INCORPORATING TECHNOLOGY INTO OUT-OF-SCHOOL TIME PROGRAMS: BENEFITS, CHALLENGES, AND STRATEGIES

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BACKGROUND

Children and youth are growing up in an increasingly technology-saturated world. Digital devices, the Internet, and interactive media have become ubiquitous.[1,2] As a result, young people are not only becoming expert users of technological devices, but technology and technologically-based learning environments are extending student learning beyond the conventional classroom.[3,4,5] This brief draws on results from non-experimental research and the insights of practitioners to outline the benefits, challenges, and strategies associated with incorporating technology into out-of-school time programs.

WHY USE TECHNOLOGY IN OUT-OF-SCHOOL TIME PROGRAMS?

Technology can strengthen the activities offered by out-of-school time programs and broaden participants' educational opportunities in a variety of ways. It can be used to:

- **Supplement in-class instruction.** Technology can be used to reinforce concepts introduced to program participants while in school. Computer software, in particular, can enable students to visualize, communicate, and practice in-class concepts.[6,7] For example, one urban school district allocated funding to local afterschool programs to provide computer-based tutoring for students at risk of failing a class or grade level. Teachers reported that the afterschool activities reinforced what students learned in the classroom and improved students' standardized test scores.[8]

  The opportunity to hone technologically-based skills can provide program participants with opportunities to practice and apply new concepts and, subsequently, prepare program participants for a technologically-based society and workforce.[9,10] For example, video production students at Bemidji High School in Minnesota, film, edit, and broadcast the school's televised Friday announcements, which they call "Lumberjack Live." The experience spurred many of the students who participated in the project to study mass communications in college or become freelance videographers following high school graduation.[11] Research indicates that when people participate in such *authentic learning*—that is, when they develop knowledge and skills within the context or situation in which they are likely to use the knowledge and skills—they are more likely to understand concepts and apply them in the future.[12,13]

- **Build links with online information.** Internet and computer software can provide students with a wealth of easily accessible information by linking related information to online documents.[14] One example is an online article on President Obama's first trip to Europe.[15] Such links allow students to connect with relevant information, and research has found that such connections promote knowledge-building.[16]

- **Provide information to program participants in diverse locations and time zones.** Internet access can unite youth from urban, rural, and suburban communities across the United States and link U.S.

youth with their counterparts around the world.[17,18] Through technology, children, youth, and educators can access and post multimedia (such as videos, documents, and entire Web pages) on the Internet.[19] Online resources can also expose children and youth to cultural and locale-specific information that they may otherwise not encounter.[20] For example, through the Global Kids out-of-school time program, high school students developed a computer game based on life in Haiti that allows players to explore the challenges children in developing countries face in obtaining an education.[21] Similarly, technology can enable program staff to access professional online communities.[22] Online communities offer educators access to instructional resources and professional development, as well as the chance to share ideas with other educators.

- **Increase engagement in learning.** The use of technology has also been associated with increases in child and youth engagement. Students using technologies, such as the tablet personal computer and educational software, reported that the experience enhanced their ability to learn and made learning enjoyable. [23,24] Research has found similar links between increased student engagement and increased motivation to learn. [25]

- **Allow program participants the flexibility to learn at their own pace.** For example, programs that have incorporated math and reading computer software into their activities have found that this practice allowed students of differing ability levels to pace their online learning in a way that was appropriate for them.[26] Similarly, some computer software includes different programs and program designs that users can select based on their preferences and abilities.[27]

- **Increase parental involvement.** Parental and family involvement in out-of-school time programs can have a positive effect on program and school outcomes.[28,29,30] Providing program participants' parents or guardians access to the Internet (to check their e-mail, conduct job searches, and monitor the academic performance of their children) has been used successfully to promote parental involvement.[31] Programs have also found it useful to incorporate technology into parent training.[32]

- **Supplement limited program staff and resources.** Limited resources and staffing can restrict the extent to which out-of-school time programs can provide enrichment activities to participants.[33,34] However, technology can expose participants to enrichment opportunities that out-of-school time programs may otherwise be unable to provide. For example, with online career development opportunities, youth can use Internet resources and online games to explore employment options to learn more about their professional interests, careers well suited to their interests, and the higher education necessary to pursue these careers.[35]

- **Promote program participants' academic success.** Technology can increase student achievement. Some studies have found that academic achievement is higher when students receive computer-based instruction than it is when they receive traditional classroom instruction.[36,37] Moreover, after using computers for educational purposes, students often rated their academic performance higher, felt that subsequent class assignments were easier, and had a greater desire to study the subject.[38]

WHAT ARE SOME OF THE CHALLENGES ASSOCIATED WITH USING TECHNOLOGY?
Even though out-of-school time programs can derive many benefits from the use of technology, program staff and educators have identified several challenges to that use:

- **Expense.** Incorporating technology into out-of-school time program activities requires sufficient funds to purchase and maintain the technology. For example, programs must be able to cover not only the costs of purchasing computers, but also the costs of software, Internet access, computer

maintenance, and other hardware (e.g., printers and scanners).[39] Budgetary constraints are among the chief barriers staff members cite for not incorporating technology into their daily activities. [40,41]

- **Staff training.** Despite the prevalence of technology in society, program staff are often ill-equipped to integrate technology into program activities.[42,] Without training staff members to incorporate technology into their daily activities, they are less likely to use it and more likely to underuse it when they do make the attempt.[43,44,45]

- **Planning time.** Some staff members have found that it can be time-consuming to plan activities that seamlessly incorporate technology, while appropriately differentiating activities for program participants of varying academic abilities, interests, and technological experiences. [46,47] In fact, some staff members reported that they do not use technology at all, because they do not have enough time to plan for its use.[48] Of the staff members who do use technology, some reported that constraints on planning time caused them to use technology infrequently or without maximizing the benefits to student learning.[49]

- **Risks.** Accessibility to the Internet has heightened the concern of adults (parents, educators, and child care providers especially) that children and youth could be susceptible to online predators or inappropriate material, such as that depicting excessive violence or pornography. [50,51,52]

WHAT STRATEGIES CAN BE USED TO OVERCOME CHALLENGES TO TECHNOLOGY USE?
In light of the potential challenges associated with technology use in out-of-school time programs, staff and educators may find several strategies helpful in incorporating technology into program activities or instruction:

Strategy 1: Offer training to staff on using technology. Staff members are more likely to incorporate technology into their regular activities when they receive training on how to use it.[53,54] Effective training should include several components: an explanation of the theory behind using technology in program activities; a demonstration of how to incorporate technology into the program; and opportunities for staff members to practice and receive feedback on technology use.[55] Sufficient time should be allotted for each training component so that staff members will feel comfortable and prepare to use technology.[56] The type of training provided may differ by program, staff need, and technology type, and may follow a variety of formats, including summer technology institutes, mini-courses during the school year, and online instruction and guidance.[57,58]

Strategy 2: Provide sufficient technical support. When staff members receive ongoing technical support, they are more likely to integrate new skills into their regular practice effectively.[59] Support could include having an information technology specialist on staff, allowing staff members access to phone or online technical support, or having more technologically savvy staff members coach their less technologically savvy colleagues.

Strategy 3: Provide guidelines and role modeling to program participants in the use of technology. Program controls and media literacy can reduce child and youth exposure to harmful media content.[60,61] Research indicates that the age, personality, and level of adult involvement can influence the effects of technology on children and youth.[62,63] As a result, it is important for programs to establish guidelines for participants' technology use to ensure they are exposed to age-appropriate media and in appropriate amounts. Guidelines may include:

- Restricting program movie use to those with G (General Audiences-All Ages Admitted) ratings and select movies with PG (Parental Guidance Suggested) ratings;

- Using computer blockers or television V-chips to restrict program participants' television and Internet viewing to age-appropriate programs or Internet sites;
- Referencing Web sites associated with federal media mandates (such as the Children's Internet Protection Act, Children's Online Privacy Act, and Family Educational Rights and Privacy Act) to help develop appropriate technology guidelines;[64] and
- Limiting the amount of program time that participants may spend on the computer or watching television.

In addition to establishing guidelines, programs can help participants become wise consumers of media by teaching children and youth how the media operate, modeling appropriate media use, and providing media education.[65]

Strategy 4: Partner with schools and businesses to purchase or maintain program technology.
Partnerships with universities, foundations, and businesses can help offset the costs of purchasing and maintaining technology.[66] Technology-based out-of-school time programs have also partnered with community science centers, primary and secondary schools, local school districts, park and recreational organizations, and Girls Scouts of the USA.[67,68] In addition to obtaining support through partnerships, funds for video production equipment have been raised by program participants' filming of school events and selling of the videos, and producing and selling video yearbooks.[69]

WHAT ARE SOME CREATIVE USES OF TECHNOLOGY IN OUT-OF-SCHOOL TIME PROGRAMS?
Technology can be used to extend student learning in a variety of creative ways. Out-of-school time programs have found the following uses to be especially beneficial:

Creative Use 1: To reinforce program participants' reading and comprehension skills. Computer-based reading intervention programs have been used to successfully supplement children's in-class reading and comprehension skills.[70, 71] A variety of programs have used technology-based programs to provide children and youth with practice in phonics, story comprehension, and vocabulary-building.

Creative Use 2: To strengthen participants' writing skills. Technology can be used to engage students in writing compositions and poetry.[72] Computer software allows children to brainstorm writing ideas through the development of computer-generated graphic organizers.[73] Some out-of-school time programs, including DC SCORES!, use the Internet to post students' completed poetry and compositions.[74] Educators have found that such Internet "publications" can increase student motivation to produce quality writing.[75]

Creative Use 3: To chronicle long-term projects. Program participants can use computer-based programs to follow developments over time, whether it is how plants are growing or how a community service project is progressing. For example, computer software enabled third-grade students in Honolulu to create a video (complete with narration, digital pictures, and on-camera interviews) to chronicle their class garden.[76] To gather information for the video, the students conducted interviews with experts and researched ideal plant conditions (including the optimum soil and watering schedule).[77]

Creative Use 4: To conduct research. Online resources can help program participants with out-of-school time research projects. Online video-streaming (such as that available through the Rhode Island and Las Vegas Public Broadcasting Services) offer online videos that correspond to local social studies, science, math, health, and language arts content standards.[78,79] Governmental agencies (including the U.S. Fish and Wildlife Service, U.S. Department of Agriculture, and U.S. House of Representatives) provide kid-friendly information sites.[80,81,82] Some nonprofit and community organizations also offer child-appropriate online resources. For example, Caribbean Conservation Corporation, a marine life conservation organization, allows children to adopt and track a sea turtle through its migration process.

The organization's Web site also provides instructional resources, including online games[83] and links to student worksheets about marine life.[84]

Creative Use 5: To help participants explore the world around them. Video technology can involve program participants in the exploration of their world through filmmaking, digital artwork, and online instruction. Online video can also expose program participants to new aspects of their world. For example, students can watch online performances by professional musicians through a variety of outlets, such as the Web site of the Dallas Symphony Orchestra.[85]

Creative Use 6: To deliver and receive art education. Out-of-school time programs have incorporated technology into photography activities. Through the First Exposures program, 11-to 18-year-olds in San Francisco participate in weekly photography classes and are mentored by a professional photographer.[86] Similarly, in the Digital Doodles class offered by Abrakadoodle, a national art education program, participants learn about photography, photo printing, and photographic artwork.[87] And in Denver's Working with Artists Photography program, instructors offer technical training to elementary and high school students on digital photography software, and darkroom picture development.[88]

Creative Use 7: To prepare youth for technology-based careers. Media technology can be used to offer program participants professional training in media production. The Dallas Media Youth Channel sponsors a weeklong Summer Media Camp, where children and teens write the script, shoot the video, and make the storyboard for television programs later shown on the channel. The channel also offers young people paid internships that enable them to help manage programming events, perform administrative tasks, participate in ongoing projects, and contribute to production needs.[89] Likewise, middle and high school students at the Adobe Youth Voices/Cinequest Filmmaking Camp produce short films and receive mentoring and instruction from professional filmmakers during the camp's month-long program.[90]

CONCLUSION
Despite the potential challenges associated with technology use in out-of-school time programs, computer software, Internet, and electronic equipment (including digital cameras and television broadcast equipment) can extend student learning in out-of-school time programs. Program partnerships, staff training, and proactive steps taken to plan against inappropriate Internet content can help maximize the diverse benefits and minimize the challenges of technology use in out-of-school time programming.

ADDITIONAL RESOURCES FOR PROGRAMS INTERESTED IN INCORPORATING TECHNOLOGY INTO THEIR ACTIVITIES

Partnerships for Achieving Careers in Technology and Science (PACTS) is a yearlong program sponsored by The Franklin Institute in Philadelphia that provides youth with instruction in technology, science, field-based research, career development, and mentoring. PACTS and The Franklin Institute offer online science and technology resources. For more information, see: http://www.fi.edu/tfi/programs/pacts/ and http://www.fi.edu/learn/index.php, respectively.

Studio 3D (Digital Design & Development) is project-based afterschool program that enables young people between the ages of 10 and 17 to learn how to use computer applications to explore science, art, and technology under the guidance of adult mentors. For more information, see: http://www.smm.org/studio3d/index.html.

MIRACLES Tech program software is being used by The John Spry Community School (Chicago, IL) to provide students with technology skills, reading and math enrichment, and life skills (such as leadership, citizenship, and teamwork). The software was designed for sixth- through 12th-graders to use during afterschool or summer programs. For more information, see: http://www.miracles.org/miraclesTech.html.

Global Kids Online Leadership Program uses digital media to promote global awareness and civic engagement by infusing an international and public policy perspective into digital media, online games and dialogues, and the program's virtual world, Teen Second Life. For more information, see: http://www.globalkids.org/?id=5.

Girl Game Company teaches middle school girls how to design and program computer games; produce a digital documentary about game development; and prepare for jobs with science- or technology-based companies. The Girl Game Company's afterschool and summer programs aim to increase the number of Latinas entering science and information technology fields. For more information, see: http://psweb.etr.org/gcgweb/public/games/index.html.

Collaborating Artists Media Project is a nonprofit arts education organization that provides elementary and middle schools with new media equipment and support, and also holds adult media workshops. For more information, including examples of student products, see: http://www.thecamproject.org.

Adobe Youth Voices is a philanthropy program that encourages young people to investigate, consider, and actively participate in their communities through the use of video, audio, digital photography, animation, and Web design. For more information, see: http://www.adobe.com/aboutadobe/philanthropy/youthvoices/.

First Exposures is a program that pairs youth with professional photographers for a year-long mentoring relationship. In addition to mentoring, students receive free, weekly photography classes. For more information, see: http://www.sfcamerawork.org/education/first_exposures/index.php.

Additional programs available in: Wimer, C., Hull, B., and Bouffard, S. (2006). Harnessing technology in out-of-school time settings. *Out-of-School Time Evaluation Snapshot,* No. 7, 1-8

Online Resources for Program Staff

- **Edutopia** aims to encourage the use of technology in education by providing online professional development, lesson plans, classroom examples, and tips for integrating multiple content areas, project-based learning, and social and emotional learning, as well as for conducting assessments. Edutopia's resources are available at: http://www.edutopia.org/.

- **PBS Teachers, PBS Parents, and PBS Kids** provide instructional, parenting, and kid-friendly activities, respectively. **PBS Teachers** offers educators pre-kindergarten through 12th-grade resources and activities that correspond to Public Broadcasting Service (PBS) programs, local and national education standards, and an array of academic subject areas. These resources are available at: http://www.pbs.org/teachers/. **PBS Parents** shares child development information, age-appropriate activities for children, and parenting advice with parents; available at: http://www.pbs.org/parents/. **PBS Kids** has coloring sheets, online games, music, and videos ready for children; available at: http://pbskids.org/.

- **Thirteen Ed Online** provides educators, parents, and students with resources to support student learning. For educators, the site includes lesson plans, online professional development, and instructional tips. For parents, the site provides information on child care and parenting strategies; for students, it provides homework help, including online educational videos. Thirteen Ed Online is available at: http://www.thirteen.org/edonline/index.html. Additionally, Thirteen Ed Online's **Afterschool Exchange** links out-of-school time programs with public television resources; available at: http://www.thirteen.org/edonline/afterschool/index.html.

- **Free Resources for Education Excellence** is a compilation of instructional resources from various federal government agencies, including diverse subject content for kindergarten through 12th-grade students; available at: http://free.ed.gov/.

- **Scholastic**, the children's book publisher and distributor, offers lesson-planning resources, student activities, information about books and authors, opportunities for teachers to swap lessons, and online videos about authors, illustrators, and professional development. Scholastic's online resources are available at: http://www2.scholastic.com/browse/home.jsp.

- *TIME for Kids* is a weekly classroom magazine for kindergarten through sixth-grade students. The Web site provides students with an online version of the magazine, research resources, tips on writing strategies, and opportunities to "virtually" visit different countries. For these student resources, see: http://www.timeforkids.com/TFK/kids; for teacher resources, see: http://www.timeforkids.com/TFK/.

- **Apple Learning Interchange** allows educators to share lesson plans, network with one another, and collaborate online. For more information, see: http://edcommunity.apple.com/ali/index.php.

- **Wiki-Teacher** provides lesson plans, academic content standards for first through fifth grades, demonstration videos, and a place for educators to upload resources that they have found especially helpful. For more information, see: http://www.wiki-teacher.com/index.php.

- **TeachAde** shares curriculum and professional development resources and enables online teacher collaboration and networking. For more information, see: http://www.teachade.com/viewHome.do.

IN THE SPOTLIGHT
Program: Global Kids
Location: New York, New York

In the following interview, Rik Panganiban**,** Assistant Director of **Global Kids' Online Leadership Program**, provided insights into implementing a technology-based out-of-school time program.

What is Global Kids? Global Kids is a 20-year-old youth development organization in New York City that is committed to transforming at-risk middle school and high school youth into successful students and global and community leaders. The program helps young people build connections between global issues and their personal experiences and then "do something about it." With youth navigating in a digital environment, Global Kids considered how video and other online artistic expression could be incorporated to make young people effective global citizens. Global Kids' Online Leadership Program allows youth to use media to connect artistic expression (such as theater, hip hop music, spoken word, and drumming) with human rights issues.

What are the benefits of technology use in your program? The use of technology is a helpful recruitment device. Students are interested in having the opportunity to review and develop video games and to discuss text messaging and social networks. Technology amplifies youth voices by allowing participants to create something that will viewed by 1,000+ people over the Internet. It also expands the horizons of program participants, who rarely leave their neighborhoods. Global Kids may not be able to fly students to Africa to learn about child soldiers, but it can offer students virtual expeditions and assess their expertise about the topic, enabling them to talk about a topic that they initially knew nothing about.

How are staff members trained to use technology? Keeping staff members abreast of new technology is a moving target, because technology is always changing. Online social networks have evolved from MySpace to Facebook to Twitter. Program staff tries to stay ahead of the evolution by talking with students about the technology they use and then strategizing with staff on how Global Kids can address arising issues.

Have any partnerships or funding been particularly helpful in purchasing and maintaining program technology? It has been helpful to use inexpensive media that is easily accessible to youth. For example, program participants use flip cameras that retail for about $100, and the program receives a two-for-one deal when they order the cameras in bulk. The program also makes use of Apple Computer's Educator benefits and financial donations from technology companies.

Are participants' family members allowed to use program technology? Participants are the only ones who have access to program technology, because: 1) when afterschool activities are held at middle schools or high schools, students are the only ones present to use on-site technology; and 2) during other program activities, only participants are present to use the technology at the Global Kids office.

Is a curriculum used to incorporate technology into program activities? Staff constantly create innovative activities and share them with colleagues. If ideas are used repeatedly, then staff members share them on the group wiki,[i] adapt them for future program activities, and incorporate them into the professional development that Global Kids offers to outside personnel (e.g., educators and other afterschool practitioners).

What guidelines are in place for program participants when using technology? Program-wide rules are applied to technology use. These include: 1) One mic[ii] (one person speaking at a time), 2) Participate (no passive participants), and 3) Safe space (an environment conducive for dialogue). There are no filters on program computers, because the program expects that participants will use the Internet for educational purposes.

What advice would you offer programs wanting to incorporate technology into their activities? Look at the way young people are accessing and consuming technology as an asset, not a drawback. We know youth are using [technology-based] tools. It is about creating a better context for using technology, seeing ourselves in different ways, making community connections, and acknowledging youth as experts with technology-based tools.

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[i] A wiki is a Web site where users can collaboratively create, modify, and organize Web site content.
[ii] Microphone.

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