The First All-Digital Library Space: The Effectiveness of BiblioTech's Services for Urban Youth

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Abstract

As the first physical library space in the United States offering all technological and digital resources, BiblioTech provides much-needed support for youth in the urbanized area of San Antonio, Texas. In this study, we critically analyzed the impact of the library's services on the community using mixed methods, specifically looking at the merit and value of BiblioTech's services for middle and high school students. The findings of a chi-squared analysis indicated a non-significant but interesting relationship between usage of library services and reading achievement data. Utilizing focus groups and surveys with middle and high school students, we

documented the importance of the social nature of BiblioTech's physical and digital spaces in the lives of the young people it serves. Namely, youth talked about their appreciations of BiblioTech's services and the affordances those services offered them. They also talked about the importance of the relationships they developed with both peers and staff at BiblioTech and the way in which the services offered them opportunities for personal development.

Introduction

With the ever-expanding role of technology, the demands placed on twenty-first-century learners continue to evolve and change. Access to the Internet is critical in order to fully participate in a democratic society. Unfortunately, the "digital divide," a term that refers to inequities in access to technology across groups, continues to be a reality among citizens in the United States.[1] For example, youth who live in historically and traditionally under-resourced neighborhoods continue to have less access to the Internet than those who live in more affluent neighborhoods.[2] Access is a critical issue as research has demonstrated the relationship between Internet access and school achievement. For example, researchers Ba, Tally, and Tsikalas showed the importance of computer and Internet access for youth from families who live in low-income situations in completing and enhancing schoolwork.[3] In order to prepare young people for the exigencies associated with global economies in a high-tech world, educators, librarians, and policy makers must come together in ways that provide access, support learners, and promote digital literacy and academic success.

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[1] U.S. Department of Commerce, "Falling through the Net: A Survey of the 'Have Nots' in Rural and Urban America" (Washington, DC: National Telecommunications and Information Administration, 1995), https://www.ntia.doc.gov/ntiahome/fallingthru.html; Albert D. Ritzhaupt, Liu Feng, Kara Dawson, and Ann Barron, "Differences in Student Information and Communication Technology Literacy Based on Socio-Economic Status, Ethnicity, and Gender," *Journal of Research on Technology in Education* 45, no. 4 (2013): 291–307, doi:10.1080/15391523.2013.10782607.

[2] Pippa Norris, *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide* (Cambridge: Cambridge University Press, 2001).

[3] Harouna Ba, Bill Tally, and Kallen Tsikalas, *Children's Emerging Digital Literacies: Investigating Home Computing in Low- and Middle-Income Families* (New York: Center for Children and Technology Reports, 2002).

As scholars explore ways of reducing the digital divide, public libraries have emerged as a viable solution to the issue. By increasing their technology-based services, libraries have the potential to impact change in underserved communities. In addition to access, successfully bridging the divide requires effective libraries and programs to provide technological training and support.[4]

Bexar County, the fourth largest in the state of Texas, is a culturally, linguistically, and ethnically rich community.[5] This region struggles with some of the same issues associated with the digital divide in other communities. As the largest city in Bexar County, San Antonio has a significant portion of its residents reporting a lack of immediate computer and Internet access. For example, a 2015 survey found that 18% of households did not have a computer in the home and 45% did not have access to the Internet through a broadband connection.[6]

As a result, community members from private and public sectors came together to create a new type of library, BiblioTech, aimed at reducing this "digital divide" by offering a variety of services. BiblioTech, the first physical public library in the United States to offer solely technological resources and digital services, strives "to provide all Bexar County residents the opportunity to access technology and its applications for the purposes of enhancing education and literacy, promoting reading as recreation and equipping residents of our community with necessary tools to thrive as citizens of the 21st century."[7] Funded by both Bexar County and private donations, BiblioTech operates in a parallel and complementary manner to the San Antonio Public Library system in order to broaden the variety of services available to community members with a particular goal of providing access to technological and digital resources. For example, BiblioTech's online patrons may use virtual access points to check out e-books,

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[4] Ba, Tally, and Tsikalas, *Children's Emerging Digital Literacies*; Susan B. Neuman and Donna Celano, "The Knowledge Gap: Implications of Leveling the Playing Field for Low-Income and Middle-Income Children," *Reading Research Quarterly* 41, no. 2 (2006): 176–201, doi:10.1598/rrq.41.2.2.

[5] "Bexar County Profile," County Information Program, Texas Association of Counties (last modified 2015), http://txcip.org/tac/census/profile.php?FIPS=48029.

[6] Alicia Hays, "BiblioTech: Bexar County Digital Library," *County*, January/February 2015, https://www.county.org/TAC/media/TACMedia/County%20Magazine/Past%20Issues/2015/CountyMag_JanFeb2015.pdf.

[7] Hays, "BiblioTech."

download magazines, and research academic-professional databases. Although they do not offer traditional printed materials, BiblioTech has three physical locations, each of which features access to nearly fifty iMac computers, Wi-Fi, printers, gaming systems, study areas, e-readers, and other resources. Electronic devices such as Nooks, Kindle Fires, and a variety of laptops may be checked out for home use.

Research Questions

In order to critically analyze the impact of its services on the community, BiblioTech approached the University of Texas at San Antonio (UTSA) with a request to conduct a study that focused on the youth they serve. In response, the UTSA research team with the support of BiblioTech staff set out to answer two questions organized around the merit and worth of the library as it pertains to student services.[8] First, we explored the merit of their services by examining the question: Is there a relationship between the use of BiblioTech services and reading achievement of middle and high school youth? Second, we explored the worth of services by asking: What do youth value about the services that BiblioTech provides?

For the purposes of addressing the first research question, "services" was narrowly defined as access to materials (technological and digital) for checkout from the library, as we looked at a relationship between the number of checked-out materials and reading achievement. However, in our investigation of the second question, "services" took on a broader scope as participants identified the services that were of value to them, including any and all of BiblioTech's resources (e.g., access to space, technological equipment, digital resources, programming, and staff).

Literature Review

As today's societies rely more heavily on technology, it is imperative that we know more about the ways that digital access impacts the ability of young people to fully participate in the community and its influence on academic achievement. In framing this study, we examined scholarly research from multiple fields, including library science, literacy, and educational theory. Initially, we discuss the expanding definition of the digital divide among twenty-first-

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[8] Donna M. Mertens, *Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods* (New York: Sage, 2010).

century youth to establish the fact that it is no longer solely related to access but also encompasses how youth engage with technology. Then, we look at the issue of digital access as it relates to urban youth with a particular focus on the role of the public library. Finally, we examine the significance of libraries as social spaces and effectors of academic achievement for these youth.

Defining the Digital Divide

The digital divide is a topic that often arises in relationship to public library digital access as well as student achievement. Traditionally, the digital divide referred to a gap between those who have access to material components of technology, such as computers and the Internet, and those who do not.[9] However, the concept of a digital divide has been reexamined by some scholars as a series of divides or a spectrum, rather than the binary have/have-not definition.[10] The digital divide has also been expanded by some to include a disparity of skills as well as disparity of access.[11] Most recently, Rowsell, Morrell, and Alvermann recontextualize the issue of the digital divide as it relates to academic literacies for youth.[12] They claim that access to the physical components of technology must be accompanied with the framing of digital literacies in order to support young people's higher-order engagement with online and digital resources, as opposed to the notion that technology is merely a tool for access to the Internet.

The Role of Public Libraries as Providers of Digital Services

Defining the digital divide becomes important when determining what types of access to information technologies should be provided and who should be providing them. Public libraries

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[9] Jan van Dijk, *The Deepening Divide: Inequality in the Information Society* (Thousand Oaks, CA: Sage, 2005).

[10] Karine Barzilai-Nahon, "Gaps and Bits: Conceptualizing Measurements for Digital Divide/s," *Information Society* 22, no. 5 (2006): 269–78; Vikki S. Katz and Carmen Gonzalez, "Community Variations in Low-Income Latino Families' Technology Adoption and Integration," *American Behavioral Scientist* 60, no. 1 (2016): 59–80.

[11] Dmitry Epstein, Erik C. Nisbet, and Terleton Gillespie, "Who's Responsible for the Digital Divide? Public Perceptions and Policy Implication," *Information Society* 27, no. 2 (2011): 92–104.

[12] Jennifer Rowsell, Ernest Morrell, and Donna E. Alvermann, "Confronting the Digital Divide: Debunking Brave New World Discourses," *Reading Teacher* 71, no. 2 (2017): 157–65.

are a significant part of this discussion as providers of access to both material goods, such as computers and the Internet, and also services, such as digital training and librarian assistance.[13] In addition to providing access to physical texts, one of the major roles of today's public libraries is to provide access to information and communication technologies. Approximately half of the visitors to public libraries connect to the Internet either on library computers or using the library's wireless network.[14] Also, more and more libraries are offering access to portable technology devices; studies show that 49% of libraries make mobile devices, such as laptops and netbooks, available to their patrons, and approximately 39% of libraries provide access to e-readers, such as Kindles and Nooks.[15] Library access to digital spaces is particularly important for patrons from underserved communities, and without it large segments of the population would not have Internet and e-government access.[16] E-government includes accessing government services via online avenues for tasks such as registering children in school, taking driver's education programs, paying fees, as well as numerous other activities.

Research on the role of public library digital services for secondary-school youth is somewhat limited. Some studies examine the effects of general access to information and communication technologies for young people. For example, studies show that youth engagement with information and communication technologies increases their integration in the community, their development of skills and social capital, and their self-efficacy.[17] However,

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[13] Epstein, Nisbet, and Gillespie, "Who's Responsible for the Digital Divide?"

[14] Jill Nishi, "Opportunity for All: How the American Public Benefits from Internet Access at U.S. Libraries: A Study from the Bill & Melinda Gates Foundation and the Institute of Museum and Library Services," *National Civic Review* 100, no. 3 (2011): 36–40.

[15] Paul T. Jaeger, Ursula Gorham, John Carlo Bertot, and Lindsay C. Sarin, *Public Libraries, Public Policies, and Political Processes: Serving and Transforming Communities in Times of Economic and Political Restraint* (Lanham, MD: Rowman & Littlefield, 2014).

[16] Paul T. Jaeger and Kenneth R. Fleischmann, "Public Libraries, Values, Trust, and e-Government," *Information Technology and Libraries* 26, no. 4 (2007): 34–43.

[17] Rebecca A. London, Manuel Pastor Jr., Lisa J. Servon, Rachel Rosner, and Antwuan Wallace, "The Role of Community Technology Centers in Promoting Youth Development," *Youth & Society* 42, no. 2 (2010): 199–228; Ruta K. Valaitis, "Computers and the Internet: Tools for Youth Empowerment," *Journal of Medical Internet Research* 7, no. 5 (2005): e51, doi: 10.2196/jmir.7.5.e51; Daniel B. Shank

research on how public library digital access and services relate to their teen patrons is more limited, with researchers often conducting surveys asking young people to identify reasons for visiting (or not visiting) the library. Teens use the library to access a variety of resources, including the Internet, computers, research materials, programs, and "hang out" spaces, and they also engage in a myriad of activities, such as studying, reading, writing, discussing books, and socializing.[18] Several studies reveal that youth mostly visited the library for information-gathering purposes, while studies investigating reasons why youth did *not* visit libraries report that youth preferred to use the Internet for information, rather than utilizing the library.[19] Teens' reasoning for either visiting or not visiting the library depends largely on their understandings of digital access in that space.

Social Aspects of Library Use

Research highlights not only digital access issues but also the broader social supports offered by library spaces that are critical in the increasingly digitized worlds of today's teens.[20] These supports include social interaction with both peers and librarians, community building, and a progression with digital technology experiences. As young adults engage in these experiences, librarians play significant media mentor roles while teaching necessary critical digital literacies,

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and Shelia R. Cotten, "Does Technology Empower Urban Youth? The Relationship of Technology Use to Self-Efficacy," *Computers & Education* 70 (January 2014): 184–93, https://doi.org/10.1016/j.compedu.2013.08.018.

[18] Linda W. Braun, Maureen L. Harman, Sandra Hughes-Hassell, and Kafi Kumasi, *The Future of Library Services for and with Teens: A Call to Action* (Chicago: Young Adult Library Services Association, 2014), http://www.ala.org/yaforum/sites/ala.org.yaforum/files/content/YALSA_nationalforum_final.pdf.

[19] Kay Bishop and Pat Bauer, "Attracting Young Adults to Public Libraries: Frances Henne/YALSA/VOYA Research Grant Results," *Journal of Youth Services in Libraries* 15, no. 2 (2002): 36–44; Sherry Cook, Stephen R. Parker, and Charles Pettijohn, "The Public Library: An Early Teen's Perspective," *Public Libraries* 44, no. 3 (2005): 157–61; Brian Kenney and Lauren Barack, "Libraries Losing Teens," *School Library Journal* 52, no. 1 (2006): 18; June Abbas, Melanie Kimball, Kay Bishop, and George D'Elia, "Youth, Public Libraries, and the Internet: Part Four: Why Youth Do Not Use the Public Library," *Public Libraries* 47, no. 1 (2008): 80–85.

[20] Denise Agosto, Rachel M. Magee, Michael Dickard, and Andrea Forte, "Teens, Technology, and Libraries: An Uncertain Relationship," *Library Quarterly* 86, no. 3 (2016): 248–69.

such as how to search and evaluate information.[21] Engagement in this way supports Vygotsky's sociocultural theory on learning.[22] Through the media mentorship relationship with the more knowledgeable other, teens are supported in their development of critical digital literacies. The importance of the expanded role of contemporary librarians was noted by Gee, who states that "libraries of the future will need to supply young people, especially those from less affluent homes, with digital tools, not as standalone entities by themselves, but as part and parcel of rich social activities and mentorship."[23] Research on digital citizenship further focuses on the key mentorship role through strong librarian-student relationships. Not only are tools and mentorship needed to evaluate information but also to provide guidance around issues such as digital etiquette, technology balance, security, social networking, and cyberbullying.[24]

Studies indicate that teens prioritize social interaction as the main reason for library use. This is particularly significant for young people with limited mobility or access to safe places to socialize.[25] Similarly, Aabø and Audunson examined the social interactions and role of libraries through the diverse types of joint activities taking place in them.[26] They found that the library is an extension of home or school through engagement in joint activities, such as leisure time with peers and joint video gaming (low intensity) or homework collaboration and library structured

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[21] Agosto et al., "Teens, Technology, and Libraries"; Elizabeth Mills, Emily Romeign-Stout, Cen Campbell, and Amy Koester, "Results from the Young Children, New Media, and Libraries Survey: What Did We Learn?," *Children and Libraries* 13, no. 2 (2015): 26; Braun et al., *The Future of Library Services for and with Teens.*

[22] Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes* (Cambridge, MA: Harvard University Press, 1978).

[23] James Paul Gee, "Digital Games and Libraries," *Knowledge Quest* 41, no. 1 (2012): 62.

[24] Leslie Preddy, "The Critical Role of the School Librarian in Digital Citizenship Education," *Knowledge Quest* 44, no. 4 (2016): 4; Denise Agosto and June Abbas, "Simple Tips for Helping Students Become Safer, Smarter Social Media Users," *Knowledge Quest* 44, no. 4 (2016): 42.

[25] Agosto and Abbas, "Simple Tips for Helping Students Become Safer, Smarter Social Media Users"; Denise Agosto and Sandra Hughes-Hassell, *Urban Teens in the Library: Research and Practice* (Chicago: ALA Editions, 2010).

[26] Svanhild Aabø and Ragnar Audunson, "Use of Library Space and the Library as Place," *Library and Information Science Research* 34, no. 2 (2012): 138–49.

activities (high intensity). Libraries that orient their programs and environment with attention to social motivation create spaces that are relevant as well as safe for teens.[27]

Intentionally creating relevant spaces is particularly important for urban teens. Agosto and Hughes-Hassell surveyed urban adolescents about information-seeking behaviors in their everyday lives.[28] Youth reported negative perceptions of public libraries, librarians, and so on, which stemmed from the notion that libraries as well as librarians were more inviting to adults and children than to adolescents. Furthermore, this study reported that urban teens did not enjoy the "outdated library decor," the rules that dictate library behaviors, unwelcoming staff, and shortage of books reflective of their "cultural backgrounds."[29] Kimball et al.'s study found that fewer urban youth utilize the public library than their rural and suburban peers.[30] However, urban teens who do visit the library do so more frequently than fellow rural and suburban teens.

The National Forum on Libraries and Teens conducted by the Young Adult Library Services Association highlights the lifeline that libraries provide for today's adolescents.[31] In addition, the study found that libraries mitigate the social and economic factors impacting teens by building upon relationships between peers, librarians, and the broader community. Together, these studies tell us that the social impact of libraries in the lives of young adults from urban communities is both substantial and significant.[32]

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[27] Agosto and Abbas, "Simple Tips for Helping Students Become Safer, Smarter Social Media Users"; Patsy Owens, "No Teens Allowed: The Exclusion of Adolescents from Public Spaces," *Landscape Journal* 21, no. 1 (2002): 156–63.

[28] Denise Agosto and Sandra Hughes-Hassell, "People, Places, and Questions: An Investigation of the Everyday Life Information-Seeking Behaviors of Urban Young Adults," *Library and Information Science Research* 27, no. 2 (2005): 149.

[29] Agosto and Hughes-Hassell, "People, Places, and Questions."

[30] Melanie Kimball, June Abbas, Kay Bishop, and George D'Elia, "Youth, Public Libraries, and the Internet; Part Three: Who Visits the Public Library, and What Do They Do There?" *Public Libraries* 46, no. 1 (November/December 2007): 52–58.

[31] Braun et al., *The Future of Library Services for and with Teens.*

[32] Aabø and Audunson, "Use of Library Space and the Library as Place"; Agosto and Hughes-Hassell, "People, Places, and Questions"; Agosto et al., "Teens, Technology, and Libraries"; Braun et al., *The Future of Library Services for and with Teens.*

Libraries, Literacy, and Academic Achievement

The multifaceted role of school and public libraries along with their affordances have the potential to affect the cognitive development of today's adolescent learners. When examined through the lens of Vygotsky's sociocultural theory, which considers both the environment and the individual in the learning process, the library is a place where peers, librarians, and digital tools facilitate learning.[33] The continued role of public gathering spaces in growth and development is reaffirmed by Gee, who postulates that without combining digital access with robust social interaction, our society will continue to face achievement gaps and inadvertently create new ones.[34]

As a space for learning, the public library has the potential to help bridge literacy and academic achievement by increasing accessibility. Researchers Fisher, Lapp, and Flood espouse that access and availability of materials have the potential to affect academic change for all youth.[35] Others confirm that access to text increased the amount of free voluntary reading by students and report that availability of titles was crucial in literacy development, which in turn influences academic achievement.[36] Researchers also report correlations between voluntary reading and increases in vocabulary development, writing rigor, grammar, and recognition of authors, as well as links to success on state and national reading assessments.[37] The inverse of

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[33] Luis C. Moll, *Vygotsky and Education: Instructional Implications and Applications of Sociohistorical Psychology* (Cambridge: Cambridge University Press, 1990).

[34] Gee, "Digital Games and Libraries."

[35] Douglass Fisher, Diane Lapp, and James Flood, "The Effects of Access to Print through the Use of Community Libraries on the Reading Performance of Elementary Students," *Reading Improvement* 38, no. 4 (2001): 175.

[36] Robert Houle and Claude Montemarquette, "An Empirical-Analysis of Loans by School Libraries," *Alberta Journal of Educational Research* 30, no. 2 (1984): 104–14; Courtney Smith, Rebecca Constantino, and Stephen D. Krashen, "Differences in Print Environment for Children in Beverly Hills, Compton and Watts," *Emergency Librarian* 24, no. 4 (1997): 8; Lesley Mandel Morrow, "Relationships between Literature Programs, Library Corner Designs, and Children's Use of Literature," *Journal of Educational Research* 75, no. 6 (1982): 339–44, http://www.jstor.org/stable/27539923.

[37] Larry Dorrell and Ed Carroll, "Spider-Man at the Library," *School Library Journal* 27, no. 10 (1981): 17; Fisher, Lapp, and Flood, "The Effects of Access to Print," 175; Stephen D. Krashen, "School Libraries, Public Libraries, and the NAEP Reading Scores," *School Library Media Quarterly* 23, no. 4

this was true, as reported by Bhatt, who found that "children who read infrequently for pleasure score 4–18 points lower on standardized reading test than those who read frequently."[38]

While the literature linking access to text to reading achievement is clear and extensive, research linking library access and academic achievement is less robust. Krashen explored the relationship between access and usage of resources in public and school libraries and student achievement. His findings showed that lack of access to reading resources resulted in lower test scores.[39] Another study that compared the achievement scores of two groups of urban elementary youth—one group that visited the community library each week with their teacher and another group that visited their school library with their teacher each week—was conducted by Fisher, Lapp, and Flood.[40] Prior to the study, both groups had similar test scores. After the intervention, the community library group increased in the percentage of youth who tested "at or above grade level" on the state-mandated achievement test by 21%. The comparison group that visited the school library showed gains of only 4%. As established in the body of research previously discussed, there are many benefits—including social, emotional, cognitive, and academic development—that are fostered through young people's interactions with libraries and the affordances they provide.

Methods

A research team from UTSA conducted this study at one of BiblioTech's physical branches. Staff at the library assisted the researchers in obtaining data from the local school district, which we used to evaluate the merit and worth of the digital library. The merit of the library was evaluated by analyzing scores earned on the reading portion of standardized state tests, while perceptions of the worth of the library services was explored through focus groups and surveys conducted with local youth.

(1995): 235; Stephen D. Krashen, *Every Person a Reader: An Alternative to the California Task Force Report on Reading* (Culver City, CA: Language Education Associates, 1996); Nicole Whitehead, "The Effects of Increased Access to Books on Student Reading Using the Public Library," *Reading Improvement* 41, no. 3 (2004): 165.

[38] Rachana Bhatt, "The Impact of Public Library Use on Reading, Television, and Academic Outcomes," *Journal of Urban Economics* 68, no. 2 (2010): 148–66.

[39] Krashen, "School Libraries, Public Libraries, and the NAEP Reading Scores."

[40] Fisher, Lapp, and Flood, "The Effects of Access to Print," 175.

Data Collection

We collected a variety of data for this study, including reading achievement scores, BiblioTech usage data, and interview/survey data from a subgroup of users.

Reading Achievement and Circulation Data

BiblioTech staff collected reading scores from the State of Texas Assessments of Academic Readiness (STAAR) for one of the seventeen school districts in the greater metropolitan area. The school district provided BiblioTech with data on 6,945 students. This district serves a largely Hispanic population, and many of the youth are recipients of the federal lunch subsidy program. The STAAR test is administered annually. The data set included categorical data (pass/fail) as the district was hesitant to release data with names and numerical scores. BiblioTech merged the reading achievement data with their own data on lifetime circulation counts for students in this school district with a library card. BiblioTech had usage counts for 716 students enrolled in the district. The circulation counts represented a two-year period and overlapped with the school year in which the reading achievement was measured. BiblioTech aligned the pass/fail score of individual students with their own record of students' library usage (i.e., circulation count of checked-out materials). They de-identified the data and then passed the full data set to the UTSA research team.

We cleaned the data set by removing students with missing pass/fail scores, students in elementary grades, and students with no library usage. After cleaning, our final data set included 535 youth in grades six through ten who were currently utilizing BiblioTech services and who had taken the STAAR reading test the previous year. The data set also included the name of the school in which the youth attended; there were seven different schools represented in our data set, including two high schools (55.3%), four middle schools (37.5%), and one early college career center (7.3%). Table 1 represents the number of youth from each school. The data was spread across genders (42% identified as male; 53% identified as female; 5% of the cases were missing this information). Of the data we received, 75% of the youth who took the test passed it.

Table 1. Reading Achievement Scores Represented by School

	No. students	% of data set
High school 1	99	18.5
High school 2	197	36.8
Middle school 1	41	7.7

Middle school 2	54	10.1
Middle school 3	18	3.4
Middle school 4	87	16.3
Early college school 1	39	7.3
Total	535	100.0

Focus Groups

For the second question, we conducted five focus groups with youth who volunteered to participate with us. On the day we conducted focus groups, we invited youth who were at the BiblioTech facility to talk with us. Nearly all of the youth we invited agreed to participate in one of the five focus groups. Each of the audio-recorded focus groups had between four and seven participants. We engaged the groups using a protocol, which consisted of semi-structured questions, and probed where necessary with follow-up questions. We began each focus group with a "chalk talk," asking participants to silently respond to the question, "Write a word that comes to your mind when you think about BiblioTech," by writing a word or phrase onto a public chart. Their responses combined with our semi-structured questions guided the conversations we had during the focus groups. Pairs of research members facilitated focus groups by either leading the discussion or by note taking. We digitized all artifacts including conversation starters, field notes, and surveys. The audiotapes were transcribed by a professional service.

Student Surveys

Following each focus group, we asked participants to complete a survey. The survey consisted of seven questions that collected demographic information, frequency of use and identification of BiblioTech services, motivation for use of services, and recommendations for attracting more youth to use the services of BiblioTech.

Data Analysis

In analyzing this data set, we used the Statistical Package for the Social Sciences (SPSS) to conduct a one-way analysis of variance (ANOVA), which allowed us to compare the usage of services by groups, and a chi-squared test for independence to see if there were relationships between our variables. We analyzed STAAR scores as categorical data (reported as "passed" or "not passed" and labeled "STAAR"). We analyzed circulation counts as interval data. The data

set we had represented two years of use. We used that to create categories of "use" and classified usage as low (used the services between 1 and 10 times), medium (used the services between 11 and 39 times), and high (indicating youth may have used the services on a more regular basis, more than 40 times). Gender and school attended also served as categorical variables.

We used the constant comparison method when analyzing the five focus group transcripts.[41] Throughout this process, the research team met to discuss the transcripts, record phrases, and assign codes. This information was documented in a codebook. Further analysis led to the collapsing of 92 codes into 14 categories, and ultimately the team noted the emergence of four major themes that transcended these categories: appreciations, affordances, relationships, and personal development.

Findings

Merit of Services

Our analysis indicated several interesting patterns. First, there was a wide range of uses by youth in this group. The mean use of the group was 9.12 times ($SD = 18.58$) with a range of 1–227 times. There was not a significant effect for gender, $F(1, 505) = .154$, $p = .695$. However, there was a significant effect for school, $F(1, 528) = 6.611$, $p < .000$. Post hoc comparisons using the Tukey HSD test indicated that the mean score for Middle School 4 ($M = 19.80$, $SD = 38.35$) was significantly different than the other six schools at the $p < .05$ level (see means of schools in table 2).

Table 2. Use of BiblioTech Services by School

	N	Mean	Std. Deviation	Std. Error
High School 1	99	4.78	6.407	0.644
High School 2	197	8.11	12.722	0.906
Middle School 1	41	6.29	6.551	1.023
Middle School 2	54	6.56	6.471	0.881
Middle School 3	18	5.78	8.531	2.011
Middle School 4	87	19.80	38.354	4.112

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[41] Barney G. Glaser and Anselm L. Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Chicago: Aldine, 1967).

Early College School 1	39	9.44	10.430	1.670
Total	535	9.12	18.585	0.804

Our chi-squared analysis revealed a non-significant trend between the use of BiblioTech services and reading achievement of middle and high school youth, X^2 (2, $N = 535$), $p = .461$. However, there were directional trends for use and reading achievement for both "passers" and "non-passers." In fact, while we cannot claim (with this analysis) that one caused the other (or which happened first), we see interesting likelihood patterns. Table 3 illustrates the relationship between the classification as passer or non-passer and level of use (low, medium, or high). The vast majority of youth in this data set were low users of the services (representing 80.2% of overall data set). Medium and high users represent 15.5% and 4.3% of the data set, respectively. However, upon closer examination, it appears that there were more low-using youth who did not pass the test than low-using youth who did pass the test (83.6% and 79.1%, respectively). The pattern shifted in the direction of youth who passed the test when comparing the medium- and high-using groups—youth who passed the test were represented in larger numbers in the medium user group (16.2%) than their non-passing counterparts (13.4%). The same appears to be true in the high user group (4.7% and 3.0% represented by passers and non-passers, respectively).

Table 3. Use of BiblioTech services ("use") and status of reading achievement ("STAAR")

		STAAR (Did not pass)	STAAR (Passed)	Total
Low users	Count	112	317	429
	% within use	26.1	73.9	100.0
	% within STAAR	83.6	79.1	80.2
Medium users	Count	18	65	83
	% within use	21.7	78.3	100.0
	% within STAAR	13.4	16.2	15.5
High users	Count	4	19	23
	% within use	17.4	82.6	100.0
	% within STAAR	3.0	4.7	4.3
Total	Count	134	401	535
	% within use	25.0	75.0	100.0
	% within STAAR	100.0	100.0	100.0

Worth of Services

The demographic information regarding usage of library services from the surveys revealed that approximately half of the participants visited the site daily. Others reported visiting the library less often; 29% of youth reported visiting two to four times per week, and 20% reported visiting once per week. When asked about service utilization, participants identified using computers for fun (95%), using computers for homework (84%), studying (80%), participating in special programs (56%), reading e-books for fun (44%), and reading e-books for homework (28%). The information about the high usage and various activities that youth engaged in aided in contextualizing the emergent themes from the focus groups, which include appreciations, affordances, relationships, and personal development.

Appreciation of BiblioTech

Youth spoke about a variety of reasons why they appreciated BiblioTech. Initially, participants shared general appreciations for the library, commenting, "It's just a great overall experience." They also spoke about their appreciation for the distinctive nature of the digital library. Specifically, they mentioned an appreciation they held for the uniqueness of the space, stating, "I like the fact that it's not your typical library." In addition, several participants discussed valuing the relationships they developed with staff and librarians at BiblioTech. One student said, "I like coming here because of the staff. They're nice." Finally, the last category of appreciation related to the safety associated with BiblioTech, including the physical safety of the site and measures taken to ensure cybersecurity for young patrons. For example, one aspect of physical safety included appreciation for the cleanliness at BiblioTech, as one student asserted, "I really like how they disinfect everything after the whole day is gone."

Affordances for Youth

Within the focus group discussions, participants observed that BiblioTech afforded them specific opportunities in various aspects of their lives. First, many participants indicated that access to the resources at the library led to increased academic success. One student commented, "If it wasn't for BiblioTech, I couldn't come here to do essays, and I probably wouldn't be in the tenth grade right now." Second, participants recognized that BiblioTech provided high-quality digital access. In reference to the information access at BiblioTech, another student said:

I feel like it's more modernized to fit with the times instead of having to go in and actually search through books. It's all right there at your fingertips. You can get it on your phone, tablet, what-have-you. . . . It's more appropriate moving forward. . . . It's just easier, more convenient, faster, and more easily accessible.

Third, some students valued not only the affordances that BiblioTech offers them individually, but also their families. In discussing how her family uses the library, one youth explained, "Job applications, filling in logs for work and finding new stuff to do. . . . We all come here together."

Relationships with Peers at BiblioTech

Participants noted several aspects of the social nature of BiblioTech that they valued. First, several students talked about meeting their friends at the library, while others discussed forging new relationships, as one commented, "I made new friends." Second, one of the ways that youth were able to develop new relationships with peers was through program involvement. As one participant shared, "You have to learn how to make friendships and partnerships, and you get to socialize here, too, with all the different clubs and activities and things, it helps." A third aspect of relationship development that youth valued at BiblioTech was the enjoyment of activities in the space. As described by one student, "It's fun and [you] learn; because when you come over here, you can play games, you can do your homework, or come over here to the quiet room. . . ."

Personal Development

Focus group discussions revealed that both middle and high school youth valued personal development opportunities within the library environment. First, participants appreciated the cultural connection that BiblioTech offered; one student described his experience seeing the BiblioTech building for the first time, "It said BiblioTech, and I know that *biblio* meant library in Spanish, so I came in." Second, the choice of patronizing the library, engaging in activities, and accessing the information resources inside BiblioTech helped youth to develop more autonomy. As one student recognized, "You get better grades because you come here and research anything in history, math, science, and it kind of helps you on your schoolwork, so that you know what you're doing on your homework." Third, participants attributed some aspects of personal growth to their experiences at the library. For example, one student described how he had to complete chores before earning the privilege of visiting BiblioTech, and he commented, "I'm learning

responsibility, and I'm showing my mom that now." Another student remarked, "It's helped me in the sense that I've learned to communicate more adequately because before I was shy."

Recommendations for Future Services

We asked our focus group participants how BiblioTech could improve their services. Participants listed three major improvements. Their first set of comments centered on expanding services. These included additional space, such as the need for a "teen room" and a separate room for very young children (under five years old) with age-appropriate items and materials. They also recommended gaming tournaments and additional "clubs" to enhance existing programming. Extending the hours of operation and modifying the requirements for checking out laptops were other recommendations.

The second set of recommendations centered on incentives for patrons. Youth believe that the addition of a food court would simplify food purchases and would be an additional attraction. They also said that "free Gatorade" would improve the services of BiblioTech.

The third set of suggestions centered on the ways in which BiblioTech might grow and "get more people to use the services." These included advertising on the news and spreading the word about BiblioTech by "encouraging kids to tell their friends about it." Other participants felt there was nothing BiblioTech could do to improve, as it was "perfect enough" and "very cool for what they have."

Discussion

Our findings indicated a positive relationship between usage of library services and reading achievement data. One explanation for this finding is that the more students used the BiblioTech services, the more apt they were to pass the STAAR assessment. However, a competing explanation might be that students who were poised to pass their test were more apt to use the BiblioTech services. While this study cannot speak to the direction in the pattern of medium and high users scoring higher on reading achievement tests (i.e., checking out more library materials leads to higher reading scores or those with higher reading achievement tend to check out more library materials), it does indicate that the services provided by BiblioTech support students and their academic achievement. These findings support extant literature. For example, Sailors's 2013 study of a second-grade classroom indicates the importance of a text-rich environment for student literacy, and Whitehead found in a 2004 study that students with library cards who

visited their community library scored higher on reading accuracy and comprehension of reading than students who did not visit their community libraries.[42] Findings from BiblioTech expand on the body of literature connecting the amount of texts that youth have access to and their reading achievement to include their access to digital resources.

The importance of the social nature of BiblioTech's physical and digital spaces becomes apparent when listening to and examining our participants' statements. Middle and high school students valued opportunities to socialize with their peers, make new friends, and develop meaningful relationships with staff. Our findings align with other research that shows libraries to be significant communal environments for teen social interaction among peers and with library staff.[43] Although their study did not focus specifically on youth, Aabø and Audunson found that the public library is used for more than borrowing materials and becomes a vital meeting place for the local community.[44] While research in traditional library spaces shows that these institutions became important social centers, BiblioTech, as both a digital and physical site, also fulfills this communal function. Based on youth comments regarding their social interaction at BiblioTech, it would appear that this new model of library serves as an important space for adolescent interaction.

In addition to the social relationships fostered at the library, youth are drawn to BiblioTech for different reasons, including the variety of technological access as well as opportunities for engagement. Student appreciation of library technology services and programming also connects to previous research about the importance of diverse amenities provided by public libraries. For example, Bertot, McClure, and Jaeger note the importance of public libraries in providing a variety of information and communication technologies, especially

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[42] Misty Sailors, "Making Literacy a 'Pervasive Part' of a Second Grade Classroom," *Pennsylvania Reads* 12 (2013): 7–15; Whitehead, "The Effect of Increased Access to Books," 165.

[43] Paula Brehm-Heeger, *Serving Urban Teens* (Westport, CT: Libraries Unlimited, 2008); Denise Agosto, Kimberly Paone, and Gretchen Ipock, "The Female-Friendly Public Library: Gender Differences in Adolescents' Uses and Perceptions of U.S. Public Libraries," *Library Trends* 56, no. 2 (Fall 2007): 387–401.

[44] Aabø and Audunson, "Use of Library Space and the Library as Place," 34.

for communities with little access to digital services.[45] In addition, availability of cultural programming at libraries, as noted by Robertson, is particularly significant when seeking to advance the library as a community center.[46] The study we conducted with urban teens at BiblioTech correlates to the greater body of literature regarding the importance of access to a variety of digital services and programs among underserved populations.

Limitations and Implications

Aspects of the quantitative data and chi-squared analysis somewhat limited our findings. The data set on circulation did not differentiate between the types of materials borrowed by youth. For example, a headphone checkout is recorded in the same manner as a digital book checkout, and therefore no distinction can be made between a youth accessing technological devices versus accessing texts. Also, it should be noted that family members may "borrow" one another's BiblioTech digital library cards, which means the usage level of an individual student may be overly represented in the circulation data set. Likewise, we were limited to the type of reading achievement data we could use for this study. As such, there are many mitigating factors that might have influenced the outcomes of the STAAR data that was provided to us by the school district and BiblioTech, and we recognize the limitation of relying on a single test score to represent the reading achievement of the students in this study.

Concerning the second research question, the focus groups that we conducted were both a limitation and a strength of this study. Participants were patrons from one BiblioTech site and were recruited by BiblioTech staff. As with most qualitative work, findings cannot be generalized to other locations or contexts. However, this qualitative approach also provided space for the voices of our young participants.

Future research might include an examination of a more nuanced set of data. A more specific understanding of what users do while they engage in services (without compromising privacy) would allow libraries to have a better sense of those aspects of use that may contribute

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[45] John Bertot, Charles McClure, and Paul Jaeger, "The Impacts of Free Public Internet Access on Public Library Patrons and Communities," *Library Quarterly: Information, Community, Policy* 78, no. 3 (2009): 285–301.

[46] Deborah Robertson, *Cultural Programming for Libraries: Linking Libraries, Communities, and Culture* (Chicago: American Library Association, 2005).

to reading achievement in schools. Because many of the youth spoke about the importance of gaming (especially the social aspects of gaming), it would behoove libraries to explore the participation of its patrons in gaming and to use that participation as a variable in a study that looks at the contribution of gaming participation to reading achievement in schools. Finally, extending this study to additional sites may uncover other appreciations that patrons hold about library services. The initial understandings and insights gained through this BiblioTech study reveal the importance of this community space in the academic and personal lives of youth and their families.