirical study in which this framework was put into practice over a series of eleven one-hour sessions at a local West Philadelphia middle school with a group of 7th and 8th grade children. My research represents a step toward “bridging the research-practice gap” (Stipek, 2007) in terms of the actual implementation of programming in K-12 classrooms, with the intent to broaden children’s perception of what we mean “to write” and empower literacy instructors to leverage their own pre-existing composition expertise to introduce the new literacy of computer programming.

Programming in Schools: Whose Responsibility?
Integrating programming into K-12 classrooms presents an entirely unique challenge—and certainly not one that I myself even considered much less conceived of during my time in the classroom. As a Philadelphia high school English teacher and department chair, my own curricula centered upon reading and writing on the printed page, giving scant attention to the metaphorical “reading and writing” with digital technologies. Working within a public charter school serving primarily low-income Title I students, I found that getting my students to articulate and comprehend the printed word was enough of a challenge as a teacher. Delving into the realm of digital literacies (Lankshear & Knobel, 2003) seemed improbable at best, and positively a distraction at its worst. Like many practicing K-12 instructors (Elborg, 2006), my conception of literacy was based only in terms of a child’s capacity to read and write on the page itself. As a result, like my fellow subject specialists at the school, I largely adopted a stance of...
benign neglect when it came to considering my student’s aptitudes with the ever-growing number of media applications of Web 2.0. While I would take my classes to the school’s computer lab on a monthly basis, these excursions down the hall were largely so that children could type up their rough drafts or conduct an Internet search. At that time, if someone was to ask me how I incorporated technology into my language arts instruction, these infrequent excursions would have served as my response. And, truthfully, I may have been puzzled by the question itself—*isn’t that the computer teacher’s job after all?*

This expectation is problematic though not uncommon. Since computers entered schools in the early 1980s, they have largely been relegated to computer labs rather than integrated into core curricula classrooms (Cuban, 1993). Despite technology’s increased affordability and mobility, this remains the persistent model today, particularly among the neediest schools, in which being computer "literate" is often considered simply knowing how to access the Internet or being able to use the Microsoft Office suite (Margolis, 2008). Disconnected from subject-based learning, computers have long been introduced to children simply as stand-alone devices, with computer teachers teaching technology rather than with technology (Cuban, 2001). Even the educational software employed by K-12 schools remains vaguely reminiscent of B.F. Skinner’s teaching machines, in which children sat isolated at desks to be “conditioned” by the devices to give the correct response (Marlow, 1997). Such was the case at my school where the primary use of the computer lab was to run a “skill-and-drill” software program entitled “Study Island”. Though we were fortunate to have a full-time computer teacher for both the middle and high school students, he ended up spending two-thirds of his day loading and overseeing children’s use of the program, which queried children in preparation for the state’s annual high-stakes tests.

Unfortunately, looking for “top down” support in gaining a better understanding of how to integrate programming into K-12 classrooms offers limited results. While national organizations such as the Common Core Standards Initiative (CCSI) and the National Council of Teachers of English (NCTE) have designed detailed frameworks for incorporating digital literacies into K-12 classrooms, none of these frameworks address programming at all. The U.S. Congress recently (2009) attempted to address this lack of coding on the K-12 level by creating a National Computer Science Education Week to spur interest in programming as a potential new literacy. However, despite this banner initiative, less than two-thirds of K-12 schools nationally offer any CS-based curricula (ACM, 2010), and the regimented academic standards and high-stakes testing introduced by the No Child Left Behind Act (2001) continue to be significant considerations when it comes to the prospects of securing school-day hours to expand digital literacy into the realm of programming.

This lack of academic standards means that the burden ultimately falls on the classroom teacher as the veritable “front line” to find innovative ways to engage children with computers critically and creatively. Rooted in practitioner inquiry (Cochran-Smith & Lytle, 2009) in which learning theory and actual practice are not disassociated entities but tied in a mutually informing relationship, this study presents my efforts to develop my own students’ literacies across the curricula—leveraging the traditional literacy of writing to introduce the emergent literacy of programming. While the Association of Computing Machinery (ACM) and the Computer Science Teachers Association (CSTA) continue the noble fight for CS standards on the state level, this study takes an alternative route using language arts curricula and standards to introduce CS into the classroom.
Setting the Stage: Programming as Means not End

I initially encountered Scratch only after I had left my position teaching English on the high school level. Entering my doctoral studies at the University of Pennsylvania’s Graduate School of Education, in my coursework I learned about Scratch as an introductory programming language but initially shied away from it, simply put off by the term “programming”. However, having the opportunity to sample the software in one of my classes, I quickly realized that learning to program is not the explicit end goal of Scratch—rather, providing children the opportunity to create and share their own digital games, stories, and animations is its primary purpose. “Imagine, Program, Share” reads the Scratch motto. Developed by the Massachusetts Institute of Technology’s Media Lab, Scratch was initially released over the summer of 2007 to lower the barriers to programming and make coding a matter of creative expression for children. To do this, Scratch circumvents the frustrating syntactic errors characteristic of typing code and instead allows users to drag-and-drop “bricks” of code onto a digital canvas via a mouse. With knowledge of how to use a computer’s mouse as the only prerequisite, children as young as eight years old are capable of creating their own programmable stories, games, and works of interactive art with Scratch.

One such creation is above. Completed by one of my students, a 6th grader named Mason (a pseudonym, as are all names herein), the project features an encounter between a cartoon hedgehog—Sonic from the popular series of video games—and an actual hedgehog, who subsequently proves to be quite angry that Sonic has turned him and other hedgehogs into cute...
caricatures. Featuring dialogue, sound effects, and movement, the project took Mason approximately ten hours to design and program, though the animation itself runs just over a single minute.

To create the Scratch project, Mason started by importing a series of images downloaded from the Internet into the software. Referred to as “sprites” these downloaded images included the Sonic figure, whose behavior Mason then programmed by using his mouse to drag, drop, and stack a variety of command bricks from the far left hand panel to the central panel.

![Diagram of Scratch programming bricks](image)

**Figure 2:** The process of writing a basic coding script

The above figure demonstrates a single command that Mason created to make his Sonic sprite move and spin. Connecting four programming bricks (part a) to form a “stack” (part b) with an input key (“When Sprite1 clicked”) creates a repeat “loop” of moving ten steps and then flipping at a 30-degree angle. Upon activation this “script” subsequently makes the Sonic sprite come alive (part c).

I was initially impressed by the program based on the fact that a technology-philistine like myself could immediately engage with it. Accordingly, I subsequently jumped at the opportunity to run an afterschool technology workshop using Scratch in the fall of 2008 at a local middle school located in West Philadelphia. Serving grades Kindergarten through 8th grade, the 600+ children attending the school come from a wide range of social and racial/ethnic backgrounds. Located within a transitional neighborhood in the city, the school is also one of the more economically diverse within the district, serving students from both an upper-middle class background as well as significant number of children who qualify for a free or reduced lunch based on the federal Title I Act. My initial group in the fall of 2008 consisted of fourteen 4th and 5th graders. Though my enthusiasm ran high, my own lack of familiarity with Scratch that fall meant that I had to quickly re-think and adjust my teaching style in the classroom. This was a hard-earned lesson. Initially I taught the program very much in terms “teaching the technology” rather than “with the technology”. Adopting the lecture-style pedagogy that I had frequently utilized as an English teacher, I stood in front of the group over the first two sessions and had them turn their chairs away from their computers so they could follow my directions using a projector and pointer. Pedantically walking the group through the various command codes, I intermittently allowed the kids to return to their own computers to replicate the sample script I had just composed. The group did so obligingly, though I frequently had to redirect them to my presence at the front of the room. “Ok, now turn back here,” I found myself exclaiming multiple
times over the initial two sessions. At the end of the first day, when I asked if anyone had any questions, the kids collectively shook their heads “no”. Asking the same question during our second session, one 5th grader finally spoke up: “So when are we going to actually get to use Scratch?”

It is not an overstatement to posit that this simple (and entirely innocent) question from a 5th grader was one of the crucial times in my teaching career I had to reflect upon exactly what and how I was teaching. As a doctoral student, I was fairly well-read in the Constructionist literature on the nature of teaching with technology toward tangible end-goals (Harel & Papert, 1990; Kafai, 2006) as well as the need for instructors to adjust their own teaching style to the tools at hand (Doering, Hughes, & Huffman, 2003); however I had read much of this seemingly in a vacuum, entirely unaware what it meant to my own teaching style. From session three onward, I adopted a far less regimented approach to the inaugural Scratch Afterschool Club, allowing kids to move freely about the room and spending my time looking over individual kids’ shoulders to monitor their progress and take their questions. “What interests you? What makes you want to create?” I would repeatedly ask during the remainder of the afterschool club as a way to spur participants’ ideas, and I happily witnessed the middle school children’s enthusiasm for the program grow alongside their familiarity with the software.

However, what also became clear over these newly “relaxed” sessions is that the ease with which one could get started with the Scratch program could also be a liability when it came to sticking with one particular project. Participants would inevitably “hit a wall” with the programming aspect of Scratch (which was to be expected) but more often than not, their solution was not to begin revising but to start anew. Whether it was the inability to develop a second background for a Mario Brothers game remix or difficulty figuring out how to coordinate the timing of a new character’s appearance in a scene, the middle schoolers more often opted to simply start something new instead of troubleshooting their existing scripts. Of course, some kids asked questions and attempted to readjust coding scripts and rework their timing, but quite often I would drop back in on a child only to find the project had been abandoned and a new one already started.

My initial foray using Scratch with middle schoolers during the Fall of 2008 session was a short one, and I generally accepted kids’ tendency to start projects over as an opportunity for them to explore a wider variety of projects. But when this inclination to “sample and shed” Scratch projects continued with the older kids in the spring of 2009 with a second afterschool workshop, I began to question my own methodology. Kids were certainly getting acquainted with the creative process and the relaxed club feel was definitely an improvement over the “stand-and-deliver” regiment I had attempted at the outset of the workshops. But participants were leaving the clubs with no finished end product by which to measure their fluency. At the close of the Spring 2009 session, when participants made brief presentations on their work, it was clear that no one had a completely finished project. There was no lack of creativity or enthusiasm on the part of the group, yet the digital animations presented ended abruptly, games advanced to blanks stages, and interactive art pieces lacked the intuitive interface to allow others in the room to fully operate and enjoy them. There was a persistent lack of a finished product, which the children themselves were aware of, explaining “It’s not finished…” or “I only just started this…” as the prefaces to their presentations.

With a new Scratch session starting in the Fall of 2009, I began considering ways to encourage middle schoolers to stick with a certain project and see an idea to its full fruition. It occurred to me that no small part of the issue was the simple fact that participants had not
necessarily had the opportunity to develop a single idea around which to plan their Scratch composition. Sampling sprites and testing coding scripts offered them entry into the software itself, but there was no discernible impetus to use Scratch as a tool for a particular end result. Much of this fell on my shoulders as a new instructor presenting Scratch as an ends rather than as a means in the afterschool environment. Consequently kids approached these workshops as “doing Scratch” as opposed “doing a game” or “doing a story” with Scratch. Drawing on my own background as an English teacher, I decided to incorporate storyboards into the Fall 2009 session which consisted of a group of eleven 6th-8th graders—Mason of the Sonic project included. Storyboards have been used as early as 1900 by filmmakers and illustrators but have more recently entered the classroom with studies (Caldwell & Moore, 1991; Hui, 2011) demonstrating their potential as an effective tool for primary and middle school children to outline and refine their narratives. Far from forcing upon the group an “outline” (which held the semblance of a paper assignment), I simply asked them to draw out their ideas in a series of sequential images, each of which built upon the previous picture. Students used dialogue bubbles and the accompanying captions to further capture the essence of each “scene”. Students understood that these screen-by-screen renderings would not represent the sum total of what their projects would eventually be, but rather would act as a “roadmap” for them as they developed their stories. I then reviewed these storyboards with each participant individually, making points, asking questions, and getting clarifications. By session five, all participants were using their storyboards alongside the keyboard and mouse.

Results were positive. All eleven participants that fall made use of multiple characters (including a clear protagonist and antagonist in each project), eight out of eleven projects (73%) made use of multiple settings, and in an anonymous post-survey, seven out of the ten respondents reported that the use of the storyboard was useful in the creation of their digital stories, while 60% indicated that they felt their storytelling abilities had been heightened by the experience.

**Scratch through a Particular Means: The Writer’s Workshop for Programmers**

This was a promising start. It was also gratifying to me as a literacy instructor who had once felt that his own background in “traditional” reading and writing had little to offer the far more tech-oriented practice of programming. Moving forward in the Fall of 2010 however, I felt the need
to push beyond the “storytelling” motif and make this connection between coding and composition more explicit. My reason for doing so was namely for the sake of getting Scratch into a real-life classroom. For the past three sessions, I had used Scratch entirely in an afterschool club setting and over both sessions two and three nearly half of the participants were returning Scratchers, having used the software over at least one of the two previous workshops. The afterschool workshop seemed to be on the brink of preaching to the digitally converted—that is, its participants were consistently children with an expressed interest in Scratch, to the extent that they opted to stay after school to use it rather than go home or to other afterschool activities. What though about the numerous middle school children who played sports afterschool, joined other clubs, or simply went home? I wanted to reach them as well.

To do so however, Scratch would have to be integrated into a core curricula course as the school had little flexibility for a club during school hours. Meeting with the school’s middle school literacy chair, Ms. Steinberg, I explained my goal to integrate a “Programming-as-Writing” elective workshop that would meet twice week enrolling a number of her 7th and 8th grade students. Ms. Steinberg was happy to oblige. Having learned about Scratch the previous semester through two of her 6th grade students (both prior afterschool club members), she had some familiarity with the software and its potential to create digital stories. Spending the afternoon with me to explain how she structured composition exercises in her classes, she introduced me to Calkins’ seminal text *The Art of Teaching Writing* (1986). Utilized by all three of the school’s middle school literacy instructors, Calkins’ book promotes a workshop model in which composition is a continuous process that is inherently personal in nature and social in practice, encouraging regular peer-to-peer feedback.

Designing the course around a scaled-down version of Calkins’ workshop model, I scheduled eleven workshops over seven weeks in the Fall of 2010. A total of ten 7th and 8th grade students participated in the “Storytelling with Scratch” class. Each class would open with what Calkins refers to as a “mini-lesson” emphasizing a particular element of effective composition (such as characterization, foreshadowing, setting a scene) which would also be tied to learning a particular coding procedure in Scratch (e.g., using the broadcast feature to establish dialogue, importing external images, using loops to standardize behavior). Every mini-lesson was supported by anywhere from one to three sample digital stories selected from the Scratch website (http://scratch.mit.edu), which exemplified a particular storytelling element or genre of storytelling (e.g., mystery, action/adventure) featured within the lesson. This not only grounded the lessons in practical application but offered an excellent segue to examining the actual coding scripts of the projects, exploring exactly how the sample story creators achieved a particular effect with the Scratch code. All lesson plans were aligned to Pennsylvania state standards in Reading, Writing, Listening, & Speaking on the 8th grade level and supported by Ms. Steinberg’s pre-writing activities. All lessons were also formatted in the template recommended by the Philadelphia School District and were made available for the school’s administration to review.
The Writing Workshop Model

A description of the writing workshop model I utilized follows here. Once again using storyboards, I supplemented them with deliberate stages of composition and designated times for feedback.

- **Pre-writing/ Planning (Weeks 1-2):** All participants generated 3-4 “seed ideas” (Calkins, 1986) and entered these into their Writer’s Notebook from Ms. Steinberg’s class. Collecting the Notebooks, I then reviewed each student’s ideas and met with them for 5-10 minutes to discuss how they got the idea and its viability for composition in Scratch.

- **Drafting (Weeks 2-3):** Once students had shared their seed ideas, they proceeded to sketch out these ideas using storyboards. With a pencil, kids drew out their individual shots with the to create a “roadmap” for their compositions.

- **Revising (Weeks 3-6):** Once their storyboards had officially been approved (sessions 3 & 4), the middle schoolers began to compose their actual digital stories. All participants utilized both a “bottom up” and “top down” approach to composing their stories, both creating entirely new projects in Scratch as well as sampling others’ finished projects and repurposing the code for their own projects. The majority of participants leaned more to “bottom up” composition, particularly over weeks 3-4 of the Choice class.
Editing (Week 6): The briefest stage in which students made final revisions based on comments they had received online at the Scratch website as well as during weeks 6-7 of class. Many of the edits were simply “fine-tuning” language in terms of spelling and grammar in characters’ dialogue or trouble-shooting the programmed behavior of coded sprites.

Publishing (Weeks 6-7): All students posted to the Scratch website again over the final two weeks of the workshop; over the last day, students presented their final projects to their classmates in terms of plot and characterization as well as in terms of the underlying code.

As with the fall of 2009 session, results were again quite positive. Nine out of ten participants generated a complete digital story, all of which entailed multiple characters, settings, and plot stages. Images of some of the stories are featured in Figure 5 (in clockwise-order). Some of them such as 8th grader Greg’s “Skateboard” story and 8th grader Andre’s “Trouble at the Playground” feature encounters with bullies that were based on occurrences from their own life. Others, such as 7th grader Barry’s “One Man Hamlet SCAM” and 8th grader Marcus’ “Fantasy Basketball” match feature popular culture figures in brief vignettes; still others like Amadu’s anime project “Ichigo” and Carlos’ “Scratch Persepolis” replicate specific scenes from stories they encountered in movies and books.

Figure 5: Select digital story images from the Fall 2010 workshop
Analyzing the underlying coding scripts students used, I found that the class members also exemplified a wider range of essential coding concepts characteristic of fundamental programming languages ranging from Java to C++. The chart below highlights some of the programming concepts students used in the creation of their stories as well as frequency of use; these programming concepts are not simply characteristic of Scratch but represent fundamental concepts characteristic of a wide range of programming languages, including Java, C++, and Python.

Table 1: Types of programming concepts utilized & in what frequency in the “Storytelling with Scratch” class

<table>
<thead>
<tr>
<th>Programming Concept (via Scratch coding brick)</th>
<th>% of Projects Utilizing the Concept</th>
<th>Frequency per Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>coordination &amp; synchronization</td>
<td>100%</td>
<td>2.7</td>
</tr>
<tr>
<td>loops</td>
<td>90%</td>
<td>2.5</td>
</tr>
<tr>
<td>event-handling</td>
<td>100%</td>
<td>1.5 different keyboard inputs per project</td>
</tr>
<tr>
<td>Boolean logic</td>
<td>10%</td>
<td>.7</td>
</tr>
<tr>
<td>conditionals</td>
<td>30%</td>
<td>1.5</td>
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</tbody>
</table>
In the anonymous post-survey, 70% of respondents agreed or strongly agreed that the storyboard helped them create their stories; 70% agreed or strongly agreed that they learned more about computing during the workshop, while 80% indicated they learned more about storytelling during the workshop, while 90% agreed or strongly agreed that they had enjoyed the writing workshop experience.

Conclusion

In terms of immediate next steps, I am currently in the process of submitting my eleven lessons to the newly-created website “Scratch-Ed” (http://scratched.media.mit.edu/) which specifically focuses on developing elementary, middle, and high school curricula to incorporate Scratch in the classroom. Generated by practitioners, the content on Scratch-Ed recognizes teachers’ pivotal role as enactors of effective pedagogy to demystify the discipline of programming by way of facilitating better processes through which to introduce the field into school-day coursework. The writing workshop model represents one such framework for practitioners. Of course, in fairness, my own development of the workshop came only after three iterations of Scratch use, in which I had ample opportunity to not only explore the software’s multiple facets but also reflect upon the ways in which to introduce it to a growing range of students. Obviously not all educators have such affordances of time and replication. However, the workshop model I have shared here is not a prescription by any means but rather a potential cast that existing literacy instructors can leverage to expand their students’ conception of writing with new media. Far from being complete, the writing workshop model for new programmers very much remains in-progress. Going forward, I myself I am interested in utilizing it with a new class of students for an extended period of time, better leveraging the external audience of fellow Scratch-users available at the website for continuous feedback throughout the composition process. I am also interested in implementing greater user-interactivity into student-generated stories (almost a “Choose-Your-Own Adventure” motif), which will not only introduce a wider range of programming variables but also delve into the intersection of narrative and game-making (Robertson, 2005).

What constitutes literacy (or literacies) in the 21st century will continue to be a choice topic of debate among educators, theorists, and policy-makers. However, a growing number of studies by actual practitioners (Clarke & Besnoy, 2010; O’Connor, 2011) very much demonstrate that such debate does not have to be an “either/ or” scenario; educators can leverage students’ traditional conception of writing onto new media platforms to both acquaint them with more sophisticated technologies as well as reinforce the writing process as a utilitarian framework. “Remember,” educator Sandy Hayes (2005) points out in Writing in a Digital Age, “students don’t have to produce standardized writing to meet writing standards” (p. 7). Programming within the structure of the writing workshop represents one such potential “unstandardized” format that deserves further exploration among practitioners, particularly those within English language arts curricula.

References


**Author Biography**

After six years teaching high school English, Quinn Burke returned to school to explore the growing conception of literacy as it applies to digital realms. He recently (2012) completed his dissertation “Coding & Composition: Youth Storytelling with Scratch” at the University of Pennsylvania’s Graduate School of Education. Quinn is currently an Assistant Professor at the College of Charleston’s (SC) School of Education in the area of learning technologies.
Appendix A: Post-Survey

**Storytelling w/ Scratch @ PAS Post Session Survey**

Please fill out this very short survey examining your thoughts and ideas about using Scratch and creating stories with computers. Some of the questions are fill-ins while others ask you to write a brief response. If you have any questions or if any question is unclear, don’t hesitate to ask a question! And remember, anything you write down stays completely confidential.

### What grade are you in?

- [ ] 4<sup>th</sup> Grade  
- [ ] 5<sup>th</sup> Grade  
- [ ] 6<sup>th</sup> Grade  
- [ ] 7<sup>th</sup> Grade  
- [ ] 8<sup>th</sup> Grade

### How old are you?

- [ ] 10  
- [ ] 11  
- [ ] 12  
- [ ] 13  
- [ ] 14  
- [ ] Other, please specify: ____

**Was this your first time using Scratch?**

- [ ] Yes  
- [ ] No

If “No”, when did you use Scratch before?___________________________________________

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**I am interested in finding out what you may have learned about computers based on your time in the Choice session. Please answer the following questions based on your time in the class.**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think computing is fun.</td>
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<tr>
<td>I am better at creating things with computers.</td>
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<tr>
<td>I think I am better at computing.</td>
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<tr>
<td>I like computing.</td>
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<tr>
<td>I probably know more than my friends about computers.</td>
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<tr>
<td>I am likely to continue using Scratch.</td>
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<tr>
<td>I can become good at computing.</td>
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<tr>
<td>I like the challenge of computing.</td>
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<tr>
<td>I think computing is useful.</td>
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<tr>
<td>I want to find out more about computing.</td>
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<tr>
<td>I am interested in a career in computing.</td>
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</table>
What was the hardest part about learning how to program using Scratch?

I am interested in finding out what you think about storytelling and writing based on your time in the Choice session. Please select the answer that best represents how true you believe the following statements to be.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The storyboard helped me create my story.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>My writers' notebook helped me create my story.</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Getting feedback online helped me create my story.</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Getting feedback in person helped me create my story.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anyone can create good stories in Scratch if he or she works hard at it.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am interested in a job where I can tell stories</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Anyone can be a good writer if he or she works hard at it.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I am interested in a job where I use writing.</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

What was the hardest part about telling your story in Scratch (instead of using pencil & paper)

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
What do you think about attending this afterschool program? Please select the answer that best represents how true you believe the following statements to be.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>I enjoyed this experience.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>I learned from this experience.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>I think this experience was fun.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I learned more about computing.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I learned more about writing.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I learned more about storytelling.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

How many hours did you spend working on your project from home or outside of the Choice class?

- ○ I didn’t work at my project from home
- ○ Less than 1 hour
- ○ Between 1 and 2 hours
- ○ Between 2 and 3 hours
- ○ 3 hours or more

Is there things that could be changed in order to improve the Choice class?

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Last, anything else we should know about Scratch, using Scratch, and/or the Choice session?

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
Thanks for taking the time to complete this survey and for being part of the Scratch Choice session this Fall!

SURVEY CREATED 10.20.2010 BY QUINN BURKE, UNIVERSITY OF PENNSYLVANIA

SURVEY BASED ON NATIONAL SCIENCE FOUNDATION BROADENING PARTICPATION IN COMPUTING PRE-SURVEY (NSF #0940511, PRINCIPAL INVESTIGATORS S. DAVIDSON & Y. KAFAI) AS WELL AS COMPUTING ATTITUDES SURVEY DEVELOPED BY LIUN NI & MARK GUZDIAL @ GEORGIA TECH UNIVERSITY: (http://coweb.cc.gatech.edu/mediaComp- teach/16).
Appendix B: Lesson Plans

**8th Grade**

All Lesson Plans in PA State are expected to follow a format identifying the following components.

- **Objective** what is the overall goal of today’s lesson?—try to keep it succinct
- **Standards** align the daily lesson with PA State Standards (listed above)
- **Materials** list all materials you will use that day (pens, notebooks, etc.)
- **Pre-Class** aka, a “warm-up” to start class
- **Mini-Lesson** your own introduction to the material—can be a lecture of basic instructions
- **Activities** list activities the students will be engaged in
- **Closure** the “wrap-up”—reviewing key points/ taking questions and comments
- **Writing** list the extent of student’s writing during that particular class
- **Assess** briefly explain how will you assess the students during the class
- **Assign** list the homework assignment for the next class
### Subject: ELA  
**Grade(s):** 6th – 8th  
**Course:** Scratch Choice  

**Objective:** The objective for the initial session is for kids to (a) re-familiarize themselves with the term *genre,* & (b) get acquainted with the basic features of *Scratch.*

**Materials:** Laptops w/ *Scratch*

**Pre-Class Activity:** Kids should enter the class and consider the prompt on the whiteboard: “What makes a story a story?”

**Lesson:** After Pre-Survey & Consent/ Assent, introduce ourselves & our backgrounds, focus on initially exploring Genre in terms of Story-Type & Format

- **Introducing the Term Genre**
  - Genres we know...genres we like (have students volunteer responses)
  - Differentiate between Genre as distinguishing story-type & Genre as Format
    - (speak briefly to the nature of Code & Coding as a language itself)

**Scratch**
- Introducing the 3 panels of *Scratch* & getting a sample sprite to move & speak
- Ensuring the kids have *Scratch* as a download on their laptops
- Briefly discuss creating stories w/ *Scratch* & demo 2 sample projects (time permitted)
    - Fairly simple but note the use of dialogue, motion, characters, etc.
    - Much more complicated but does show the potential.....
    - have students note the Interface (define) of each project

**Activities:** Class discussion & start playing with *Scratch* (time permitted)

**Writing Activity:** Pre-Surveys

**Closure:** Review the basic 3 panels over the final 5 mins. & introduce the Scratch website ([http://scratch.mit.edu](http://scratch.mit.edu)) for those who are able/ would like to work from home

**Assessment:** No formal assessment but take note—are kids paying attention? Engaged?

**Assignment:** Start thinking about your own story ideas—come in with 2 ideas for next week!

---

### Content Area: ELA  
**Grade(s):** 6th – 8th  
**Course:** Scratch Choice  

**Objective:** The objective for the session is for kids to (a) further explore this concept of Genre (b) introduce Scratch as a type of grammar they will “write” with

**Materials:** Laptops w/ *Scratch* & Storyboards

**Pre-Class Activity:** Kids should enter & begin getting out to laptops, accessing the software; collect Signed Consent/ Assent forms

**Lesson:** Two Parts—Discussing Genre & Reviewing Scratch

- **Part I: Understanding Genre**
  - Genre in terms of “story type” & genre in terms of

- **Part II: Getting Acquainted with Scratch**
  - Review the 3 panels of *Scratch* & getting a sample sprites to move & speak
  - Anyone start using *Scratch* at home?
  - What ideas do we have (take a survey of the group)
  - Briefly discuss creating stories & demo 2 more sample stories:
    - My *Scratch Story* (traditional)
http://scratch.mit.edu/projects/idigcows/123644
o Harry Potter & the Monster Under the Bed (much more intricate)
http://scratch.mit.edu/projects/mizzy42/11516

Activities:
• Start playing with Scratch Use each other as resources too! Import at least one sprite (35 mins)
Writing Activity: Creating individual storyboards & start playing with the say (dialogue) feature
Closure: Have a few kids volunteer their own story ideas (5 mins)
Assessment: No formal assessment but take note are kids paying attention? Engaged?
Assignment: Start working on your own story ideas—come in with 2 ideas for next week!

Content Area: ELA  6th – 8th  Scratch Choice

Objective: The objective for today’s lesson is to introduce the storyboards by way of characterization
(introducing protagonist & antagonist, in particular)
Materials: Laptops w/ Scratch & Storyboards

Lesson:
➢ Review the concept of storyboards with the group, identifying how each panel advances the basic narrative
➢ Again anyone using Scratch at home? Uploading others’ work to remix?
➢ Review terms “protagonist” & “antagonist” & their role in the story to develop a central conflict
➢ Be able to identify a central conflict...
  o Source: Writer’s Notebook!
  o What is the essential Plotline—is it do-able in Scratch?
➢ Distribute the storyboards & have kids start generating their own images/text used in Hollywood originally
  o a basic map to help you get started
  o don’t worry about the quality of drawing! Just get started

Activities:
• Review & getting settled (10 mins.)
• Importing the protagonist & antagonist & developing costumes in Scratch (20 mins.)
• Demo how to broadcast, how to create a loop (repeat/ forever) as well as an “if/ then” statement (10 mins). Stress the importance of loops as a way to be more efficient with your coding
• Storyboarding Review (10 mins.)

Writing Activity: Continue developing characters’ dialogue in Scratch
Closure: Have a few kids volunteer to introduce one of their characters (5 mins.—if possible)
Assessment: No formal assessment but take note of the kids completed storyboards—really focus on who is working ahead & who may be falling behind
Assignment: Work on your project & aim to have your main characters in place by Thursday

TU.
11/16

TH.  
11/18

Content Area: ELA  6th – 8th  Scratch Choice

Objective: The objective for the 4th session is for kids to (a) complete their Storyboard & (b) learn how to import external images as sprites & stages into their projects
Materials: Laptops w/ Scratch & Storyboards
Pre-Class Activity: Kids should enter the club & begin getting out to laptops, accessing the software

Lesson:
- Review storyboards with the group—identify how each panel advances the basic Narrative & review the language in terms of grammar & spelling
- Can everyone identify a central conflict?
  - This should be able to be put into a single sentence—Don’t try to do too much!!

Activities:
- Storyboarding Review (5 mins.)
- Roundtable review of the Sample Coding Concepts? Broadcast in particular (5 mins.)
- Individual Storyboard work (5 mins.)
- Importing the protagonist & antagonist & developing costumes in Scratch (10 mins.)

Writing Activity: Writing via available descriptor lines of the Storyboard

Closure: Collect all Storyboards and have kids continue to search out images of their lead characters

Assessment: Review all submitted Storyboards in terms of their central conflict, clarity of narrative, and “do-ability”

Assignment: Work on your project & aim to have begun coding your lead characters by next week

Content Area: ELA

Standards: 1.9.8.A, 1.9.8.B, 1.2.7.C, 1.3.7.C, 1.5.7.A, 1.5.7.F, 1.7.8.A

Objective: The objective for the 5th session is for kids to (a) review their marked Storyboards & (b) evaluate the “do-ability” of their storyline— a side goal is to also introduce Dialogue into projects

Materials: Laptops w/ Scratch & Storyboards

Pre-Class Activity: Kids should enter the club & begin getting out to laptops, accessing the software

Lesson:
- Return storyboards with Comments—any questions? Make adjustments accordingly...Remember, we want to see a single, central Conflict
- Any questions about importing images into Scratch?
- Using Dialogue in Scratch to Advance a Narrative
  - Sample scripts (via Projects) in terms of creating Dialogue (direct them to the page)
    - Note also the use of the Broadcast feature

Activities:
- Storyboarding Review (5 mins.)
- Continue work with importing the protagonist & antagonist & developing costumes in Scratch (25 mins.)
- Demo how to utilize Dialogue via the Broadcast feature (20 mins).
  Stress the importance of broadcasting in order to deliver a narrative flow

Writing Activity: Develop lead characters’ identities via dialogue in Scratch

Closure: Have a few kids volunteer to introduce one of their characters (5 mins.—if possible)

Assessment: No formal assessment but take note of the kids completed storyboards—really focus on who is working ahead & who may be falling behind

Assignment: Work on your project in terms of importing (and perhaps coding) all key
## Content Area: ELA 6th – 8th  
### Scratch Choice

### Standards:

### Objective:
The objective for the 6th session is for kids to continue to develop their stories in terms of their central conflict and begin considering supplementary effects, including music and sound effects; also, touch upon the key role of Setting in driving the story and using multiple Scratch stages.

### Materials:
Laptops w/ Scratch & Storyboards

### Pre-Class Activity:
Kids should enter the club & begin getting out to laptops, accessing the software.

### Lesson:
- So where are we at? Where are people having problems? Do we know how we want our project to be received (e.g. funny, suspenseful, etc)?
- Who is making use of multiple Settings? Review the process for changing stages (again, return to the Broadcast feature).
- Demonstrate the significance of Sound Effects & Music to heighten the experience
  - **Bad Car Crash** [http://scratch.mit.edu/projects/paintballer/44650](http://scratch.mit.edu/projects/paintballer/44650)
    - *Kind of funny but really, little effect*
  - **Police Car Crash** [http://scratch.mit.edu/projects/robbie/173462](http://scratch.mit.edu/projects/robbie/173462)
    - *Sound effects are nice here*
  - **Music for Car Crash**: [http://scratch.mit.edu/projects/KeyBoardRocker/254493](http://scratch.mit.edu/projects/KeyBoardRocker/254493)
    - *Cool music but should have sound effects!*
  - **Sampler here**: [http://scratch.mit.edu/projects/lego645/281015](http://scratch.mit.edu/projects/lego645/281015)

### Activities:
- Review & getting settled (20 mins.)
- Developing the Setting & its key role in driving forward the Narrative (25 mins.)
- Adding Music/ Effects to set the Mood via the Samples (10 mins). **Stress the importance of details**

### Writing Activity:
Continue developing characters’ dialogue in Scratch

### Closure:
Review the Sensing feature – and have students aim to add another Setting for next week

### Assessment:
No formal assessment but take note of the kids’ stories and who is in fact coordinating the Scratch stages into a series of progressions.

### Assignment:
Continue to work on your project & upload to the website by Tuesday

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## Content Area: ELA 6th – 8th  
### Scratch Choice

### Standards:

### Objective:
The objective for the 7th session is for kids to continue to develop their Scratch stories and focus on adding features like sound effects, music via the Sensing feature— also consider Symbolism & Irony.

### Materials:
Laptops w/ Scratch & Storyboards

### Pre-Class Activity:
Kids should enter the club & begin getting out to laptops, accessing the software.

### Lesson:
- Review: Website upload? Who is using multiple Settings?
- The “Devil’s in the Details”—Why are Comedies & Horror the hardest genres to pull off? What make them work?
- Another Musical Story (courtesy of Darrell)
Spaghetti Cat  [http://scratch.mit.edu/projects/swifty2/1075670]


How does the Music amplify the suspense here? Note the coordination

- Troubleshooting via the "Single-Step" Feature

Activities:

- Review & getting settled (10 mins.)
- Developing the Setting & Adding Music/ Effects to set the Mood (30 mins.)
- Review using the Sensing to coordinate sprites (10 mins.) Again, the importance of the small details!

Writing Activity: Continue developing characters' dialogue in Scratch, plus typing via Sensing input

Closure: Close by introducing the term "trouble-shooting" & demo-ing the "Single-Step" feature (5 mins.)

Assessment: Review the students' use of the Sensing feature—how are they using it in terms of colors, touching, etc?

Assignment: Continue to work on your project

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**TH. 12/09**

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<thead>
<tr>
<th>Content Area: ELA</th>
<th>6th – 8th</th>
<th>Scratch Choice</th>
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Objective: The objective for today's class is to put all the elements together to arrive at a Theme to one's story— inherent from the storyboard, to what extent is there an underlying message (not necessarily a moral) to your digital story?

Materials: Laptops w/ Scratch & Storyboards

Pre-Class Activity: Kids should enter the club & begin getting out to laptops, accessing the software

Lesson:

- So where are we at? Where are people having problems?
- What do we mean by the term Theme?
- Allow for workshop time to continue troubleshooting—work with students individually

Activities:

- Roundtable review & getting settled (5 mins.)
- Discussing Theme (10 mins.)
- Individual Work on Projects (40 mins.)

Writing Activity: Students will compose a project description to accompany their online upload

Closure: Remind the class that only one full more week before demonstrations

Assessment: No formal assessment but take note of the kids' stories and make note who may not be completely ready for the final presentation in 2 weeks—really focus on these kids next week

Assignment: Continue to work on your project

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**TU. 12/14**

<table>
<thead>
<tr>
<th>Content Area: ELA</th>
<th>6th – 8th</th>
<th>Scratch Choice</th>
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</table>

Objective: The objective for the 9th session is to begin to finalize one's digital story—troubleshooting both in terms of Narrative flow as well as the underlying code.

Materials: Laptops w/ Scratch & Storyboards

Pre-Class Activity: Kids should enter the club & begin getting out to laptops, accessing the
### TU. 12/21

**Content Area:** ELA  
**6th – 8th**  
**Scratch Choice**

**Standards:** 1.9.8.A, 1.9.8.B, 1.5.8.E

**Objective:** The objective for the penultimate session is to finalize one's digital story and assess one's story based on the 7 elements-rubric (Story-structure, characterization, language & vocabulary, graphics, background/staging, underlying code, originality)

**Materials:** Laptops w/ Scratch & Storyboards

**Pre-Class Activity:** Kids should enter the club & begin getting out to laptops, accessing the software

**Lesson:** Individual Support

**Activities:**
- Review Rubric for Effective Storytelling in Scratch (15 mins.)
- Individual Review on Projects (40 mins.)

**Writing Activity:** Continue developing characters' dialogue in Scratch & revise online descriptions

**Closure:** Close by asking the group as a whole if there are any large scale problems? (5 mins.)

**Assessment:** Review the students' progress—who is ready for Presentation? Who is far behind?

**Assignment:** Continue to work on your project

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### TH. 12/23

**Content Area:** ELA  
**6th – 8th**  
**Scratch Choice**


**Objective:** The objective for the final session is for the group to present their digital stories to each other, ask questions, offer feedback, and enjoy the progress they've made.

**Materials:** Laptops w/ Scratch & Storyboards

**Pre-Class Activity:** Kids should enter the club & get their projects uploaded for show

**Lesson:**
- **Administer Post-Survey & Act as “MC” for each participant**
  - **Get setting up**—ensure there is a projector available and kids can download the finished digital stories to the website or to a removable flash drive

**Activities:**
- **Post-Survey** (20 mins.)
- **Individual Presentations** (30 mins).
- **Wrapping up**—final thoughts on what worked/ what needs working on…. (10 mins).

**Writing Activity:** Kids can write notes on the projects they see, offering feedback on paper as
well as by talking

| Closure: Thank the kids for all their hard work—to keep Scratching via the website! (5 mins). |
| Assessment: So how do these digital stories work? |
| Assignment: Consider the Boot-Up Summer just next door at Penn this summer (August dates). |