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Melissa P. Johnston
Florida State University

Bradley Wade Bishop
University of Kentucky, bbisho13@utk.edu

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The Potential and Possibilities for Utilizing Geographic Information Systems to Inform School Library as Place

Melissa P. Johnston
The Florida State University, USA

Bradley W. Bishop
University of Kentucky, USA

Teacher librarians often consider their students and the internal school environment in planning programs and services but ignore the larger community from which learners originate. The purpose of this study was to provide a review of the ongoing discussions related to the school library in the community context and provide implications for utilizing geographic information systems (GIS) to inform the idea of the "school library as place." This preliminary exploration, a thematic literature review, indicated multiple possibilities for implementing GIS in school libraries that may enable teacher librarians to better facilitate students' development of a sense of place, support their learning needs, and ensure that the community is reflected in the library collection and programs.

Introduction

School libraries around the world consider the larger community in which they are situated as a vital aspect in planning programs and services (Programme on Educational Building, 1999). Yet in the United States, while school libraries consider their student users and the internal school environment, the community from which these learners originate is all too often ignored. The "library as place" literature provides theoretical background for viewing the broader community environment of the school library. Studies regarding the meaning of place in library literature reposition research away from the "user in the life of the library" to "the library in the life of the user" (Zweizig, 1973, p. 15; Wiegand, 1999). In viewing the institutions through the eyes of those using them as opposed to those who work within them, research provides ample evidence "that for their users libraries are indeed important places to be, and they also suggest that libraries are important as places for many more reasons than we currently realize" (Wiegand & Bertot, 2007, p. viii).

The commonplace definitions of place and space, as well as the multiple perspectives on these two concepts, create confusion in the literature and necessitate clarification. In his book, *Space and Place: The Perspective of Experience*, Yi-Fu Tuan spoke of the freedom of space in contrast with the security of place, which suggests that the concept of space is more abstract and place retains concreteness (Tuan, 1997). This is viewed in practice as security in the physical sense, but also in

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the sense of safeness that comes from mutual respect, openness, acceptance, and tolerances, as well as the freedom of space, such as that provided by the resources and areas in which to explore new ideas, knowledge, and learning partnerships. Tuan (1997) explained “what begins as undifferentiated space becomes place as we get to know it better and endow it with value” (p. 6). Despite this clarification, the literature reviewed contains much discussion of space when the authors are actually discussing the concept of place.

The same abstraction that positions space in theoretical opposition to a sense of place for library users, librarians, and researchers makes its physical measurement possible. One tool utilized to measure and analyze space is Geographic Information Systems (GIS) that comprise “an integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes” (Wade & Sommer, 2006, p. 90). Using GIS to analyze the space of students’ communities may inform school library programs and resources as they “fulfill extremely important educational, informational, and social functions within their respective cities, providing community gathering, work, and study places that would be difficult to duplicate in any other manner” (Leckie, as cited in Most, 2009, p. 33). Library as place studies indicate “important symbolic, cultural, and socioeconomic roles” for libraries in their communities and the rise of information technology expands the libraries’ role by adding another tool the public can use” (Most, 2009, p. 33).

The majority of “library as space” literature concerns public libraries; very little work has been done on school libraries as space. Yet, a wealth of literature on planning, facilities, and design exists in school library research and the idea of school library as place is mentioned quite frequently in practitioner based literature, describing the school library’s importance as place and practical observations. Possibly as a result, teacher librarians have few resources or traditions to call upon to ensure that the school library is built to reflect and serve the community in which it resides. One illustration of the lack of support available to teacher librarians in creating community space is the dearth of school library literature that concerns GIS utilization. This purpose of this thematic literature review is to explore the interplay between the space surrounding the school library and the establishment of the school library as place.

A Sense of Place

In examining the various interpretations of space and place, two conceptual views appear to be most relevant to the school library and guide this review. First, Tuan (2001) suggested that place is security and space is for freedom. These two elements are concepts found repeatedly in the education literature that addresses place and space as well (Chawla, 1992; Ellis, 2003, 2005; Eyles, 1989). This interpretation finds that while children need a safe place at school to learn, they also need space to explore new ideas and for creative self-development. Education literature contributes the second conceptual idea, i.e., Eyles’ (1989) interpretive framework, drawing from research of cultural geographer Ashcroft (2001), who explained that place is tied to the culture and the identity of those who inhabit space, and place is created through everyday life experiences, social structures, and relationships. This idea of “every-day life provides the unquestioned background of meaning for the individual” (Eyles, 1989, p. 103) and therefore influences how each individual will define place. This interpretation, paired with Tuan’s perspective, provides guidance in exploring the idea of place and space in school libraries.

Children need a sense of place.

Landers (as cited in Ellis, 2004, p. 25), asserted that children’s interactions with family, participation in informal communities, such as those with neighbors and peers, and formal

communities, such as church, sports and school, are key in examining their everyday lives. "The people that children have relationships with give meaning to their localities and support the construction of identity through place" (Ellis, 2004, p. 25), or identity takes shape through the experiences the child has had. Educators often research the aspects of children's lives that they do have control over, but research on the places of students' lives outside of the school must be considered. After all, the students spend more of their time in those places than school. The examination of students' everyday lives should serve as a starting point in informing school program planning and policy-making (Ellis, 2004).

Ellis (2005), building on the work of Eyles (1989) and Ashcroft (2001), explained this in the context of the school setting as "the classroom as a place isn't just the walls and furniture, but rather the whole experience that results from the way people inhabit it, and how they inhabit it is influenced by identities they have already created in other places" (p. 58). Ellis (2003, 2005) suggested that place is more than just a space, but is a multi-dimensional entity involving everyday life experiences, social structures, and relationships, but also influenced by multiple global factors. Holloway and Valentine (2000) similarly expressed the necessity of examining children's experiences and perspectives, as well as their wider social structure, including their global community, and the role they play in shaping children's identities. Research finds that children's lives are tied to and impacted by many factors, such as globalization, culture, politics, economic, and social forces, which while beyond their control, can shape their lives (Holloway & Valentine, 2000).

Chawla (1992) investigated children's favorite places and noted that "children's place attachment" is based on children's experience of place and concluded that "place provides children with three types of satisfaction: security, social affiliation, and creative expression and exploration" (p. 60). Therefore, the assertion is that in order to create this sense of place for children certain needs to be met, these can be cultural, physical, or social. When the place is compatible with the child's own sense of place identity, the place tends to offer meaningful experiences for the child; however, when the place is in conflict with the child's own sense of place identity, the place can limit the child's meaningful experiences (Proshansky, Fabian, & Kaminoff, 1983).

The school library as place.

Ellis (2005) believed in today's environment that schools have the potential to be important places and will "increasingly be important sources of security, belonging, identity, social affiliation, space for creative self-development, and opportunities to learn about the world and be connected to it" (p. 70). The school library exemplifies this belief, yet there is an extreme dearth of literature and research to investigate the school library as place. In a school library, children can access resources to learn about the world and are provided a space for creative expression and exploration. Limberg and Alexandersson (2003) addressed the concept of the school library as a space for learning due to its unique position in the school. They focus on exploring what meanings students construct through the school library and how these meanings are constructed, or the school library's place in information seeking, rather than a physical sense. Most recently, research by Gunson (2010) continued on this path of exploring the school library as a place that fosters inquiry and curiosity, building on the work of Maniotes (2005), asserts the importance of creating a learning environment called third space where the most meaningful, lasting learning takes place.

The school library also provides a place where students can feel acceptance and a sense of community or social affiliation through relationships. These relationships lead to what Bush (2007)

defines as a type of “safe haven” or a “sanctuary” for mutual respect, openness, acceptance, and tolerance (p. 416), or security. Evarts (2007) affirmed this, noting that the school library benefits students who are “isolates in the school” and need to feel accepted and would benefit from belonging to a community. Osterman’s (2000) research concluded that students’ sense of acceptance, or a sense of “belongingness,” is crucial and the school library can serve as a place to form these connections.

Finally, Gunson (2010) explained that teacher librarians have the opportunity to create spaces to “celebrate the unique physical and cultural settings found in their community” (p. 46). Gunson found the connection to the larger community a particularly important consideration, especially for students living in rural communities; that creating learning experiences that extend to the world outside of the school allow students to make connections with the personal, familiar experiences, and settings of their community. Additionally, Gunson (2010) concluded the importance of place for school libraries and indicates a need for investigating how to create this “place” for new students coming into the school due to restructuring and redistricting, but does not expound on how to meet this need.

The research on place, paired with that from education, addresses many perspectives and constituting elements that can be applied to the school library in order to construct a school library program that promotes a sense of place. When considering the library as a place, both the physical room and the internal structure of the school library program must be considered, along with the student users themselves, in order for students to establish their own sense of place (Ellis, 2005; Osterman, 2000).

The Interrelationship of Space and Place

The literature clearly illustrates that school libraries have the potential to be a place of safety, inquiry, belonging, acceptance, and self-discovery. Yet creating this “place” for students is reliant on many factors, some which can be addressed through research-driven program planning, and some that cannot. The occurring theme found in the limited research is that while it is important that schools and school libraries strive to create places of belonging and meaning, there is the need to consider the broader community and world from which these students originate.

Ellis (2005) explained that a sense of place is influenced by identities already created in other places and through other experiences of everyday life; it is this identity created in the space outside school that must be considered when attempting to create a library program and environment that promotes a sense of place for its students. Where do these students come from? What experiences have they already had? What communities do they already belong to? The answers to all of these questions shape the identity a child brings in with them to the school library. In examining the needs of children in relation to place, four types are discussed: security, social affiliation, and creative expression and exploration” (p. 60). In order to meet these needs, and create an environment or program that is in harmony with a child’s own sense of place identity, school libraries must consider the cultural, physical, and social aspects of their users.

School Library Space Informs School Library Place

This research poses the question: How can teacher librarians create an environment where students can establish their own sense of place without knowledge of the broader community or the world their students come from? Just as the diversity of students is recognized and addressed in instruction, it must also be recognized when planning school library facilities and programs. Students bring with them a variety of background experiences that shape their needs as library users. Teacher librarians, as information professionals, should lead the way in utilizing available

data sources to meet the needs of their users and utilize all tools available to learn about students' needs, including their environment external from the school.

Teacher librarians realize the importance to collect data in order to document services, and to inform decision-making, such as circulation statistics, test data, reading pattern data, and also for instructional assessment purposes (American Association of School Librarians [AASL], 2009). With the current focus on evaluation, an area still absent from school library literature is analyses of the external environment or the broader community of student users. The analysis of the demographics of the space in which a community exists via GIS is an area that can be addressed in research by the teacher librarian to inform the creation of school library places. As noted above, the environment of the school library, the materials, and services that the library offers within its place might best serve students by mirroring the needs of each library's unique group of users, which usually involves consideration of the surrounding community environment (Koontz, 1995).

Geographic Information Systems (GIS)

GIS, the research tool, offers librarians the ability to spatially analyze and display user demographics. In conjunction with existing user locations, GIS is a powerful tool for understanding who and where users are, the socio-demographics of the broader community they live and participate in, and their needs (Koontz, 1997). GIS is used as a tool for research and development of communities worldwide. Most recently, public participation GIS (PPGIS) has empowered communities in neighborhood revitalization and urban planning by allowing community members to share their information. Information from a greater variety of community members results in maps and analysis using GIS that can help governments make more informed responses and allow a greater number of community members to share in the power of decision-making that impacts everyone (Craig, Harris, & Weiner, 2002). For example, the United Nations (2008) utilizes indigenous people's local knowledge to assist in nature conservation, disaster management, and to preserve traditional medical practices. Another example includes, the Public and Community Libraries Inventory of South Africa (PaCLISA) project that focused on plotting the physical location of libraries in hopes that "public and community libraries have the potential to play a key role in establishing democracy and improving the quality of life of all South Africans" (Lor, van Helden, & Bothma, 2005, p. 273). These efforts in many international communities and a few in public libraries thrive, but for now school libraries are left off the map. A literature review performed in 2010 of library research that uses GIS as a tool to assess and analyze library services discusses 34 articles indexed in the *Library Literature and Information Full Text* and *Library, Information Science and Technology Abstracts (LISTA)* databases (Bishop & Mandel, 2010). All of the articles included work in mostly public and a few academic libraries, but none in school libraries.

These studies reflect that GIS has been used to analyze and display data in predominantly two different ways (1) analyzing service area populations and (2) managing facilities and collections (Bishop & Mandel, 2010). For example, to analyze service area populations, user demographics may be entered into GIS and projected over street maps. Mapping user demographics can be utilized at a countywide level or specifically along school boundary lines. Similar analyses may be conducted for managing facilities and collections, albeit at different granularity than viewing school district populations. GIS can be used to analyze in-library use data and occupancy of library study space by mapping locations of students and materials within the facility at sample times in order to assess those library services. GIS as a tool may be used to assist with other school library concerns, but early adopters will probably begin, as in public and academic libraries, with both market analysis to profile service areas and address issues such as

collection development, circulation statistics, community, and patterns of in-library use data (Jue, Koontz, Magpantay, & Lance, 1999).

GIS in Schools

Although it was not designed for educational purposes, GIS has been used in education for many years in secondary schools as well as primary schools in many diverse subject areas including geography, science, environmental studies, social studies, history, and more. While mainly in the United States, GIS is gaining ground as a teaching tool in Canada, Australia, Sweden, New Zealand, Singapore, France, Finland, Australia, Rwanda, and Turkey (Bednarz & Van der Schee 2006; Broda & Baxter 2003; Demirci, 2009; Foster, Shilling, & McConnell, 2007). Technological developments have given teachers new opportunities to utilize GIS software and online resources in the classroom to promote global awareness, encourage critical thinking, with real-world technology applications, and instill students with a sense of place and community (Hite, 2008). While implemented in educational planning and as a curricular resource, the potential for GIS to inform the school library program has yet to be realized.

How a school library defines its place, including its collection, services, and the total room environment, defines how students may create their own sense of place. Therefore, it is necessary for the teacher librarian to learn as much about the community and the various environments their students come from, because as noted above, a student's background and personal identity, created by the larger global community they live in is crucial. For example, United States Census findings will contain demographic and socioeconomic statistics found to correlate with public library usage (Koontz, 1997). These statistics include age, level of educational attainment for persons 25 years and older, number of households living below the poverty levels, and median household income (Koontz, Jue, & Bishop, 2009). Although demographics and socioeconomic statistics of interest may be different for school libraries, these figures are still beneficial to the teacher librarian in representing the community's population to create school library programs that consider the variety of needs of the students that are unique to the specific environment of their school.

Beyond the census data, an e-government initiative from 2002, Geospatial One-Stop (GOS), provides access to spatial data and maps for novice and advanced users of GIS. The portal includes the ability to view maps, spatial data, and other spatial services from state, local, and tribal governments, as well as from the private sector and academia (Tang & Selwood, 2005). With similar databases available at the state, county, and city levels, teacher librarians would simply need to seek out the expertise of their local GIS professionals, which most school districts rely on to manage school redistricting and bus routes. Another option is to form partnerships with local public libraries, which usually collect data for their own planning purposes (Langhorne, 2004; Lyle & Dean, 2004).

Implications for Practice

The findings from this literature review and preliminary discussions indicate that there is need for the teacher librarian to not only consider his or her student users, but also the broader community environment in which they live, in planning the school library environment and the school library program. There is ample room for additional research to address the utilization of GIS in the school library context as a valuable data analysis and visualization tool. There are multiple possibilities for implementing GIS in school libraries, including examining student users' wider social structure or community to enable teacher librarians to better facilitate students' development of a sense of place.

Collection Development

The collection of resources that a school library offers must reflect the school curriculum, but also the diversity of its users. The school library program “includes a well-developed collection of books, periodicals, and non-print material in a variety of formats that support curricular topics and are suited to inquiry learning and users’ needs and interests” (AASL, 2009, p. 38). It is the responsibility of the teacher librarian to select a collection of resources that considers the unique needs of all students. Not only do teacher librarians select the books for the collection, but also provide information to teachers for classroom instruction, therefore providing opportunity to recommend literature that connects to the students. The school library provides children access to resources, both print and electronic, to learn about the world and have a space for creative self-development or exploration (Gunson, 2010). Yet it is through their interactions with the resources that students can develop a sense of place and therefore school libraries should create collection informed by the demographics of their users

Multiple studies that compare the socioeconomic status of communities find significant differences in the access to print in the home (Constantino, 2005; Krashen, 2004). Krashen (2004) notes the inequity in resources available to students from high and low socio-economic backgrounds; students from wealthier parents generally have access to print-rich environments at home, while students from poorer backgrounds do not, therefore making the role of the school library all the more important. Research on home collections may be beyond the resources of most teacher librarians; however, GIS may be used to analyze other socioeconomic indicators that would help steer collection development. For example, with lower reading levels and/or reduced print in the community, teacher librarians can focus on obtaining reading level appropriate materials in greater quantities, with heavy use or longer check-out periods in mind.

Community demographics must also be considered in the selection of resources to address the specific needs of diverse learners. These groups may include those with different language needs, such as English Language Learners (ELL); differing cultural needs, such as minority groups; as well as social needs resulting from socioeconomic status. For example, Hispanic students “display increased enthusiasm and improved attitudes when provided a wide selection of books in Spanish and Spanish-speaking high school students who immigrate to the United States tend to display more desire to read books in Spanish than U.S.-born Hispanic students” (Schon, Hopkins, & Davis, as cited in Callsion, 1991, para. 20). Additionally, Clarke (as cited in Callsion, 1991) finds that the reading tastes of Indian, African American, and Caucasian high school students “vary widely and that ethnic origin does have a major influence on the student's interest in materials selected for reading” (para. 21). The school library is often the primary source for many students to access a rich and diverse collection of resources to support their learning efforts, yet there is very little research on how to identify and address the unique needs of various diverse groups. For public libraries, some vendors provide demographic data to influence collection development and predict circulation (Molyneux, 2006). Similar data could be useful in school libraries, but further research is required. GIS data presents the teacher librarian with the unique opportunity to demonstrate acknowledgement of the broader community in providing information resources that make connections to the world of the students.

Stakeholder Responsiveness

In most communities, stakeholder views shape the school library program. With each stakeholder being vital in the formation of the school library sense of place, their input may at

times over-represent or under-represent minority viewpoints of the surrounding community. Spatial data may be utilized and GIS as a tool can generate maps. These valuable visualizations convey meaning that is not easily done in text, tables, or other presentation materials. As any educator should know, some learners prefer visuals and often a map may be the only way for stakeholders to see the big picture in one view (Dunn, 1990). Maps may assist in planning purposes when presenting data to superintendents, school boards, community members, and other stakeholders by providing a visualization of the school in relation to its student's communities in order to justify collection and programming decisions.

The global economy, the political climate, and school reform initiatives all impact education and impose difficult budgetary choices on superintendents and school boards. As student populations and resources fluctuate, difficult resource allocation impacts all education agencies, including school libraries (Konnert & Augenstein, 1996). Therefore, the superintendent and other stakeholder perspectives of the school library are important (Woolls, 2008). In this time of budget cuts school libraries need make sure that they are relevant in the larger community. The people of a community have a vested interest in schools, as they pay taxes, but sometimes vote against education projects. Additionally, community businesses represent possible sources of funding and support. Educating the community with data and maps to more concretely represent the space and the school library's place within the community may help them understand why school libraries are important to the communities they serve.

Adapting to Changing School and Community Boundaries

As populations change and school system grow, redistricting often becomes necessary as new schools are built to accommodate present growth and relieve overcrowded in existing schools. Redistricting is complex, increasingly so with school choice and magnet programs, and these changing boundaries directly impact all facets of the educational program, including the school library. Yet the literature on how school libraries address these changes in their programs is almost nonexistent. As Gunson (2010) concluded, it is important to know your users and utilize this knowledge to guide decision-making in the school library, especially to adapt and meet the needs of a changing population.

Each municipality's local government, including school districts, usually utilizes GIS professionals to work with other spatial issues, such as transportation. Reaching out and connecting with those individuals may help teacher librarians in performing analyses of each school's community. School libraries can connect with GIS professionals employed at the school district level or within the same area of local government just as some public libraries have (Bishop, 2008).

Public libraries utilize GIS to optimally distribute funding for low income and majority-minority communities and demographics to inform closings and openings (Jue et al., 1999; Koontz, Jue, & Bishop, 2009). School libraries could apply GIS in similar ways, for example, the redistribution of print to school libraries that serve communities with a shortage of access to books at home. Moves of collections that mirror changes in school boundaries will keep users with their materials. In determining the needs of a new school library similar reallocation of resources from existing libraries may occur within the same school district. For example, in Uganda, the social network of secondary school headteachers was investigated using GIS to determine how resources were being exchanged or shared between schools and the impact of physical distance on the existence and type of these exchange relationships (Hite, 2008). This type of information on resource sharing could have implications for the school library as well. With many school district boundaries in flux, adjusting to population changes both migratory and more permanent, school

libraries could utilize GIS to advocate for greater funding in areas with lower standardized test score attainment. For example, test scores for schools may be linked to school boundaries to create maps that would highlight areas of educational concern.

School Library Facility Planning

Often libraries and schools make the mistake of designing facilities without a complete or accurate understanding of their surrounding geographic market areas. Knowing your users is the foundation of good marketing and today's library must be customer-focused, which means first identifying all needs of your customers and potential customers. This change runs parallel to research that focuses on the school library as place. The Council for Educational Facilities Planners (2004) research concludes that there is an integral relationship between the quality of educational facilities and the level of student achievement and the facilities impact the learning, development, and behavior of the user.

Strategic planning assists schools and districts in planning and implementing new school library programs. The planning process should take into consideration the demographics of the community (e.g. race and ethnicity, income distribution, level of formal education, extent of parent involvement) and include representatives from all key stakeholder groups, including parents and influential members of the community (Zilonis, Markuson, & Fincke, 2002; Woolls, 2008). GIS may be used to perform analyses of demographics within school district boundaries, the relationship of the school to other community centers and public libraries, as well as design considerations within a school library facility. For example, whether or not a public library exists in the area may determine if a school library could serve as a center for students and their parents to access online services and the broadband connectivity issues that would have to be addressed (Mandel, Bishop, McClure, Bertot, & Jaeger, 2010). These considerations informed by analysis of the space around the school may provide insight into creating a school library as a place that reflects the community it serves.

Conclusion

Geography provides another concept that contributes to the school library as place, local knowledge, which simply means "to-know-a-city-is-to-know-its-streets" (Geertz, 1983, p. 167). Local knowledge is a valuable commodity, but with larger and more diverse communities, it is impossible for teacher librarians to fully understand the complex community demographics of their users, GIS can assist by informing planning with local knowledge. This could be especially since in many cases the teacher librarian true for those teacher librarians that may not live within the same community or be aware of the plethora of communities represented by learners they serve. GIS can assist by informing planning with local knowledge and many countries such as France, England, Hungary, India, Australia, Tanzania, Ethiopia, and Uganda, are already utilizing GIS as a tool to improve education planning (Hite, 2008). Regardless of community, school library planning as well to provide a rich view of the community. School libraries throughout the world are responsible for providing a place that meets the needs of a diverse learning population and in order for this to occur teacher librarians must understand and acknowledge the broader community and the cultural implications.. The cultural aspects, socioeconomic indicators, and other factors involved with the everyday lives of their users contribute to how comfortable users feel within the place created at each school library. This is especially important in many nations and countries that continue experience extreme poverty and low literacy rates; that these youngest

library users are not alienated by materials that are too detailed, too advanced, or irrelevant to their needs. Also countries that experience high rates of immigration can utilize GIS to make sure that these student populations needs are being met with language and culturally appropriate materials and services. The possibilities for utilizing GIS in a school library context warrant further investigation. The implications derived from this review present just one facet of the potential for utilizing GIS to allow school libraries to evolve into a place that reflects the entire community and to position the school library a place within the lives of students.

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Authors' Notes

Melissa P. Johnston is currently a Ph.D. candidate at the Florida State University College of Communication & Information's School of Library & Information Studies and works as a Research Assistant at the Partnerships Advancing Library Media (PALM) Center. Melissa earned a Bachelor's and a Master's degree from the University of Georgia and worked as a teacher librarian for 13 years.

Bradley Wade Bishop, Ph.D., is an assistant professor at the School of Library and Information Science at the University of Kentucky. Wade has professional experience as a teacher, academic librarian, graduate research associate, teaching assistant, and instructor. For more information, please visit Wade's website: <http://www.uky.edu/~bwbi222>