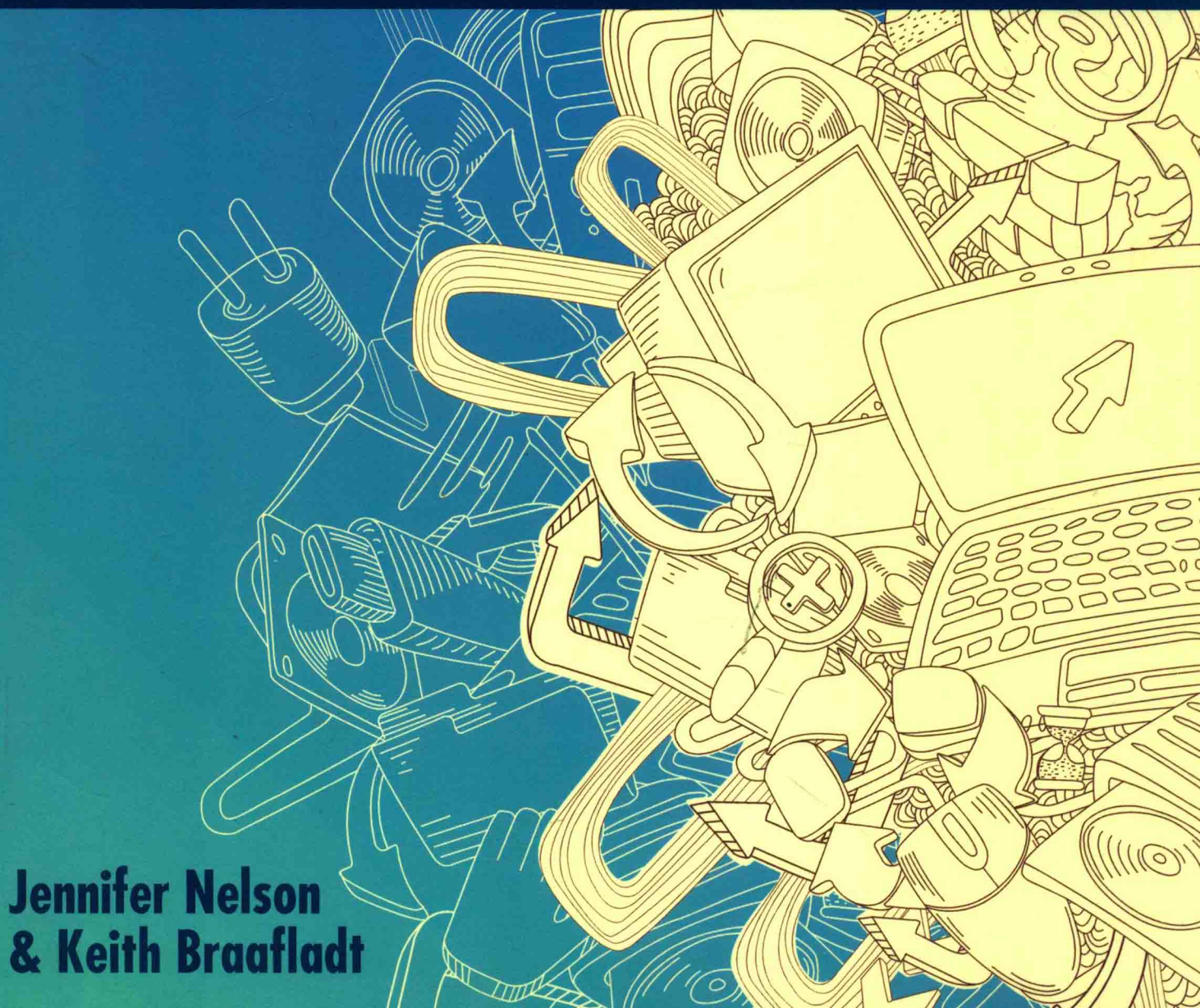# Technology and Literacy

## 21st Century Library Programming for Children & Teens
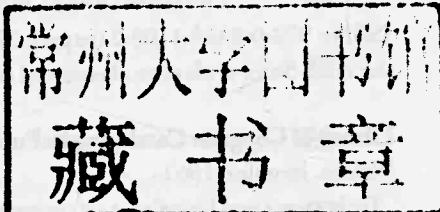
Jennifer Nelson
& Keith Braafladt

# Technology and Literacy

## 21st Century Library Programming for Children & Teens

**Jennifer Nelson
& Keith Braafladt**

**Jennifer Nelson** is a passionate advocate for the role of public libraries as informal learning centers. She has over twenty-five years of experience working in libraries and has spent much of the last five years collaborating with the Science Museum of Minnesota developing sustainable practices for informal technology workshops for youth in public libraries. A frequent conference presenter on topics related to technology programming, youth, informal learning, and the future of public libraries, Jennifer holds a master's degree in political science and a master of library and information studies from the University of Wisconsin-Madison. She received her BA (magna cum laude) in political science from the State University of New York at Buffalo. She worked for over twenty years at the Minneapolis Public Library in a wide range of capacities and is currently senior grant writer at Project for Pride in Living, a Minneapolis-based nonprofit and library consultant.

**Keith Braafladt** is an experienced teacher and developer with a deep understanding of learners and the creation of learning environments in informal settings. Keith has a depth of experience with technology program implementation and spends considerable time developing effective curriculum for technology and media-infused classes and workshops. Keith's educational background is in fine art and museum practice. His work has focused on the intersection of art, technology, and science and how these integrate to support creative self-expression and social meaning making for adults and youth.

# Technology and Literacy

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# Acknowledgments

# Introduction

The inspiration for this work is best illustrated by retelling a story. In the fall of 2009 Jennifer had just purchased a snazzy new MacBook Pro. As she sat at home with her then twelve-year-old son, Henry, they embarked on a conversation that went something like this:

Henry: "Gee, mom, I bet they didn't have computers like these when you were a kid."

Jennifer: "Well, Hen, we didn't. I didn't use my first computer until I was in college. And when I started working at the library, the computer took up a room the size of our living room. And it couldn't do what our new one does."

Hen: "I bet when I get to be as old as you, they won't even have computers like our new one. I wonder what they'll be able to do. But I'm not worried about it because I'll figure it out."

In that sentence, Henry, in his twelve-year-year old wisdom, summed up the nature of technology adoption for the millennial generation: I'll figure it out.

He doesn't plan to need special training, and he's not worried about out how he'll adapt. He just knows he will. Now Henry is at a distinct advantage—his mom is a librarian, and his dad is a professor; he doesn't have to worry about where his next meal is coming from. We

foster opportunities for him to experience new things and are fortunate that we can afford to do so. But not all kids have this luxury.

In 21st century America, kids still have variable access both to technology learning opportunities and to caring adults. The availability of these two resources can help ensure that all kids believe that they will be able to figure it out. And that's where public libraries can continue to make a difference in the lives of 21st century kids: by providing access and exposure to technology by library staff who are versed in the needs of 21st century learners.

In the following chapters we'll describe an approach to technology training for youth that is grounded in our belief that public libraries, today more than ever, have an important role to play in ensuring that kids of all stripes and in all locations are supported in developing key literacy skills that they will need to succeed in their lives.

This book is based on what Keith and Jennifer learned through a series of projects that took place between 2006 and 2010 which were supported generously by the Best Buy Children's Foundation, the Minneapolis Public Library, the Hennepin County Library, the Science Museum of Minnesota and its Learning Technologies Center, and the Institute of Museum and Library Services, through Media MashUp, a Nation of Leaders demonstration grant (NLG 07–08–0113).

Media MashUp was a project designed to test the adoption of rich media technology programs in a set of diverse public libraries. The project looked at several facets of program adoption: technology infrastructure, staffing, and the impact on youth. By most measures, the project was a success. Through the diligent work of staff at Hennepin County Library, Charlotte Mecklenburg Library, Free Library of Philadelphia, Seattle Public Library, Memphis Public Library, and the Wilmette (IL) Public Library, the project learned many lessons about how to navigate the sometimes rough waters of new program adoption. The technology workshops the project supported were largely based on a wonderful piece of software called Scratch (http://scratch.mit.edu), which is being developed by the Lifelong Kindergarten Group at Massachusetts Institute of Technology's Media Lab. Scratch is a wonderful tool for kids to create animation and media projects using a very simple and elegant programming language.

In this book we'll explain why we believe it is important for libraries to offer rich media technology-based programs for youth and how you can do it in your library. We'll share stories of our work and successful strategies we've developed. We know that the paths we've found aren't the only ones that will lead to success, but we hope that our stories will spark your interest in developing innovative and impactful programs for youth where you work. Chapters will provide a rationale and context for the shift toward technology-based youth programs as well as step-by-step instructions for developing Scratch-based workshops and classes.

# Contents

# Literacy, Public Libraries, and Education

To truly understand the important role that technology programming for youth can play in building stronger societies it's important to look at how young people learn today. Youth are entering a world that is vastly different from the one their parents were raised in, and the skills it takes to be successful have changed radically as well. The basis of our economy has shifted away from agriculture and factory work, and there are new understandings of what literacy skills are needed to be successful in work as well as to be civically engaged.

Over the last forty years or so, the American economy changed from a manufacturing and production-based economy to a knowledge-based economy.[1] With this wholesale shift in the structure of the economy has come a similar shift in the jobs created by the companies that drive it. Some economists have gone a step further and begun to identify a burgeoning conceptual economy.[2] The conceptual economy as described by Daniel Pink has six high-touch senses—design, story, empathy, symphony, play, and meaning—that are critical to success in the new world.[3] These new senses aren't in opposition to currently required skills and attributes. Instead, they are an enhancement of fundamental attributes we already possess. Other economists discuss the importance of creativity for continued economic vitality.[4]

As the nature of the economy has changed, so have the ways Americans experience their lives, their careers, and their work. This is a twofold change. First, the greatest number of jobs available is no longer in manufacturing, which required only on-the-job training to earn high wages. Most jobs are now created in the information/knowledge sector and require

more sophisticated skill sets and more up-front education. Additionally, there is a growing stratification among workers, with jobs requiring either an advanced degree (medicine, law, engineering) or little to no extra training (entry-level health care or customer service).

The second change is in the number of jobs that individuals will hold in a career. Recent research from the U.S. Bureau of Labor Statistics shows that the average worker experiences ten job changes in a lifetime, far more than earlier generations. Derived from a longitudinal survey of late-stage baby boomers prior to the latest economic crisis, this observation is a likely indicator of future employment trends. This is particularly true given the increased number of business closings and consolidations. In the midst of this changing economic structure, the educational system has to produce kids who are flexible, adaptable, and, as Henry told Jennifer, able to "figure it out."

While the structure of the U.S. economy has undergone this dramatic shift, there has been a comparable social movement in understanding what literacy means in a computer- and Internet-driven world. Several organizations have developed approaches, or frameworks, for understanding literacy in the 21st century. Although they differ in some respects, there are several commonalities. All these frameworks recognize that technology skills are critically important, but not the mastery of skills in specific software applications. Rather, they argue the importance of an approach to learning with technology that involves critical thinking, higher-order problem solving, flexibility, creativity, and other related concepts.[5] These needs aren't developed strictly from a philosophical bent. They are developed from an understanding of the changing nature of work and employment that has been driven by the shift to a global economy. Literacy is now understood to encompass the traditional three Rs (reading, writing, and arithmetic) as well as a host of skills and attributes unique to the world in the 21st century. There are fine strands of literacy—media, digital, information, for example—as well as more encompassing frameworks that attempt to bring together all of what is needed to thrive in a modern society. The Metiri Group identifies *digital age literacy, inventive thinking, effective communication,* and *high productivity* as the hallmarks of 21st century literacy.[6] The Partnership for 21st Century Skills (P21) is another national initiative that has drawn positive attention and support for its work in redefining literacy. P21 uses an expanded framework that acknowledges the continued important role of reading, writing, math, and science and adds components that address technology and media fluency, interpersonal skills, and higher-order thinking and problem solving. In addition, it explicitly recognizes the importance of global awareness.

## CONSTRUCTIONIST APPROACH TO LEARNING

Corresponding to this expanded understanding of literacy and the changed economy is the recognition that there are multiple ways that children can learn and build knowledge. The

foundation for a new kind of thinking about how children learn is described in the *constructionist* approach rooted in the work of Jean Piaget and Seymour Papert. Applications for this approach have blossomed through the work of the Media Lab at the Massachusetts Institute of Technology (MIT), in particular the Lifelong Kindergarten Group. Similarly, as a society we've developed a better understanding of how children learn and how to best teach them. Mitch Resnick, for example, provides a nice discussion of learning that notes the importance to youth of connecting their life experiences with their learning and the importance of design thinking.[7] Although there are numerous approaches to learning that inform our work, none is more evident than Papert's work, particularly his articulation of a constructionist approach to learning in informal settings.

The constructionist approach to learning addresses the developmental needs of youth by incorporating the idea that we experience the deepest learning when we actually make things (construct learning artifacts) in a social setting. Learning is a social activity, and meaning is constructed by building. There are two ways to think about construction—knowledge is constructed through trial and error and through constructing objects in the real world, not just in the abstract in a classroom. The "show what you know" idea—that deep learning also happens when you have to explain projects you've built and demonstrate what you've learned—and technology workshops in libraries become tremendous opportunities for growth and learning. As an additional bonus, there is the good that comes from learning to speak in public.

In the world of 21st century education and learning, using computers to create things is a prime example of constructionism at work. Scratch (the software that is the basis for our approach to technology programming) is built on these constructionist foundations; hence its focus on supporting the development of fluency with media tools and computer programming while also addressing the 21st century literacy skills. Wrapping technology programming in 21st century public libraries with informal learning and a constructionist perspective on how learning takes place advances the whole idea of what a library can be. This is even more true when viewed through the lens of the developmental assets the library is nurturing.[8]

With this rich understanding, we can now turn to the question of how public libraries can best create the environment for this new learning and literacy to happen.

## LITERACY AND THE PUBLIC LIBRARY

Public libraries in the United States have always been institutions where learning takes place. From the earliest days of the public library movement in the early 20th century to the beginning of the 21st century, learning has been an important component of library service. Another primary ethos in the development of public libraries is that they are free and open to all. Our collections, whether print, audio, or digital, are built around the goal of providing free access to information regardless of format so that learning is available to all.

Public libraries develop and offer classes and workshops to respond to a range of community needs. Early in the 20th century these programs ranged from providing English language learning for new immigrants to acting as a people's university where the unschooled had open access to literature on all subjects. Continuing in the 21st century, public libraries retain this practice of equitable service to all; with fewer membership requirements than any other educational organization, we truly serve all people in all of our communities. Over time, the types of programs and activities offered by public libraries have shifted as the needs of our communities have changed. As our knowledge about how people learn has grown and changed, the opportunities we offer and how we offer them have changed as well.

In particular, there has been tremendous change over the last hundred years in the forms in which information is contained, the tools with which it is accessed, and the skills needed to put it to use. Throughout most of the 20th century, reading was the primary skill that patrons needed to take advantage of the rich opportunities for learning that libraries offered. Today, with the advent of computers as tools for accessing information and building knowledge, our patrons need to have a skill set that goes beyond reading and includes a host of skills related to technology, digital fluency, media literacy, and more. Computers, the Internet, and various software applications have come to dominate how libraries operate and influence the services we provide. But the basic premise of what a public library can do (offer unfettered access to information) and how it serves its community (by identifying and responding to its needs) has remained constant.

The more than 16,600 public libraries in the United States are the heart of learning and informal education in America.[9] They have become our communities' primary center for informal learning, the place for accessing the tools of modern society—whether those tools are books or computers. Libraries are ubiquitous—they exist in virtually every community in the United States, rural, urban, suburban, exurban—and are an important constant. Libraries have supportive infrastructures that provide access to technology as a fundamental service. The concept of lifelong learning is expressed in the mission statement, goals, and priorities of many public libraries. The concept addresses the key public library role in informal learning and access to information technology.

The extent to which public libraries provide this basic access to computers and the Internet for the communities they serve is unrivaled by other organizations. Although some areas of the United States are fortunate to have community technology centers, most are without, particularly rural areas. Over 98 percent of public libraries offer computer and Internet access; more important, *71 percent of library users report that the library is their primary place for accessing computers and the Internet* [italics added].[10] A vast majority of these libraries offer broadband and high-speed access to the Internet.[11] These are critical functions as access to the Internet becomes essential for civic participation in 21st century America.

At the same time, libraries continue to provide support for literacy in all its forms; computers and software, like books, are tools for teaching and learning literacy.[12] And, of course, libraries strive to remain barrier free with no direct cost for membership. Our patrons (and their parents, teachers, grandparents, friends, and neighbors) have already paid for access. Public libraries require only respectful use of our space and resources. We remain important organizations in our communities, and our services complement those of the civic, recreational, and educational organizations that share our cities and towns.

Recognizing the changes in libraries, the Institute of Museum and Library Services (IMLS) has supported a range of projects that explore what it means to be a library in these times of radical change. Their work, through the Museums, Libraries, and 21st Century Skills initiative (www.imls.gov/about/21stCSkills.shtm), helps to shape the ways in which libraries respond to the tremendous changes in our communities.

## LIBRARIES AS LEARNING CENTERS

Public libraries are a perfect place, and this is the perfect time, to develop, test, and offer educational technology programs for youth that are grounded in key literacy skill building—programs that fit between home and school and home and work. For today's youth, libraries provide many programs—homework support, book clubs, anime or manga clubs, and console gaming, to name a few—all of which fill those critical out-of-school-time hours. Just as technology is fast becoming the primary tool to support learning both inside and outside of school, libraries have an increasingly important role to play in providing access to these tools to youth who lack home resources. Public libraries have important choices to make in how we develop services and programs for youth. In addition to providing programs and learning opportunities at no cost, public libraries are free from externally imposed mandates related to what services are offered and how they are evaluated.[13]

The success of public schools is measured by the percentage of students passing required standardized tests, but there is no similar measure for libraries. Indeed public schools are in a quandary as their very funding is threatened by failure of students to perform at certain levels. Public libraries, on the other hand, have no such threats. This creates an immense opportunity for libraries to create a niche that responds to the needs of our young customers and to apply a range of approaches to serve those needs. And while it is tempting to develop and build solely on the basis of what kids are interested in, we have a professional obligation to provide opportunities that build skills and provide opportunities for youth to grow and stretch as learners and leaders.

In this book we advocate for the development of technology-infused programs to support informal learning in public libraries. While we are concerned with just one aspect

of informal learning, out-of-school-time programs for youth, we believe this approach is relevant for how we serve all audiences for the 21st century.

Libraries are key community agencies, akin to science centers, history and children's museums and other organizations (Boys and Girls Clubs, YMCAs, for example) that provide out-of-school-time activities for youth. All of these organizations use an informal approach to learning. Note that we use the term *informal learning* rather than the more commonly used *lifelong learning*. This may seem a subtle distinction, but although lifelong learning is important and denotes the role public libraries play for patrons of all ages, the term is so all-encompassing that it loses much of its meaning. It can mean just about anything to anyone and doesn't denote a particular approach, be it formal, informal, or experiential.

What we call things, how we label them, is important. The act of naming is powerful; a name sets up expectations and sends a message. Many libraries proclaim the concept of lifelong learning and education in their mission statements. But do we really know what it means? Using these terms also positions libraries in alignment with schools—institutions of formal learning. For example, the International Federation of Library Associations (IFLA) defines lifelong learning as "all purposeful learning activity undertaken on an ongoing basis with the aim of improving knowledge, skills and competence."[14]

Public libraries in the United States are unlikely to adopt a formal approach to learning—doing so would move us far beyond the current models of staffing and could create an entirely different focus for service. So naming, developing, and calling out an informal approach, we believe, sets libraries up for the greatest success, particularly in working with youth in out-of-school time.

Shifting the library's role to that of supporting informal learning allows us to establish standards more closely aligned with those of organizations such as museums, camps, and YM/WCAs. When we make this shift, we can create a tremendous opportunity to meet youth where they really are—intellectually, developmentally, and cognitively. The standards by which we develop our programs and measure our success are then relevant to the outcomes we hope to achieve. We are positioned to support a community of youth who are deeply engaged in learning with workshops and classes that expose them to a much wider range of important literacy skills.

Taking this approach also allows us to make the best use of staff and a range of techniques for teaching and learning. Most informal learning organizations employ a wide variety of strategies for engaging youth that are as much about social skill development as specific content. So although learning the techniques to be a teacher in a formal classroom setting is probably beyond the interest and capacity of libraries, adopting the practices of informal educators is not.

# INFORMAL LEARNING

Throughout this book, we use the phrase *informal learning* to reflect a core set of beliefs about how to best teach in informal educational settings. A key difference between formal and informal settings is the outcomes that are expected for program participants. In a formal educational setting, the expectation is that learners will complete fixed objectives that can be measured and tested. Further, a specific thing will be learned, and that knowledge will continue to increase.

Formal education is most often classroom-based and takes place within an institution whose primary focus is structured education. [15] Teachers in formal settings are credentialed and trained to develop curriculum with learning outcomes that are aligned with specific educational standards, whether they be content-based or focused on helping kids to pass required tests. The dictates of formal education inherently limit not only what can be taught, but also how teaching is structured, because at the end of the classroom day success is measured by the learners' ability to demonstrate specific content knowledge or by formal examination.

In informal settings, the limitations are not better or worse, but simply different. Although educators are freed from the requirement to teach to curriculum or testing standards, it is absolutely necessary to have clear and defined learning outcomes in an informal educational setting. Outcomes must be meaningful for learners and must be carefully documented to provide feedback for both learners and educators. Public libraries can take a broader approach that takes into account both what we teach and how we teach. We can focus on providing a setting that builds developmental assets and 21st century skills. Because librarians don't need to be licensed and trained as teachers, we are free to use teaching methods that encourage collaboration among participants. We can help youth develop their leadership skills while they deepen their content knowledge.

As libraries begin to engage with the informal learning community, we can develop better tools and skills for monitoring and measuring our success. We can be strategic and gather meaningful data that can help us to market ourselves to our funding agencies.

As long as we continue to align ourselves only with schools and the formal educational setting, and as long as we try to build programs to support the formal requirements for schools, we tie our fates to the vagaries of state and federal mandates for educational success. Moreover, we lose the essence of what libraries can do: step into the third space between home and school, home and work, to provide creative and meaningful opportunities for learning that use a range of techniques and tools to meet the needs of the learner, not the curriculum or the mandates.

# PROGRAMMING OPPORTUNITIES FOR INFORMAL LEARNING

Traditional library preschool storytimes are a perfect example of how to approach informal learning in public libraries.[16] Story times are presented as opportunities for children to gain exposure to key literacy skills—letter knowledge, narrative skills, print awareness—in myriad ways.[17] Some include music and dance or finger plays, or food, but all are grounded in key literacy practices and are designed to generate an interest in books, libraries, and reading. Story-time programs may be formulaic, but there is nothing inherently formal about them. Even though most are thematic, they are not designed to teach kids how to read or to teach them lessons related to the content. Holidays such as Thanksgiving and topics such as trucks or elephants may guide an actual story-time development; there are legions of guides to developing story times that ensure success by connecting to the needs of our patrons.

Story times were never about teaching kids to read; rather, they were developed to expose them to literacy practices in a safe setting and with a wider array of tools than most family could provide. Books weren't ubiquitous in homes in those days, just as computers aren't now. Public libraries didn't always offer story times for young children. In the 1940s and 1950s libraries responded to a growing body of educational research that identified a need for children entering school to be ready to read. The goals for the story times were much the same as they are today and include a desire to promote social skills in young children, again as a prelude to entering the system of formal education.

> In the 1940s and early 50s, librarians began to understand their value as a resource for children learning to read. Public libraries offered an early version of storytimes in the early 1940s as a response to the emerging theory of "reading readiness." Reading readiness was the theory that children needed to be mentally prepared for reading by being exposed to literature before being given physical books to read. . . . This wide-scale effort, which resulted in literacy-focused story hours for preschool-aged children nationwide, was the library's first step toward becoming a major player in early and emergent literacy.[18]

Today's story-time practitioners are largely children's librarians in public libraries. They are not reading teachers, nor are they required to take classes in reading beyond a children's literature course in library school. They aren't required to take additional training, yet providing story times has become almost a requirement for public libraries of any size. This is true despite the fact that an increasing number of organizations in a community—both large and independent bookstores, for example—now offer them as well. Libraries no longer own the market for story times, yet we have set the standard for a quality early literacy program. We've proven it works and now others in the community have adopted our practice.