Making Games, Art, and Animations with Scratch

Kylie Peppler and Yasmin Kafai

A piece of art created in a Clubhouse by an 8-year-old special education student features a picture of a glass of milk, a hand-drawn cookie, and a clip art image of stars that is animated to rotate and change colors at dizzying speeds when the viewer clicks the screen. At the same time, a recording of the artist's loose rendition of Happy Birthday plays. This piece is particularly interesting because the designer is unable to read or write beyond an emergent level but has tied together images, sound, and animation in order to create a personally meaningful and powerfully communicative project using a visual computer programming language called Scratch.

Scratch, a media-rich visual programming software, was created especially for the Computer Clubhouse community to mix new media while simultaneously learning to computer program (Resnick, Kafai, & Maeda, 2003; Maloney et al., 2004). The software is now freely available on the Scratch Web site (www.scratch.mit.edu) and was originally created through a grant from the National Science Foundation awarded to Mitchel Resnick and his Lifelong Kindergarten group at the MIT Media Lab together with Yasmin Kafai and her research team then at the UCLA Graduate School of Education and Information Studies. Mixing a variety of sounds, images, drawings, and photos, Scratch allows youth to easily create their own video games, art, and animations, and then share their creations with others on the Web. Being able to mix a rich assortment of digital media and create interactive work by snapping together building blocks, much like LEGO building blocks, allows youth to take control of the computer in a way that other applications, like Kai's SuperGoo, just doesn't allow. As youth create Scratch projects, they learn important mathematical and computational ideas, while also gaining a deeper understanding of the process of art and design.

Computer programming and media mixing within the context of Scratch can be easy to use and facilitates the creation of digital art. Youth are now able to share creations like this within a Scratch online community, which allows creators from all over the world to view, comment on, download, and remix existing Scratch projects. Our observations suggest that youth leverage previous knowledge in the

design process, appropriating the design software through personal and epistemological connections to their work. While youth were engaging in Scratch, we found that they were learning a variety of new concepts and knowledge important to professionals in creative, critical, and technical fields. In this chapter, we illustrate how media mixing led to the eventual widespread adoption of Scratch within the Clubhouse and beyond through an online community. We followed one Clubhouse of early adopters in South Los Angeles and present example work from three cases over a 2-year period, discussing the learning that took place in the design process as youth appropriated Scratch as a tool for their self-expression.

SCRATCH IN THE CLUBHOUSE COMMUNITY

The success of the new software Scratch was largely dependent on whether and to what extent youth were able to appropriate it into their cultural, personal, and epistemological worlds. In other words, ultimately youth needed to make Scratch a part of their Clubhouse practices while also exhibiting technological fluency and an acquisition of new knowledge though this process. In constructionism we often talk about the process of appropriation, which posits that learners construct knowledge by making it their own, as a key aspect of learning (Papert, 1980). In this chapter, we demonstrate that tools like Scratch or any type of software or artifact introduced at the Clubhouse can be appropriated by the learner as well. Papert argued that learners appropriate knowledge through the making of (1) personal connections (i.e., connections to outside interests, past experiences, or prior knowledge) and (2) epistemological connections (i.e., connections to important domains of knowledge).

More specifically, we focus on three areas of epistemological connections that are particularly important to the Clubhouse youths' work in Scratch: connections to the arts, media, and new technology. These three fields encapsulate the majority of the connections that we have observed youth making to important domains of knowledge that would be recognized in professional fields. This type of situated learning takes place as youth learn the big ideas of computer programming (see Chapter 11). We summarize this as the technological connections that youth make in Scratch, which also include learning to debug technology problems when they arise, as well as becoming more technology fluent. Clubhouse members' design projects are a natural springboard into learning how computers function, particularly by encountering new technical problems, exposure to computer programming, and various types of logical thinking problems.

These technical experiences take on many shapes in the various projects but share a common denominator: Youth at the Clubhouse are looking at the computer in a whole new way—as a new medium for expression and particularly one that requires them to know how to manipulate features to achieve creative ends, sharing many skill sets with computer scientists and professional media artists (Maeda, 2004). A recent report from the National Academy of Sciences highlights the powerful new domain of Information Technology and Creative Practices (ITCP) in the arts and design (Lenhart, Madden, & Hitlin, 2005; Mitchell, Inouye, & Blumenthal, 2003; Roberts, Foehr, & Rideout, 2005). The integrated domain of ITCP yields a

variety of culturally significant results, ranging from innovative computer animation, electronic music, and virtual games that are already part of young people's worlds. In constructing their Scratch projects, youth learn to become more deliberate in their artistic choices and, in the process, often draw connections between several modalities.

In addition to the artistic and technical expertise developed, members use Scratch as a way to engage critically in the world, fostering their ability to decode and evaluate popular media designs, understanding references made in popular designs, and deconstructing and interpreting the meaning behind such designs (Buckingham, 2003; Peppler & Kafai, 2007). This is somewhat unique especially for after-school settings and is in large part due to the media-mixing abilities in Scratch. In our observations, youth naturally pull on their cultural resources as well as popular media in their work. In this chapter and throughout this book, we discuss some of the challenges and opportunities for critical engagement in informal settings.

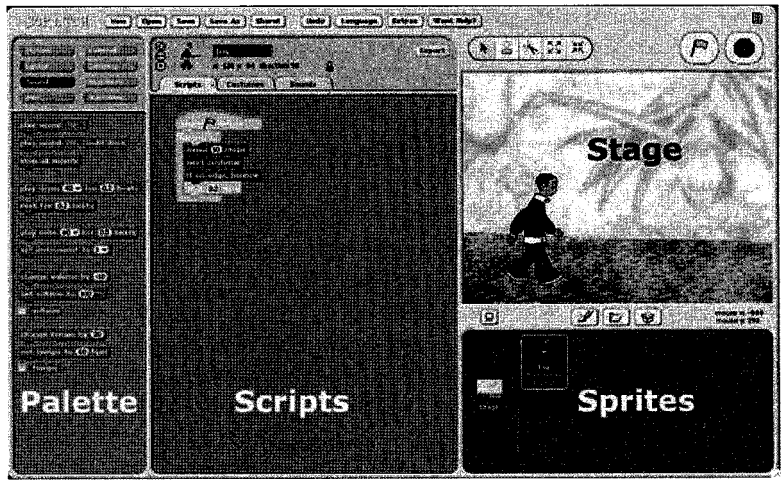
Taken together, these artistic, media, and technological connections form the basis for a complex set of contemporary practices, expanding what it means to be truly fluent in today's multimedia landscape well beyond traditional forms of print literacy. These expanded forms of literacy are not only important to media educators, but are of value to a host of other fields, including computer science and the arts.

A CLOSER LOOK AT SCRATCH

Though Scratch is not the first programming environment aimed at novice programmers (Guzdial, 2003; Kelleher & Pausch, 2005), it is among the first to emphasize media manipulation and programming activities that resonate with the interests of youth, such as creating animated stories, games, and interactive presentations. In today's media landscape, youth define themselves in relation to popular culture phenomena in music, video games, sports, Internet, television, and film. In fact, most youth immerse themselves in several forms of media concurrently in the after-school hours, often doing homework with their iPods playing, chat screens going, and television playing in the background. By allowing youth to incorporate their interests in new media, this becomes a natural springboard into creative production. In fact, youth are significantly more likely to persist in a creative project if it references popular culture in some way (Peppler & Kafai, 2007).

The Scratch screen (see Figure 4.1) is divided into four areas. On the right is the stage; a button on the bar below the stage allows the stage to be displayed in full-screen mode to show off a finished project. Below the stage is an area that shows thumbnails of all sprites (or onscreen objects) in the project; clicking on one of these thumbnails selects the corresponding sprite. The middle pane allows the user to view and change the scripts, costumes (images), or sounds of the selected sprite. The left pane is the palette of command blocks that can be dragged into the scripting area; the palette is divided into eight color-coded categories. A Scratch project consists of a fixed stage (background) and a number of movable sprites, or onscreen objects. Each object contains its own set of images, sounds, variables, and

FIGURE 4.1. Screenshot of Scratch interface with labels



scripts. Visual programming of these objects can be done by dragging command blocks from a palette into the scripting pane and assembling them, like puzzle pieces, to create "stacks" of blocks. This user interface design grew out of a desire to make the key concepts of Scratch as tangible and manifest as possible. Having the command palette visible at all times invites exploration. A user who notices an interesting command can double-click it right in the palette to see what it does. A user can watch stacks in the scripting area highlight as the action unfolds on the stage. These explorations are supported by having the palette, scripting area, and stage simultaneously visible, providing the user with a process model of how their scripts are interpreted by the computer, creating visibility in a world often hidden from the consumer.

MEDIA MIXING WITH SCRATCH

We observed Scratch activities at the South Los Angeles Clubhouse with predominantly Latino and African American youth ages 8–18 and collected all their projects for over a period of 2 years. Clubhouse youth created a variety of projects such as animated stories, video-game art, and interactive or playable art using pop culture images and sounds. Using a comparative case study approach, the youth highlighted in this chapter were selected from over 30 other case study participants based on the prototypical nature of their work and their persistent interest in Scratch over a period of multiple weeks. Each case presents a novel take on how members of the South Los Angeles Clubhouse community appropriated Scratch, as well as highlighting the type of learning that each project exemplifies. Most of these projects are a remix of found images, ideas, and sounds that have been imported into Scratch and uniquely remixed.

Media Art Making with Brandy

"Star Milk," which was presented in the introduction of this chapter, was created by an 8-year-old African American girl named Brandy, who was unable to read or write beyond an emergent level at the time of this study, but was able to create a unique and expressive work of art using Scratch (see Plate 14) (Peppler, 2007). This piece was intended to be a birthday card for the Clubhouse coordinator, and Brandy made connections to her personal and cultural experiences of birthday celebrations, birthday cards, and the birthday song.

Most notably, this piece of art is a good example of the connections that Brandy made to creative or artistic fields, such as media arts. While the term *media arts* is used frequently, it's also used interchangeably with *digital arts* and/or *new media* in many contexts. When a group of professional media artists gathered to discuss the work being produced at the Clubhouse, they were particularly struck by this piece as being exemplary in the collection (Peppler, 2007; Peppler, 2008). Generally, the professional media artists saw this piece as a being successful and "informed by the vocabulary of Scratch." They noted that the quality of the Happy Birthday song was striking because she improvised a new melody around the traditional version, and that the work displayed an unexpected choice of images given the idea for the piece and intrigued the viewer by the interesting coloring scheme and composition. Importantly, the professional media artists compared Brandy's work with that of professional media artists, like Ben Benjamin, and, more generally, blues singers. Clearly, the work being done at the Computer Clubhouse presents opportunities for youth to engage in meaningful and expressive work, which has qualities that can be connected to work being produced in a professional context.

Brandy also made ties to other epistemological domains, such as traditional literacy. In fact, Scratch became a tool for Brandy to reengage in traditional literacies and the schooling curriculum. Ironically, Brandy probably learned to computer program at a novice level before learning to read or write at this same proficiency. In the piece depicted in Plate 14, Brandy used computer-programming concepts like loops and user inputs in this piece. Through working to express herself using a computer language, she was able to make the connection to other types of traditional literacies, which ultimately inspired her to try again at learning to read and write. In Brandy's own words, "Scratch is like a map because it helps me learn"—a powerful testimonial by someone who would otherwise be considered illiterate or preliterate by many.

Music Video Animations with Kaylee

Our second example comes from a 12-year-old African American girl named Kaylee, an avid consumer of pop and R&B music and music videos (Peppler & Kafai, 2007). Frequent activities at the Clubhouse include looking up song lyrics online, singing, and downloading images of her favorite stars. For her first Scratch project, titled "k2b" (see Figure 4.2), Kaylee created a music video based on Gwen Stefani's "Hollaback Girl" (2005). In this sense, the "k2b" project makes several

personal connections to Kaylee's outside interests and prior knowledge of popular culture. The Stefani song responds to a disparaging remark by a fellow musician likening Stefani to a popularity-obsessed high school cheerleader. Stefani's track is set in an imaginary high school and relays the message that insults are not things that she tolerates. In the refrain Stefani asserts that she "ain't no Hollaback Girl," referencing backup members of a cheerleading squad whose job it is to holler back the calls of the head cheerleader. A possible interpretation of Stefani's meaning is that she is choosing not to return insults with words but rather responds by stepping it up with an inventive comeback.

"k2b's" likeness to the original video reveals how closely Kaylee studied the original lyrics and music video and yet reinvented it with a spin. Once a user presses the start button, the "Hollaback Girl" track begins and twelve predominantly female avatars dance on screen. Like Stefani's video, these characters are dressed in a variety of costumes and are programmed to perform dance steps often imitating the choreography of the original. The "k2b" video also alternates between urban, school-themed backdrops. Toward the end of Stefani's version, cheerleaders hold up cue cards that spell "B-A-N-A-N-A-S." At the same point in the song in "k2b," Kaylee programs blue and yellow letters, spelling B-A-N-A-N-A-S, to flash and spin on screen. Furthermore, Kaylee becomes a participant in a larger design culture by posting her work for others to view online. On the Village, an intranet for the Computer Clubhouse Network (see Chapter 8), her project has received over 600 hits from members around the world, a sign that she's created a Scratch project that has stimulated a lot of interest. Kaylee quickly learned how difficult it was to choreograph and direct a complex animation.

Undoubtedly, Kaylee is making connections to the traditional arts, media education, and computer science. The aesthetics of the images played an important role in the design process. In the search for "k2b" images, it was less important to her to insert an image of herself than to find one that fitted her perception of how a music video should appear, underscoring the importance of understanding and emulating contemporary art and pop culture aesthetics. Additional connections to traditional arts include the designer's attention to the choreographing of dancers. "k2b" required precise timing and unique dance moves for each of her characters onscreen. Thus Kaylee was making connections to various arts domains and building an understanding of animation, choreography, music videos, and film. During these design moments, programming took a back seat to design considerations of when characters should enter and exit the stage and how each of the dancers should move, which are roles seldom assumed by youth in the traditional arts. Kaylee also made epistemological connections to computer science. This is exemplified by the designer's use of programming concepts like looping constructs, conditionals, and assembling programs out of base components—concepts that are even difficult for novice computer science majors. In addition, she was able to repurpose code in a meaningful way and accomplish artistic design goals for the piece by taking pieces of code and creatively recombining them for new characters.

The elements that Kaylee chose to alter from the original illuminate how she was critically reflecting on the music video. For instance, while Kaylee chose a school setting in "k2b" similar to that in Stefani's video, she had in fact inserted

FIGURE 4.2. Kaylee's dance video "k2b"

pictures of her own school in Los Angeles, in addition to urban settings that reminded her of her neighborhood (even employing a hand-drawn aerial view of her path between school and the Computer Clubhouse). While the blue and yellow color palette of her work reminds one of the colors featured in Stefani's video, a backdrop of a UCLA tennis court leads one to suspect that Kaylee chose these colors because they are UCLA's school colors, the university that Kaylee hoped to attend. Perhaps most conspicuously, images of Gwen Stefani are nowhere to be found. Kaylee was adamant that she didn't want a picture of Stefani; rather, she wanted a picture of herself and one of her little brother. In the search for these images, Kaylee was very particular about the "look" that she was trying to achieve; her knowledge of pop culture made her very discriminating about the images that she chose, rejecting images of herself in her church clothes because it wouldn't be appropriate for a music video.

What does it mean for a 12-year-old girl to insert herself as the lead singer of this song and why would she want to do this? Because of Kaylee's frequent activity of downloading and studying the lyrics of her favorite songs, one can deduce that she chose "Hollaback Girl" for her video not because she merely liked how it sounded, but because the message of the song was one that she found particularly relevant to her life. Based on discussions with Kaylee about her experiences, this song resonated with her in the way that she navigated—and felt others should navigate—middle school, where often fights break out over petty insults. Furthermore, by placing elements in the video that highlighted her life, her school, and her family, we see the value that she placed in her upbringing. Kaylee's particularity regarding the ways that "k2b" should look like a "real" video demonstrated that the elite world of Kaylee's pop idols was not superior to images of her family and her environs. This demonstrates that Kaylee was making critical connections to

popular culture and youth culture themes of power, confrontation, and resistance, which are common among school-age youth fighting to be heard and recognized.

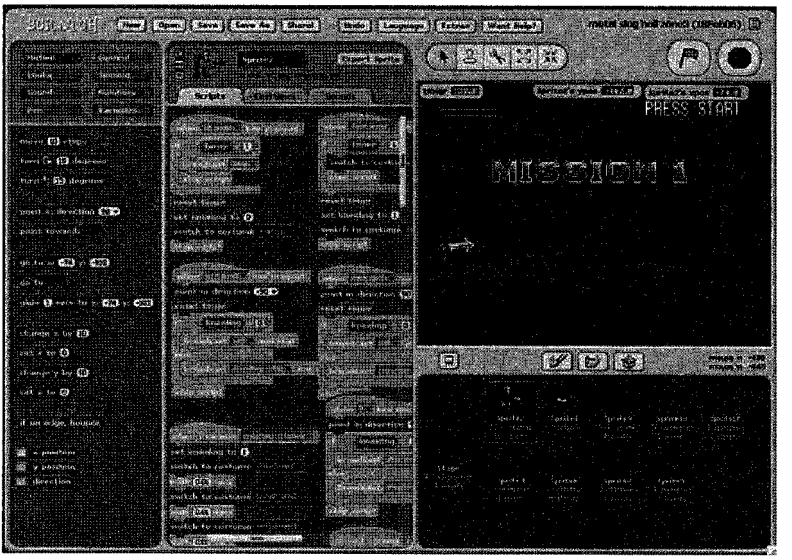
Video Game Making with Jorge

In our last example, we draw from a video game called "Metal Slug Hell Zone X," created by a 15-year-old Latino male designer named Jorge, who modeled the piece after a popular video game with a similar title (Peppler & Kafai, 2007). The original Metal Slug is a futuristic "run and gun video game" widely known for its sense of humor, fluid hand-drawn animation, and fast-paced, two-player action. At home Jorge had a passion for video gaming, and at the Clubhouse he spent the majority of his time working on Scratch projects. "Metal Slug Hell Zone X" was his second project. When the viewer presses a start button, a title screen prompts the player to choose one of four avatars. The selected avatar then appears on the screen in a barren purple desert landscape with moving clouds overhead. Players use the arrow keys to move forward and backward, crouch, jump, and fire a gun (see Figure 4.3). Jorge clearly relied on his personal interests in video gaming as well as his prior knowledge of the Metal Slug games to create this work, which reflect that Jorge was able to forge several strong personal connections to Scratch while making his video game.

Jorge mixed a full range of creative software to make his project. Using the paint editor within Scratch, Jorge paid meticulous attention to realistically animating the avatar as it moved. He made sketches based on playing the original video game, downloaded sample avatars from Internet fan sites, and refined each frame of the movement in the paint editor for smooth stop-action animation. Utilizing the visual programming capabilities of Scratch, Jorge animated these images to respond to keystrokes so that the avatar walks effortlessly across the screen or jumps when prompted by control keys. Jorge used standard design conventions found in video games, even creating special responses if the avatar is told to do something (such as shoot) while crouching or jumping. He learned how to design for interactive play and redesigned his program several times, discovering that it can be friendlier to the user to design a game that responds to standard key strokes (e.g., right and left arrow keys) rather than random characters on the keyboard.

Jorge also learned how to participate in the distributed online culture specific to designing and making fan video games. Scratch facilitated his understanding of how games are made by professional production specialists and he also networked with other fans, like himself, who want to create amateur productions. In this sense, Jorge learned about the art of animation and video-game design. The "Metal Slug Hell Zone X" game also has some complex technical components underlying his design. Jorge discovered how to create a side-scrolling game and complicated types of animation by using a combination of difficult programming concepts, including variables, loops, conditional statements, communication and synchronization commands (such as broadcast and when-receive), and Boolean logic. These demonstrate a range of computer programming concepts (and a wide range of technology fluency) in the adoption of these concepts for use in his game.

FIGURE 4.3. Jorge's video game "Metal Slug Hell Zone X"



Finally, Jorge's project also moves beyond some of the connections to artistic and technical domains, to make connections to media education. For example, Jorge's video-game production provides insight into how the goals of media education apply to gaming. In this project, Jorge learned about game design through imitation, and as Buckingham (2003) points out, "imitation is an indispensable aspect of learning" in media education (p. 134). Beyond Jorge's attention to interface conventions, he explored, and in some senses reformulated, genre conventions of shooter games. The title denotes that his work is in the same series as other Metal Slug games (e.g., Metal Slug 2, Metal Slug X, and Metal Slug Advance), yet there seems to be a parodic edge to the title (Hell Zone X) because, while he has conformed to most of the trademarks of the series, Jorge's re-creation has an almost Zen-like impact on the viewer/player. Jorge's game lacks the loud music and sound effects of the original, and with animated clouds floating overhead and the rolling terrain beneath, the resounding quality of this game is one of tranquility and solitude. Jorge created no antagonists to shoot, no violence, no blood, and no chaos that we might otherwise expect in a "Hell Zone," and instead has focused on creating a smoothly animated protagonist and a space for this character to dwell. While some might question whether Jorge had the time or the know-how to do such things in Scratch, when we examine this case longitudinally, we actually discover that his earlier work contained all of these conventions, which were slowly subtracted from the game until it reached the point in the design process described in this chapter. This seems to be a play on the genre itself (simultaneously a violation and a creative act). Jorge told us that one of the reasons for coming to the Clubhouse included the sense of focus and calm that he experienced when he worked on his projects. In this sense, the game serves as a metaphor for

Jorge's everyday experiences and encapsulates the sense of relief that Jorge felt at the Clubhouse when he was engaged in his work.

LEARNING WITH SCRATCH ON MULTIPLE LEVELS

Through these case studies, we can see that youth are mixing a variety of media, genres, and ideas in Scratch. Learning to mix new media allows youth to build on their existing knowledge and learn about new epistemological domains of value to the larger society. This is particularly important as youth from under-served areas engage in after-school learning. At the Clubhouse, youth are able to build bridges between their cultural backgrounds as well as extend their understanding of domains that are outside of the typical offerings of low-income schools, such as computer science, art, and media education curricula. While these case studies describe the successful appropriation of Scratch within the South Los Angeles community, even a cursory look at the Scratch online archive gives one the sense that youth all over the globe are able to use this tool for personal expression, critical engagement, and the development of technical expertise.

This chapter demonstrates how media mixing within Scratch provides youth with a tool to develop several skill sets while simultaneously supporting prolonged engagement with projects that are often deeply individual and personally meaningful. Scratch is but one tool for media mixing, as youth doubtlessly mix media across a variety of software at the Clubhouse. Regardless of the platform, youth—especially ones the age of those in our case studies—are at a critical stage in the formation of their identities and often become disenchanted in both school and out-of-school settings with activities that do not allow them to build upon their preexisting interests. Being able to use one tool like Scratch for a variety of purposes (such as making art, animations, or video games) allows youth to make connections among different genres of work and different disciplinary domains, and allows youth to appropriate the software in a way that resonates both personally and culturally with them. For this reason, we add a third type of connection that youth make while engaging in Scratch—cultural connections—which are relations to a larger cultural context, whether it be youth culture in general or part of other specific cultures to which the youth belong (Peppler & Kafai, 2006).

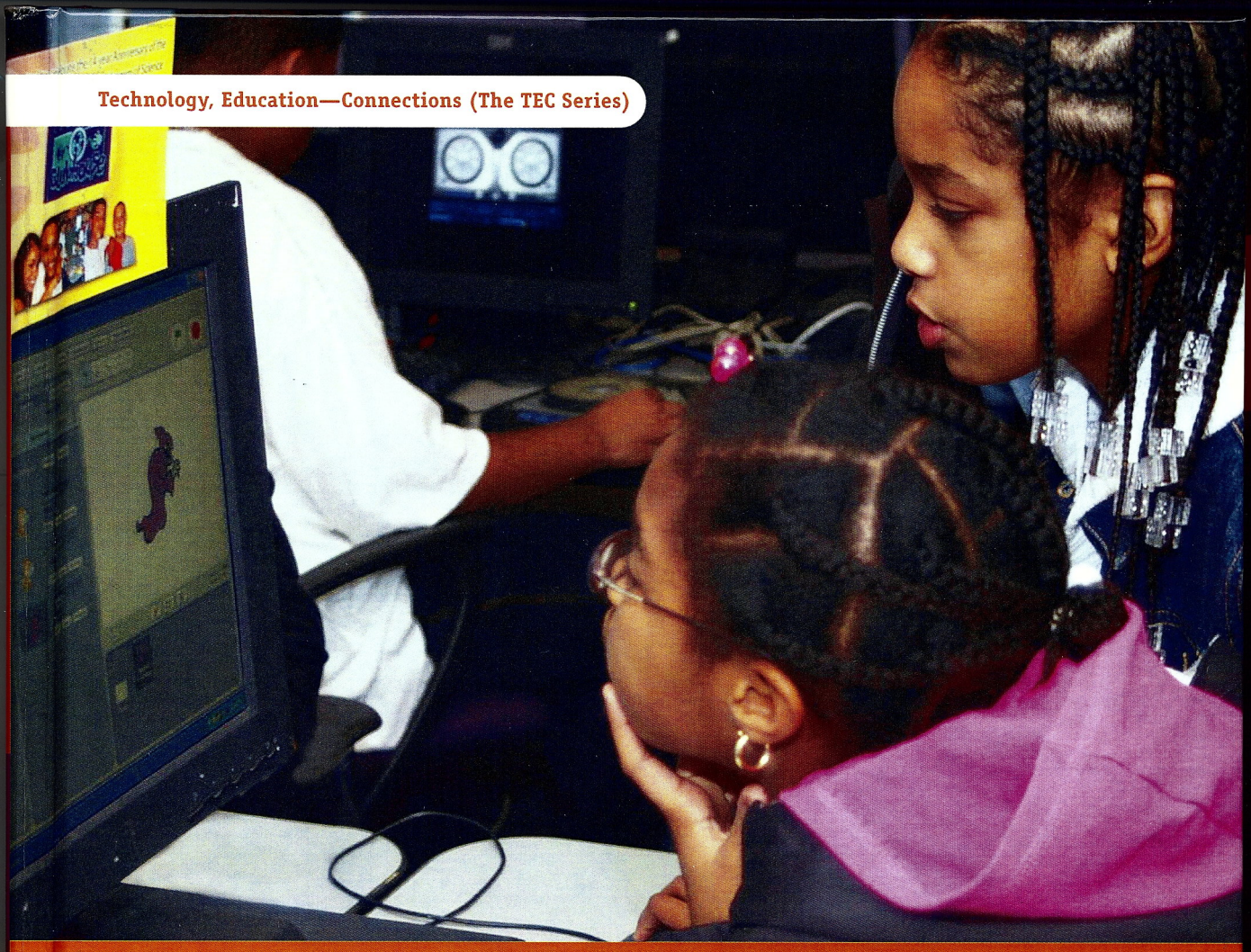
Epistemological connections are varied and plentiful in the work created in Scratch. We have explored three broad areas here, including connections to the arts, media, and new technology made while engaging in work in Scratch. While there are countless other connections that youth make to math, science, and other areas beyond the arts, media, and computer science, these areas are particularly well suited for summarizing the media-rich aspects of Scratch. What is unique about the creative experiences in Scratch is that youth are able to create and animate their own images but they are also able to engage in a broader range of roles, from artist, to performer, to director, and more. While other types of production, such as video production, act in a similar manner, Scratch enables both individuals and collectives to engage in this type of work. We have also argued that, through production, youth are increasing their understanding of media more generally

and becoming more critical and discriminating participants in the larger media landscape (Peppler & Kafai, 2007). As youth engage in Scratch, they comprehend which aspects of media are malleable and how interface design changes the user experience. In addition, these case studies illustrate how designers develop an understanding of how genres are products of social and cultural construction, and result from choices made during the creative process. At the core of the technical learning in Scratch is the building of computer programming conceptual understanding. These case studies illuminate how programming within a media and/or arts context is very different from a context of math and science. Programming in this context is less about code and more about personal and critical expression. In fact, as youth engage in Scratch they are learning to manipulate the medium of the computer to create their own software packages, which is the main advantage of using a suite of programming tools such as those found in Scratch.

While case studies of youth in the Computer Clubhouse give us only a partial understanding of the larger design culture, they do provide us with an understanding of how individuals are able to repurpose the design environment for personal expression. Media mixing with Scratch has implications for broadening the participation and applications of traditional programming courses in K–12, which tend to focus on mathematics and science. Additionally, media mixing with Scratch is an essential component to artistic expression in a digital era—a tool that has an arguably increasing importance for youth and society at large. These projects emphasize media applications that are all at the core of technology interests for youth and thus could provide new opportunities to encourage and broaden participation of youth from underrepresented groups to become designers and inventors with new technologies.

As youth become more comfortable with the media-mixing capabilities within Scratch, they begin to branch out and explore other areas such as the physical interfaces or sensors that they can incorporate into their work in Scratch. The MIT Media Lab has made Scratch Sensor Boards available through the Scratch Web site, which are reminiscent of LEGO Mindstorms kits, but the upcoming chapter (Chapter 5) presents some of the work that youth have been doing to create their own sensors and various types of input, moving away from the keyboard and mouse interfaces into a wider array of interfaces. In doing so, youth connect to a wider array of computer science, engineering, and science concepts, moving beyond what is just offered in the on-screen environment.

Technology, Education—Connections (The TEC Series)



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THE COMPUTER CLUBHOUSE

CONSTRUCTIONISM AND CREATIVITY IN YOUTH COMMUNITIES

Forewords by BARTON J. HIRSCH AND ROSALIND HUDNELL

Contents

PART III: COLLABORATIONS IN THE CLUBHOUSE COMMUNITY

PART IV: SHOWCASES OF COMPUTER CLUBHOUSE SUCCESSES

This book is about the Computer Clubhouse—the idea and the place—that inspires youth to think about themselves as competent, creative, and critical learners. So much of the social life of young people has moved online and participation in the digital public has become an essential part of youth identities. The Computer Clubhouse makes an important contribution not just in local urban communities but also as a model for after-school learning environments globally. This model has been uniquely successful scaling up, with over 100 clubhouses thriving worldwide. Showcasing research by scholars and evaluators that have documented and analyzed the international Computer Clubhouse Network, this volume considers the implications of their findings in the context of what it means to prepare youth to meet the goals of the 21st century.

Book Features:

- A successful, scalable model for providing at-risk youth a rich array of media design and computing experiences.
- Diverse examples of media created in the Clubhouse, ranging from digital stories, video games, interface designs, and digital art projects.
- Color photos of life in the Clubhouse, including youth projects.
- Interviews with stakeholders in the Clubhouse Network, from the director to coordinators at various international clubhouses.

"It is difficult to conceive of an after-school setting that would have a greater emphasis on positive youth development.... Beyond learning computer programming, young people at the Clubhouses learn marketable skills in product design, project management, teamwork, marketing, and communication.... Read [these chapters], appreciate what has already been accomplished, and consider the exciting possibilities for the future."

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—**Michael Cole**, author of *The Fifth Dimension: An After-School Program Built on Diversity*

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