Library 2.0: Collaborative Tools and the Effects on Library Services

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There are a number of different perspectives on what Library 2.0 means, its development and whether its existence is valid as a theoretical framework for technological innovation. Although there are differing perspectives on Library 2.0, the development and use of collaborative tools in the Web 2.0 environment is changing the way in which people interact and retrieve information. There is a desired need to enhance and develop services that reflect Lib 2.0 concepts with the assistance of collaborative tools.

This paper will discuss a brief history of past available library services and the development of the Web 2.0 environment and its effect on the library space. This paper will also discuss current and developing collaborative tools in the Lib 2.0 environment and it’s effects on library services now and in the future. This is important to discuss because the library of today and tomorrow, is a library at the forefront of user-centered services involving constant technological innovations. As a result, librarians must be prepared to handle the constant need to change and develop library services as so many libraries of the past have done before.

**Library 2.0: Collaborative Tools and the Effects on Library Services**

 Throughout history the library adapts to the changing needs of its patrons with different types of services. These services often vary from region, culture and century depending on the contextual social needs. Given the vast advances in technology in the 20th and 21st centuries, libraries focuses shift based on its needs and the needs of its patrons. The emergence of the Web 2.0 environment allowed participants of the web to not only search for content, but become active creators and producers within web. With the explosion of Web 2.0 technologies and applications, professionals noticed a shift in library usage and patron needs.

The development of this shift in libraries and the implementation of its core concepts and tools is often called Library 2.0. There are a number of differing perspectives on what Library 2.0 means, its development and whether its existence is valid as a theoretical framework for technological innovation. Although there are differing perspectives on Library 2.0, the development and use of collaborative tools in the Web 2.0 environment is changing the way in which people interact and retrieve information. There is a desired need to enhance and develop services that reflect Lib 2.0 concepts with the assistance of collaborative tools.

This paper will discuss a brief history of past library services available, and the development of the web 2.0 environment and its effect on the library space. This paper will also discuss current and developing collaborative tools in the Lib 2.0 environment and it’s effects on library services now and in the future. This is important to discuss because the library of today and tomorrow is a library at the forefront of user-centered services involving constant technological innovations. As a result, librarians must be prepared to handle the constant need to change and develop library services as so many libraries of the past have done before.

**Development of Library Services and Web 2.0**

From the ancient world to the 21st century, there is a noticeable shift in focus and priorities causing the library to change and restructure itself many times throughout history. Throughout the centuries, library’s purpose and mission changes based on societal and cultural shifts causing libraries to focus on different types of services. As different types of needs arise from cultural circumstances, the library evolves to meet the demands of society and it’s patrons.. As libraries become more dependent on a large base of patrons to sustain themselves, this change and restructuring becomes critically important. Technological developments also have led the library to push for new and innovative services to keep up with the demands placed on them. As a result, library services develop depending on societal values and needs, while continuously changing and evolving because of technological advances. Looking at the evolution of the library is important to understanding why priorities change in libraries and the ways in which it has affected services in the past, present and future.

**Brief History of Library Services**

 With the advent of the earliest form of writings known as cuneiform, writing became an important part in sharing and preserving knowledge. According to scholars, one of the earliest forms of a library’s existence as part of a social institution was around 3,000 B.C.E (Rubin, 2010 pg. 35; History of libraries). During this point in history, these early libraries were not really libraries, but were typically used as storage centers for archival records that belonged to temples and palaces. They did not provide the wealth of services we see today, but rather its tasks were to keep track and organize religious, financial and governmental records and preserve them for later use when the need arose (Rubin, 2010 pgs.35-36)

 As more societies developed and wealth increased, the library developed it’s priorities to suit other social needs. For example, some libraries were created to suit the educational needs of the upper classes. Egyptian libraries held medical and spiritual records and some upper class Egyptians held private collections (Rubin, 2010 pg. 37). Librarians also served as teachers to royalty and the upper classes and developed collections to suit their educational needs. At the library of Alexandria, librarians served as teachers and advisors to the royal family (History of libraries). The library at Alexandria also encouraged scholars from different regions to come and use their resources that resulted in the city becoming a cultural and learning center (Rubin, 2010 pg. 38).

The growth and maintenance of the collection became a priority for some libraries because the collection of the library became to be seen as a symbol of wealth, power and prestige for individuals, cities and regions. To help organize its growing library, the library at Alexandria developed a cataloguing system called the Pinakes that contained 10 subject class headings (Rubin, 2010 pg. 38). The library was so important to the status of the city that at Alexandria books from ships and other cities were often confiscated and replaced with copies, while the library retained the original copy (Berti & Costa, 2009 p.9). The Romans also used their private collections as status markers of wealth and power (Rubin, 2010 pg. 39). In this stretch of history the primary service developments revolved around education and collection development for scholars and the upper classes.

 As societies and empires collapse and rise, knowledge is still shared with the help of different institutions. Throughout history religion is an example of one institution that played a great role in library development. In medieval times monks had libraries that developed early forms of copy services, check out systems and an early form of inter-library loan between monasteries for clergymen and monks. It was important for monks to track down relevant books to read and copy for religious and educational purposes (Setton, 1960 p.376-378). Most of the population was illiterate and relied on an oral tradition of education in a religious culture that demanded them to be aware of it’s teachings. The pilgrims that flocked to the monasteries came for the religious knowledge of the monks who could read and write the various ancient languages (Glenn, 1993). Pilgrims were also encouraged to come because they often made offerings to the church and monasteries for their religious services and for the maintenance of their buildings (Theilmann, 1987 pgs.97-98). The needs for this library were not only for economical and educational purposes, but to support the religious and spiritual needs of the church and its followers (Rubin, 2010, pg.41)

 One of the most significant technological innovations was the creation of the printing press in 1454 in Munz, Germany. The printing press allowed the masses to gain access to copies of books and knowledge previously hidden away in collections. By the 1600’s, 100,000 books were printed in Europe and this had severe implications on libraries (Rubins, 2010 pg. 45). The great availability of books allowed people from all classes to become literate. As literacy increased, new professions developed as people learned new competencies and skills. As the bourgeois classes grew, new needs arose for public spaces (Dittmar, 2011 pgs. 1139-1140). Libraries were able to fulfill the educational needs of people, but as education and recreational time increased, libraries had a new audience with new needs.

 By the 18th and the 19th century there was a need among the bourgeois classes for public spaces that allowed self-improvement and entertainment (Dittmar, 2011 p.1140 ; Rubin, 2010 pg.47). An increased amount of people began to have more spare time because of the innovations of the Industrial Revolution (Rubin, 2010 pg. 47). Private, social, circulating and specialized libraries emerged starting in the 18th century to satisfy bourgeois needs. These were often social spaces with community outreach, reading rooms and book rentals. These types of libraries required member fees, subscriptions or affiliations with a company or special group (Rubin, 2010 pgs. 47-50). As a result, there was a great interest in developing a public library for those who did not have access, but wanted to educate and improve themselves. In 1854, the first public Library was established in Boston. These new needs shifted the library’s main focus to help create productive and educated citizens by providing a public space to foster self-cultivation. Many Library collections focused on self- improvement, recreational materials and entertainment (Rubin, 2010 pgs 54-58). With the influx of immigrants, other services developed geared toward their special needs, such as, U.S history classes, agency referral, newspapers in their native languages and much more (Rubin, 2010 pg. 62). New systems of classifications developed in response to the increase audiences and materials required in the public library. For example, the implementation of the dewy decimal system in 1876, and the creation of the Library of Congress’s subject headings in the late 19th and early 20th century (Rubin, 2010 p. 129). By the 20th century, cataloging rules and standards were designed for catalogs to standardize and improve retrieval for the abundance of materials available, such as the, Anglo-American Cataloging Rules (AACR) (Rubin, 2010 pgs.128-141). Some of the basic library services and tools we know today have not changed since the 19th and 20th centuries.

In the second half of the 20th century new technological innovations allowed libraries to search for materials in faster ways then traditional methods. In the 1950’s and 1960’s libraries were able to store small amounts of records digitally with the development of early computers. By the 1980’s bibliographic records could be stored and searched electronically with networks, allowing users to look for relevant materials based on bibliographic information. The catalog’s development continuously evolves as time and technology progresses (Rubins, 2010 pgs.227-230).

 The knowledge that librarians have about bibliographic information allows librarians to be a vital resource in helping and answering questions to patrons who did not always understand this type of record structure. Librarians are not always available 24/7 and users have developed instant gratification needs for information inquires (Sadeh, 2007 pg. 310). When librarians are not around to help answer information retrieval questions users become frustrated and seek other sources (Rubins, 2010 pg. 146, 279). With the availability of the web, this creates a new set of library usage issues (Rubins 2010, 235-236). Even in the 21st century, the library is still seen as a space for learning and information. As technology advances and develop at a fast pace, the need to store and retrieve information in digital formats and to share that information in faster and easier ways develops in response to this climate (Rubin, 2010 pg 111,160).

**Development of Web 2.0 and the Library**

Out of the network connections that the department of defense created in the 1960’s, called ARPANET, to facilitate fast communication came the birth of the web (Rubins, 2010 pg 228 ). The early web consisted of searching only for content with little interaction ( King & Brown, 2009 pgs.33). It was passive, static, rarely changed and consisted of email, remote logins and file transfers (Aqil & Siddique, 2011 p.395; Rubin, 2010 p.234). As web usage increased, a new dynamic relationship in the web environment emerged. This web environment is collaborative, changes frequently, user centered and functions on the creation of content from users (Aqil & Siddique, 2011p 395). File sharing, software sharing and open software development allowed communities of users to develop resources and applications on the web (Rubin, 2010). This phenomenon on the web drew great interest to people who wanted to explain it. In 1999, Darci DiNucci coined the term Web 2.0 and in 2004 O-Riley made the term popular at a conference (Aqil & Siddique, 2011pg 395). The next shift in web development is often called Web 2.0, while its predecessor is termed Web 1.0.

Web 2.0 consists of interactive technologies and user contribution to function and continuously provide new content to users. According to Notess (2006), Web 2.0 is a set of techniques that create an interactive and easy to use web experience that allows users the ability to edit and move objects (40-41). Ajax, APIs, long tails, tags are some of the tools available in the Web 2.0 environment that allow interactivity and development of websites and applications. AJAX (Asynchronous JavaScript an XML) is a combination of web technologies that allow websites and applications to update without reloading. API (Application Programing Interface) allows data sharing between applications that allow users to create “mashups” of data. Notess explains that Long tail is a concept that uses tools to make less popular content accessible on the web (Notess, 2006 pgs 41-42). Such tools allow users to come across information that they potentially missed. Another web technology is tagging. Tagging is subject indexing that lacks controlled vocabulary. Tags are both browsable and searchable and allow users to personalize content. When tags are grouped into collections they are folksonomies (Notess, 2006 pg.42; King & Brown, 2009 p. 34). When any of these tools are used in combination with other websites it is known as “mash ups” and plays great part in web 2.0 activity (Notess, 2006 pgs 41-42). These mash up’s permit and encourage users to interact and organize the web with tags, comments, RSS feeds ,blogs, wikis, bookmarks and social networks (King & Brown, 2009). This type of activity is vital because King & Brown (2009) explain that Web 2.0 dose not exist without the creation of content from users. With this technology, the web becomes a platform that allows for simultaneous activity (King & Brown, 2009 pg 35). When libraries began to set up networks between other libraries it was the beginning of an era of fast and open communication in the library space. Libraries began to use some Web tools to help devise services for patrons, such as list serves and the creation of library webpages. As the web progressed into web 2.0, a shift in library services emerged.

**Library 2.0**

As other web tools developed, researchers noticed the abundance of users using social collaborative tools to ask questions, post advice and conduct research. This dynamic shift in Web 2.0 tool usage in the library space is called Library 2.0 (Foo & Ng, 2008 pg. 3) . In Library 2.0, library services are collaborative, synchronous and are driven by user needs. This space encourages library staff and users to interact and collaborate (Aqil & Siddique, 2011). There are a number of collaborative tools within the Library 2.0 environment discussed that users widely use that allow them to collaborate and to contribute with the library. Some examples include libraries using blogs, social networking sites, RSS feeds, and podcasts to promote library services, events and answer questions. Other uses include wikis to post discussions, resources and tutorials, and instant messaging for chat services (Aqil & Siddique, 2011;King & Brown, 2009). Blogging, tagging, comments and ratings allow users to be directly involved in developing services and content for the library (Aqil & Siddique, 2011). Any of these tools can be created as a mash up on a library websites or catalog. For example, Google maps can be used to locate book locations in or outside of the library (Aqil & Siddique 2011, p.399). In Library 2.0 any type of resource, whether it be virtual or physical, is considered library 2.0 activity if it reaches out to the public and is evaluated frequently by them (Sodt & Summey, 2009 pg. 99). In summary, Library 2.0 is a mash up of services and combinations of Web 2.0 tools to create an interactive environment between users and librarians (Aqil & Siddique, 2011).

**Movement vs. Concepts and Tools**

There is a current debate whether Library 2.0 is a movement, while others see it as a set of concepts and tools to help the library keep up with the pace of user needs (Aqil & Siddique, 2011 p. 395). Within the literature there is no definite perspective or definition of library 2.0 (Notess 2006, pg 46). One definition is that Library 2.0 is a movement that provides a user center environment that encourages and facilitates content creation and community building. From this perspective, Library 2.0 is about changing and evolving to meet user demands and needs (Sodt & Summey, 2009 pg 98). It is also seen as a power shift in the community space where librarians and users come together to create content. Sodt & Summey (2009) explains that Ojala (2007), discusses that Library 2.0 is a Utopian vision that empowers users (98-99). Another perspective states that the development of library 2.0 is more of a revolution then evolution (Ross & Sennyey, 2008). Other’s see it as a set of web services for the library (Maness, 2006).

There is a consensus that Library 2.0 allows a collaborative space where users and librarians access tools to create, publish and share content with each other. As a result the relationship that libraries and patrons once had in the 19th and 20th century changed. The relationship between librarians and patrons is no longer one directional relationship (Peltier-Davis, 2009). In a one-directional relational the patron asks for help and receives the information from the library or librarian and the relationship stops. In the Lib 2.0 environment users actively engage in creating content and providing feedback to the librarians using some of the collaborative tools made possible by web 2.0 interfaces, and applications (Curran, Norrby, & Christian 2006). The relationship is constantly flowing back and forth between libraries and users and as a direct result, a lot of services are developing using Web 2.0 Tools with the help from users (Peltier-Davis, 2009).

**Implications of Web 2.0 Collaborative Tools on Libraries**

The use of Web 2.0 tools has implications on libraries and users. For example, users begin to lose the value of library sources when they have access to the web from other sources, such, as their phones and other devices. Ease of access is considered more important then the quality of information (Ross & Sennyey, 2008). Users will expect services with Web 2.0 tools and if libraries are not incorporating them they will potentially lose users to other sources (King & Brown, 2009 pg. 39). Users also have expectations for materials in digital formats and this preference is changing library collections. Library collection growth will not be as important, but rather providing an environment were users can utilize tools from different spaces will be a priority (Ross & Sennyey, 2008). ). Another issue is that not all libraries provide the necessary resources and tools that users are becoming accustomed too. This could be a problem for some libraries because not all libraries have adequate IT staff to develop and incorporate Web 2.0 tools in their services. If a library wanted to allow ratings for content in the catalog, it would need the resources to make this happen, such as, funds and the people with the expertise to design this system (Aqil & Siddique, 2011 pg. 397. Another issue for libraries is that users want more materials in electronic formats and help navigating the web for resources. Although the web provides an abundance of materials, it is difficult to centralize information (Ross & Sennyey, 2008). It is difficult for librarians to organize the web in a matter that will be searchable for users. This is a problem because users rely on web-based content as reliable sources when often they need to be evaluated with a keen eye . Users are turning to other resources when the library cannot fulfill their informational needs. For example, Google is rated above the library as a reliable resource (Rubin, 235-236). As a result, one of the biggest effects is that in order to attract more users, libraries are shifting into more business like models were marketing and competition are common (Ross & Sennyey, 2008).

**Current Developments of Library Services**

Although the library is created to function information centers for the public, many researchers are seeing a new trend from users. In a 2011 report by the Public Library Association, there was a 23.7 percent decline in circulation in public libraries. In a 2009 Pew report, on a typical day 73% of Americans are logged in using the internet, where the top two activities included checking email and conducting searches using search engines (Peltier-Davis, 2009 p. 16). This gives a glimpse to the usage behavior and patterns of users on the web to ask questions and seek different types of resources As a result of the availability of these tools and users usage patterns, many libraries are using Web 2.0 tools in their services in order to improve the quality of resources and to also draw in potential users (Foo & Ng, 2008 pg. 3). With the aid of collaborative tools many libraries are currently implementing them in their services. For example, a study conducted among 81 academic universities and 42% adopted one or more Web 2.0 tools in their services (Xu, Ouyang & Chu, 2009). Academic libraries are also currently more likely then other libraries to adopt Web 2.0 tools in their services (Ross & Sennyey, 2008).

 Web 2.0 tools have the potential to provide an array of services and there are currently many ways in which libraries incorporate them in their services and outreach. Blogs are used to communicate with patrons, start conversations, promote resources and services, deliver newsletters, and offer subject guides (King & Brown, 2009 p. 36; Aqil & Siddique, 2011, p.396)). Social networking is another tool to reach out to users because it allows libraries to reach users in their spaces and allows them to post links, events and promotions. Twitter, Facebook ,MySpace, and Flickr are some websites that libraries use to reach and collaborate with patrons (King & Brown, 2009 p. 37). One example is the Library of Congress’s Prints and Photographs Division joining Flickr to promote and interact with the public (Aqil & Siddique, 2011 p. 398). Another website discussed is LibraryThing. LibraryThing is a website that allows users to share and connect with others who have similar read lists (King & Brown, 2009 pg.37). These type of websites could be beneficial to libraries who want to reach out, interact and update users about current and developing services, while at the same time receive feedback to help improve resources, current services and upcoming events.

RSS feeds allow users to subscribe to the library and look at quick information from the library without having to visit the website, blog or email. Bookmarking sites such as del.icio.us, allow libraries to create bookmarks for users, who can then rate on the content posted (King & Brown, 2009 pgs. 38). This is useful for validating the usefulness or revalence of sources posted. Instant messaging is useful for libraries because questions and concerns can be answered immediately and instant messaging has the added bonus of being available on a wide range of devices such as cell phones, tablets and PDA’s. Many libraries are using this in their references services during reference hours (Aqil & Siddique, 2011 pg 398). Wikis are used as collaborative spaces that allow content editing by anyone and serves as a useful space for creating tutorials or discussions. Podcasting and videos are used as another way to promote news, events and tutorials for the library. Podcasting and video streaming are used to provide reading services to children and the disabled (King & Brown, 2009 38-39; Aqil & Siddique, 2011, 397-398). Because of future expectations for services with web technologies, libraries are encouraged to provide services to teach information literacy to new users as well (King & Brown 2009, p.39).

**Emerging Trends**

Out of the collaborative tools that are developing and mashing with other applications, tagging and open-source sharing have great importance to the emerging trends in library service development. There is a great need from users and libraries for free shared content Currently not all libraries can provide access to all databases due to the cost of serial licenses and limitations in contracts from serials. The web provides instant access to information from all types of devices and as a result users are accustomed to acquiring information from anywhere and anytime (Chad & Miller, 2005 p. 5-6) Scholars are discussing ways to make the library more functional to user needs, while making content easily accessible, searchable and easier to use.

A trend that is discussed among some librarians is the implementation of a catalog that is interactive and more accessible. Ross & Sennyey (2008) explains that the catalog in some libraries is archaic and needs updating. King & Brown (2009) also state that “the current catalog is boring…..(p.39)” King & Brown also discusses some library catalogs that are currently allowing users to tag materials, rate, comment and even give users recommendations based on searches and items viewed (King & Brown, 2009pg. 39). User tagging is very popular in the Web 2.0 environment and this trend is developing in library services. Many social networking sites allow users to tag content using hashtags or hash clouds, such as Flickr. This allows users to classify and customize content in their own words and descriptions, while allowing users to become active organizers of the web. Tagging is a very popular form of online classification used online that is starting to make its way in library catalogs. Some library catalogs allow users to tag resources in the catalog because it allows users to classify information using natural language allowing more search results (King & Brown, 2009 pg. 39). This is critical since users typically use words that they are familiar with when conducting searches and not subject headings. Often search results will not pull all the resources that are relevant because of vocabulary chosen. Users are sometime more confortable with the search terms they use for online web search engines (Macgregor & McCulloch, 2006). In the future more catalogs will include both marc tags and user tags to help increase user’s search results and allow users to take some control in improving the organization of catalogs (Aqil & Siddique, 2011 pg 397). The next possible trend discussed is a worldwide open-access catalog. This would allow reliable content from all over the world available to users and would encourage scholars to conduct more research (Sanger, 2006). Another trend worth discussing is making library homages customizable and personalized to suit the users interests. Users would be able to make profiles where they can bookmark and list favorites. Users would also conduct searches and have recommendations pop up based on other searches or saved favorites (Dempsey, 2006).

With an emphasis for more digital content, some libraries are changing their traditional space. Sodt & Summey (2009) discuss that some libraries are using the information common model to change their library spaces. Many libraries are providing more physical and virtual spaces for collaboration. There are comfortable furniture, social spaces, wireless networks, more computers, printers, and lap top loan programs. There is also the ability to collaborate virtually using different types of software, like skype or library chat rooms (Sodt & Summey, 2009 pg 99). Libraries will no longer be the storage spaces of the past, instead there will be less emphasize on developing collections with books and more digital materials. They will also serve as community information centers with more space for new technology and collaboration (Rubins, 2010).

**Conclusions**

One of the reasons for including collaborative tools in library services is because people always have a need to share information with one another whether it’s through an institution or through daily interactions. History demonstrates that people always make an attempt to create, save and search for information despite any social and personal reasons. Currently, users demand access to more types of information and resources as a result of the growth of cell phone, PDA’s , tablets and wireless web connection capabilities.

Developing library services will not be the sole responsibility of librarians, but will also involve users who come in contact with the library with the libraries available collaborative tools and social networking websites. There are a wide range of tools and websites that allow many possibilities as “mash ups” for implementing new cutting edge library services. It will be important for librarians to understand that Web 2.0 environments are placing different kinds of demands that involve searching and collaborating through collaborative tools and devices. With the collaborative tools that Web 2.0 offers, librarians need to question and anticipate the next shift and change in technological innovation What will Web 3.0/Lib 3.0 look like in libraries and what will libraries do to prepare for the next shift (Notess, 2006 pg.42)

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