Evidence Based Library and Information Practice

Conference Paper

LibQUAL+® and the Information Commons Initiative at Buffalo State College: 2003 to 2009

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Abstract

Objective – To examine the effect of a transition to an information commons model of service organization on perceptions of library service quality. In 2003, the E. H. Butler Library at Buffalo State College began development of an Information Commons, which included moving the computing help desk to the library, reorganizing the physical units in the library around functional service areas, and moving the reference desk to the lobby.

Methods – In 2003, 2006, and 2009, the library administered the LibQUAL+ survey, which measures the relationship between perceived library service delivery and library user satisfaction. The 2003 survey was conducted before the implementation of the Information Commons Initiative. Analyses of variance were conducted to compare the effect of the service changes on users' perceptions of library service quality between the three data collection points, as well as to explore differences between undergraduate and graduate students.

Results – The analyses revealed significant differences between the three data points, with significantly more positive perceptions of library service quality in 2006 and 2009 than in 2003. Comparisons between 2006 and 2009 were not statistically significant. In 2003, no significant differences were found between undergraduate and graduate students' perceptions. However, in 2006, undergraduate students perceived higher levels of service quality after the development of the Information Commons than graduate students. This difference was maintained in 2009.

Conclusion – The Information Commons has become a popular place for new programming, exhibits, workshops, and cultural events on campus. The library staff and administration have regained the respect of the campus community, as well as an appreciation for user-driven input and feedback and for ongoing assessment and evaluation.

Introduction

Across numerous types of service businesses and organizations, of which libraries are a part, evaluation and measurement of service methodologies and outcomes has become a common, multifaceted necessity. The era of accountability has arrived, and libraries are no longer viewed simply as separate entities providing "inputs" into larger systems. Rather, library systems naturally are *part* of these systems, and they must be defined and evaluated accordingly, including their processes, outputs, and outcomes in relation to larger systemic structures.

Library measurement and evaluation evolved significantly throughout the 20th century and especially into the 21st century. Several key contributors, as individuals and as members of larger library associations, enriched the field of library measurement and evaluation, and their contributions will be discussed briefly to provide a chronological context to undergird a portion of the literature review, particularly as it relates to the selection of the LibQUAL+® survey instrument. More importantly, though, their contributions led to the recognition and acceptance of the need for library evaluation, which helped spur attempts to strengthen library evaluation research. One such attempt stemmed from an initiative from the Association of Research Libraries (ARL): a pilot project designed to examine and assess service quality among academic and research libraries. This project led to the development of LibQUAL+®, a psychometric survey instrument designed to measure the relationship between perceived library service delivery and library user satisfaction. Successive attempts to strengthen and expand the research base in this field continue today.

Throughout the past six years, LibQUAL+® played a special evaluative role at Butler Library at Buffalo State College. In 2003, the E. H. Butler Library engaged in an extensive physical and virtual reorganization of service provision and delivery. Specifically, the library initiated the development of and transition to an Information Commons model of service organization. Prior to this transition, however, Butler Library collected LibQUAL+® data from its user groups for two primary reasons: 1) to establish a baseline (i.e., pre-test) for measurement of changes to users' perception of library service quality over time, and 2) to receive concrete feedback from its constituencies to help guide the direction of development of the Information Commons. After completion of the Information Commons, LibQUAL+® surveys were administered again in 2006 and 2009 for purposes of benchmarking against peers, self-benchmarking, and post-testing user perceptions of service changes.

This paper will present the evaluative, practical findings related to Butler Library's journey of developing an Information Commons. A literature review will be presented, which will cover: 1) a brief acknowledgement of key contributors to the field of library evaluation research, and 2) an overview of LibQUAL+®. Further literature about the Information Commons model will be touched upon in the methodology section of this paper. The purposes of this research are simple: 1) to provide other academic libraries with a documentation of our successes and challenges in developing an Information Commons; 2) to illustrate changes in users' perceptions of library services between 2003, 2006, and 2009; and 3) to contribute to the bodies of practice-based library research and service evaluation, particularly in relation to Information Commons case studies and LibQUAL+® research.

Literature Review

Library Evaluation

Most fields respectfully acknowledge the early works of their key contributors, and the field of library evaluation should be no exception. Three prominent individuals wove a common thread in this field throughout the past century: James Thayer Gerould, a library administrator; F. Wilfrid Lancaster, a library educator, and Duane Webster, a library association executive (Kyrillidou & Cook, 2008). The efforts and contributions of these individuals highlight the evolution of library evaluation practices, and each brought different perspectives into the assessment and measurement of library services. Their endeavors serve as the foundation for how future research would supplement their practices and findings and further improve upon library service evaluation models and methodologies.

SERVQUAL: The Origins of LibQUAL+®

ARL reports of descriptive statistics fill a critical need in evaluative library research, even today. Decades of statistics pinpoint practices of collection investment, (in)stability of library funding, and declines and improvements in resource allocation. Trends in these areas can be monitored, and initiatives can be instituted when deemed important or necessary to the ARL membership. However, these trends and practices make an assumption that has yet to be proven empirically: the relationship between expenditures and service quality (Cook, Heath, Thompson, & Thompson, 2001) - "A measure of library quality based solely on collections has become obsolete" (Nitecki, 1996, p. 181).

Recognizing the lack of instruments that directly measure service quality from the user point of view, ARL approved a membership-centered pilot project in 1999 to respond to college and university administration demands nationwide for accountability (Cook, Thompson, Heath, & Thompson, 2001). Part of ARL's New Measures Program, this project represented a paradigm shift away from descriptive, collection-input driven measures toward service evaluation, user satisfaction, and formalized, standardized measurement initiatives grounded in scientific methodology. These efforts promoted the need to rely less on the *ARL Index* (ARL Statistics) as the primary, most important assessment tool; rather, this project represented a collective, collaborative effort of many ARL-member libraries and librarians to adopt a new way of conceptualizing and conducting library evaluation.

To begin the collaborative efforts, ARL accepted the adoption of Texas A&M University's research in SERVQUAL (SERVice QUALity), a psychometric survey instrument that addressed user assessments of service delivery (Cook, Heath, Thompson, & Thompson, 2001). Although it is beyond the scope of this paper to address SERVQUAL in-depth, one important point should be noted. The SERVQUAL instrument was designed in the 1980s to assess service quality in the for-profit business world (Cook, Heath, Thompson, & Thompson, 2001). Thus, in order to utilize and incorporate this research into the field of library evaluation, ARL requested the instrument be re-conceptualized, re-designed and

re-tested to better address service delivery to users of libraries. The new instrument would need to be tailored to library users, rightly presumed to be a distinctly different population than traditional "business customers." Also, the instrument needed to be grounded in college and university library settings and environments; after all, libraries typically are non-profit entities focusing more on service provision (as compared to for-profit settings, possibly focusing on resource provision or production). Nevertheless, SERVQUAL represented a promising survey model, a foundation from which a more library-oriented survey could be developed.

LibQUAL+®: An Overview

In general terms, LibQUAL+® is a 22-core-item "total market" survey instrument designed to assess library service quality of an academic library from the point of view of the library user (Thompson, Kyrillidou, & Cook, 2008). Factor analytic studies and item analyses reveal that LibQUAL+® measures the single overarching dimension of perceived library service satisfaction and quality (Thompson, Cook, & Heath, 2001). However, this should not be confused with its three subscales: Affect of Service, Information Control, and Library as Place. These three "dimensions" measure components of library service satisfaction:

> *Affect of Service*
>
> This aspect of user satisfaction examines the helpfulness and responsiveness of library employees to users. Early LibQUAL+® research indicates three components to this subscale dimension (Cook, Heath, Thompson, & Thompson, 2001). *Assurance* is "the knowledge and courtesy of employees and their ability to convey confidence and trust" (Cook, Thompson, Heath, & Thompson, 2001, p. 265). *Empathy* includes the caring, compassionate, individualized attention of employees toward their users. *Responsiveness* is the ability and willingness to provide efficient service to its users.
>
> *Information Control*
>
> This aspect of user satisfaction examines the availability, timeliness and appropriateness of library resources. Components of this subscale dimension include user perceptions of the *comprehensiveness of collections*, *barrier-free access* to information at the time of need, and *information formats* (e.g., print, digital, etc.) (Cook, Heath, Thompson, & Thompson, 2001).
>
> *Library as Place*
>
> The final subscale measurement examines how well physical library facilities serve users' needs for space and technology. This concept assesses the ability to meet needs for *community socialization*, *utilitarian space* (e.g., for study, collaboration, etc.), and space for *creative and scholarly inquiry and rumination* (Cook, Heath, Thompson, & Thompson, 2001).

Although validity issues will be discussed later, it is important to note two potential shortcomings of these subscale areas. First, *Library as Place* is a continuously changing phenomenon, especially as technology demands force a shift from print-based resources to digital and web-based resources. Loudly and clearly, users have expressed an overwhelming need for resources to be available anytime, anywhere, from any location (Thompson et al., 2008). This demand has fostered technological changes in the ways in which resources are accessed, particularly from remote locations using computing and web-based technologies. Thus, *Library as Place* is becoming less "physical." As more resources become available as online digital full-text, the "dependency" on a library's physical space for information resources becomes lessened. In fact, it may become possible in the not-so-near future for users to complete library research activities

entirely in an online, digital environment. If this becomes the case, this aspect of user satisfaction may shift dramatically, if not be eliminated altogether.

Secondly, and on a similar note, information formats are shifting toward digital, electronic versions. However, one particular item in the *Information Control* subscale inquires about "the printed library materials I need for my work" (Thompson et al., 2008, p. 14). Again, this item may become less relevant given the shift toward digital formats. If the question is asked, it may "plant the seed" in the mind of the survey respondent that printed materials *should* be a part of a library's collection. If a library shifts to a digital-based collection (which Butler Library has done—90% of journals are digital), then the respondent may perceive the library is deficient in this area. Consequently, this item could threaten the validity of LibQUAL+® data. This is why it is important for LibQUAL+® researchers to monitor these trends and make necessary item modifications or deletions accordingly (e.g., delete the word "printed").

LibQUAL+®: Psychometric Properties and Integrity

In 2007, LibQUAL+® collected data from the one-millionth library user and the one-thousandth institution; and since its conception in the early 2000s, surveys have been administered to library users in 20 countries in 12 different languages (Thompson et al., 2008). The sheer number of data collected is massive and expansive, lending to a richly diverse longitudinal collection of statistical information. What started out as a need for stronger evaluative measures in North American academic libraries has expanded to a global scale, a truly remarkable representation of libraries both nationally and internationally.

Validity

Some LibQUAL+® studies have engaged in rigorous statistical testing to determine criterion-related validity (Thompson, Cook, & Kyrillidou, 2005; Heath, Cook, Kyrillidou, & Thompson, 2002). However, since LibQUAL+® was a unique instrument, *convergent validity*, or statistical comparisons between instruments measuring the same or similar concepts, could not possibly be tested (Shadish, Cook, & Campbell, 2002). Instead, Heath et al. investigated LibQUAL+®'s *concurrent validity*, or the distinct ability to distinguish concepts from one another in order to measure each concept separately, as compared to the ARL Index, a predominantly collection-and-expenditure-based reporting instrument (Heath et al., 2002; Shadish et al., 2002). As expected, the "strongest" correlation between LibQUAL+® and the ARL Index involved *Information Access* (r^2 = .147 = 2.2%), and this correlation was small. The reason the two instruments did not correlate presumably is due to each instrument measuring distinctly different concepts—LibQUAL+® measures user satisfaction, and the ARL Index measures collection holdings and expenditures. Thus, in a fascinating way, this study showed and strengthened LibQUAL+® 's validity by disproving its correlation with a conceptually different measure.

One other potential threat to validity is *self-selection bias.* LibQUAL+® surveys rely on the voluntary completion of the survey by respondents. Due to confidentiality, a library would not be able to access personally identifiable information (such as email addresses) for the purposes of conducting research using random-sampling methods. Instead, libraries market the survey to its users utilizing whatever means available to them. Libraries rely on these marketing efforts to "attract" users (and non-users) to participate in the typically Web-driven survey. Self-selection is not a random sampling method and, thus, carries with it the potential flaws of such a bias—the most general concerns being: "do respondents differ from non-respondents?" For example, a user who is greatly satisfied with library services may be more than willing to complete a survey "to help the library." Alternatively, a user who is greatly dissatisfied may be more likely, too, to complete a survey to voice their concerns. However, what about users

who are "in the middle"—maybe only somewhat satisfied? Are they more, less, or just as likely to participate in this survey? Also, what about the likelihood of *non-users* to complete the survey? Are library non-users just as likely to complete the LibQUAL+® survey (or not complete it) than library users? These questions and concerns inherently could impact the validity of any research findings, including those of LibQUAL+®.

Reliability

A plethora of research studies have examined the stability of LibQUAL+® 's reliability, including longitudinal analyses, and most reliability correlation coefficients reach at least .85, .90, or even higher (Thompson, Cook, & Thompson, 2002; Thompson & Cook, 2002; Cook, Heath, Thompson, & Thompson, 2001; Cook & Thompson, 2001). Although it is beyond the scope of this paper to cover all reliability studies in depth, the research of Thompson, Cook, and Thompson (2002) is most indicative of LibQUAL+® 's reliability. Their research reported a Cronbach's alpha coefficient of .948, a remarkably high internal reliability indicator.

Item Response Scoring—The "Gap Measurement" Model

Given its roots in attitude measurement, LibQUAL+® utilizes a *gap-measurement model* for item response scoring. For each survey item, respondents provide three different ratings; these ratings include:

- The *minimum* level of library service that is deemed acceptable
- The *perceived* level of library service seen as being offered
- The *desired* level of library service. (Thompson, Cook, & Heath, 2000, p. 166)

Gap measurement relies on the *perceived* scores of respondents as indicators of service quality (Thompson et al., 2000). Specifically, the difference between perceived levels of service and minimum and desired levels of service is calculated to determine positive and negative scores. If levels of perceived service are greater than or equal to minimum levels of services, users typically are "tolerant" and accepting of the library's service in that area. If it falls below that minimum, however, then the user believes the library is not performing up to their minimal expectations in that area, which typically results in dissatisfaction. Similarly, if perceived service meets or exceeds their desired level of service, then typically a user is "satisfied." Anything below desired levels of service may be an indication of dissatisfaction. However, LibQUAL+® posits that service quality may still be acceptable as long as the library meets users' perceived minimal levels of service, even if they are not functioning at the desired level. This "gap" indicates a threshold known as the *zone of tolerance*. Ideally, libraries should attempt to meet users' desired levels of service, but, even if they meet their minimal levels of service, libraries generally will be met with at least somewhat satisfied users.

Gap measurement carries its own set of pros and cons. One positive outcome of gap measurement is an inherent "lie detection" and random response scale. "Logically . . . a user's rating of desired performance should never be below . . . minimally acceptable performance [ratings]" (Thompson et al., 2000, p. 168). If so, especially if persistent throughout a respondent's cumulative scores, it likely is an indication of random response (and, thus, a threat to score validity). Consequently, such aberrances are determined through simple counting, and once aberrances for an individual survey reach a predetermined threshold, that survey is deemed invalid and subsequently is deleted from data inclusion.

Another positive outcome also happens to be related to multiple ratings. Gap measurement carries an "intuitive" appeal, a "complex simplicity," if you will. Assuming a respondent understands the nature of the rating methods and how they are related to one another, a respondent can provide very important, powerfully reliable data (Thompson et al., 2000).

One con of gap measurement involves the user directly. Instead of responding to one 22-item Likert-type scale, the gap measurement model "forces" users to complete three Likert-type scales, one for each perceived service rating. This results in, minimally, a user completing over 60 responses. This reality may have been beyond their expectation and, consequently, may result in mid-completion respondent attrition, which typically is another threat to validity.

Similarly, another con involves the user's comprehension of an item's concepts and/or constructs. For example, a respondent reaches the item: "Library space that inspires study and learning." If they do not understand the concept "library space" (or if it is not applicable to them, such as only accessing the library through remote digital access), they may be confused as to how to answer. Then when they attempt to provide a score for *each* rating, the chances of computing imperfect scores are compounded (Thompson et al., 2000). Interpretation problems magnify inaccuracies when multiple ratings for one item are involved.

The Information Commons Initiative at Buffalo State College

Historical Background

2003 was the year of the perfect storm of bad news for Butler Library. As was the case in hundreds of academic libraries across the country, 2003 was a year of an unprecedented decrease in gate counts, reference desk statistics, and library material circulation. At Butler Library it also was the year of an unprecedented increase in technology-related questions and complaints: usernames did not work, e-mail accounts needed to be activated, passwords needed to be reset, printers were jammed, work was not saved, discs were lost, and software could not be loaded. Students with these types of problems had such a confusing time resolving them that the process was given a name—"The BuffState Shuffle." In 2003 users' frustration levels were high on all fronts, and staff morale seemed to be at an all-time low. Library administrators were scrambling to justify filling vacant lines for functions that appeared to be in decline. As Scott Carlson noted in his 2001 article in the *Chronicle of Higher Education*, "Gate counts and circulation of traditional materials are falling at many college libraries across the country, as students find new study spaces in dorm rooms or apartments, coffee shops, or nearby bookstores" (p. A35). New technologies, increased automation, and of course the Web, improved access to information and empowered users. It also kept users away from the library. The silence was deafening . . . but only for a while. We needed to find a way to get our users back.

Our first formal step was to confirm what we suspected: users were staying away because they were unsatisfied with the library on many fronts. Hence, in 2003, we administered the LibQUAL+® survey to formally measure library patron satisfaction and, according to the data received, library user groups perceived Butler Library as falling short in all three dimensions/service areas. Scores for overall satisfaction, affect of service, information control, and library as place ranged from the 40th to the 42nd percentiles. (Baseline percentiles were determined through comparisons against 2003 LibQUAL+® norms.)

William M. Sullivan, senior scholar at the Carnegie Foundation for the Advancement of Teaching, stated, "Thinking of a library as an information center is the first step toward losing it" (Carlson, 2001, p. A35). What really was the library then if not an information center? The disappointing results of LibQUAL+® served as a wake-up call for Butler Library to redefine itself. What resulted was the creation of the Information Commons and, seven years later, a library that had reclaimed its place as the academic and cultural heart of the Buffalo State College campus.

College & Library Overview

Buffalo State College, a Carnegie Master's-L level institution, is the largest four-year urban college in the State University of New York (SUNY)

system. Enrollment for fall 2009 was 11,714 students: 9822 undergraduate and 1892 graduate students. Five schools, the School of Arts and Humanities, the School of Education, the School of Natural and Social Sciences, the School of the Professions, and the Graduate School, offer 162 undergraduate programs with 11 honors options and 60 graduate programs including 17 post-baccalaureate teacher certification programs. First-year undeclared students are enrolled in University College, which provides support programs and specific opportunities to foster student success. The top five majors at the college are business, elementary education & reading, technology, criminal justice, and history.

Butler Library is a medium-sized academic library which houses more than 675,000 printed books, over 174,000 electronic books, and access to full-text articles from over 57,000 unique print and electronic journals. The library is open 110 hours each week during regular semesters and within our building we have two extended-hours facilities, StudyQuad and QuietQuad, which are open and staffed 24/7 during regular semesters. Butler Library is the largest open computer lab on the campus, housing more than 200 computers, which provide full access to library resources, the Web, the Microsoft Office Suite, and various specialized software applications. Access to the wireless network and secure networked printing is also available in the library. The library has a café and several lounge areas. Security cameras are installed for safety and the building is routinely patrolled by University Police Student Assistants.

The Beginning of a Developmental Plan

Credit must be given to the seminal article by Donald Beagle, *Conceptualizing an Information Commons*, for giving librarians at Butler Library a vision for the future. (1999) Librarians by nature tend to be excellent organizers, visionaries, and adept at seeing the bigger picture. The road to revitalization of the library required a new way of defining the library's purpose and its responsibility to provide support to the greater academic community. The Information Commons concept defined by Donald Beagle provided an excellent framework. Of particular interest were Beagle's new descriptions for use of library space and his redefinitions of library services. Butler Library's front line staff could clearly articulate many instances of poor or confusing service on campus. If we could consolidate the provision of essential services within the library itself, students would be better served by a "one-stop shop." The plan was for that one-stop shop to become an Information Commons.

Implementation: Building an Information Commons

The look and feel of the Butler Library of seven years ago is but a distant memory—so much has changed. Below is a summary of the major highlights of the library's reorganization:

The Computing Help Desk moves into the library

A review of the literature on restructuring academic libraries is full of information and case studies about the marriage of computing services and library services. In Butler Library this was the most obvious service to include in the Information Commons. This move allowed for support to be available at the point of need—most students discover they need password resets or specialized computer assistance when they using library computers. Having the Computing Help Desk in the library also raised user satisfaction levels as this service was physically more accessible and visible. The help desk staff instantly became supportive partners, fully participating in technology and customer service planning within the Information Commons.

Continuous Assessment/Continuous Improvement (CA/CI)

Two librarians participated in a year-long CA/CI training workshop during which public service areas were evaluated and a structure for change was developed. Continuous improvement

continues to be the philosophy within the Information Commons.

Use of an outside facilitator

During times of change staff can become nervous or concerned about their future role in the organization. The entire library staff needed to come together around an understanding and vision for the creation of an Information Commons. An outside facilitator was hired and helped aggregate input to create a newly envisioned mission statement for the Information Commons. In our session, the facilitator did an excellent job of rallying the staff around a common goal. In retrospect, this activity proved to be extremely productive and worthwhile.

Library reorganization

Physical units in the library, such as microforms, media services, interlibrary loan, were re-organized around functional service areas. Librarians had responsibility for functional areas but were encouraged to develop interdisciplinary partnerships and scholarship. The Associate Director for Information Commons position was created to oversee all public areas of the library including the Web site and online and print resources. An Information Commons supervisor was appointed to oversee all clerical and student staff. All clerical staff were cross-trained in all functional service areas.

Perhaps the most visible change, and the most controversial, was the move of the reference desk from the back reference room to the library lobby. Librarians initially disagreed with this move, indicating the potential of compromised privacy and that the area was too noisy and too visible. However, within a week, reference desk statistics in all categories increased. Reference librarians were busy again and librarians' concerns soon subsided.

Managing expectations

With little additional, direct fiscal expense, the concept of the Information Commons seemed to be a risk worth taking. This implementation, in a sense, could even be considered a trial phase, if necessary—enabling the library to try something new, yet leaving open the option of returning to the previous structure of services. Even with some resistance and dissension, expectations remained cautiously optimistic. However, all agreed that increased visibility and aligning with user expectations was a positive step in the right direction.

Post-Implementation Evaluation: The Second Data Collection Point (2006)

The year-long process of creating an Information Commons was well-grounded and justified by the disappointing results of the 2003 LibQUAL+® data. In 2006, Butler Library administered a second collection of LibQUAL+® data. Although detailed results will be presented later, it is worth noting that users' perception of overall library service quality changed significantly in a positive direction. Across the board, LibQUAL+® scores showed improvement in all three service dimensions. These results helped justify and confirm the direction of library service reorganization into the Information Commons model.

The Services

Almost immediately after the Information Commons was opened and marketed, typical library usage statistics (e.g., reference desk, gate counts, circulation) indicated the library was becoming busier, and campus offices and departments seemed to realize that conducting their business in the library could be more practical, more efficient and effective, and could reach more students. Hence, the Information Commons became the site for new services such as:

- The Writing Help Center
- Academic Skills Remote Location
- Advisement
- Bengal ID Card Office
- Transfer and new student orientation
- The Application Support and Training Desk (a new technology and software service which the library itself decided to oversee and incorporate into the Information Commons)

As a direct result of the success of the Information Commons, the library received funding to create and staff this area to provide software and application support and training for students, faculty, and campus staff. This is the only area on campus that provides this much-needed service, its value indicated by the over 16,500 questions that were answered by this area in 2009.

Equipment Loan

Students need to borrow equipment for use in their coursework. Previous to the library taking on this service, equipment loan was located in a secluded office, which provided limited hours of service. The library identified space adjacent to the Application Support and Training Desk, purchased new equipment, created a Web site to reserve and track this equipment, created video tutorials for proper use of this equipment, and as a result logged over 3,000 loans that year.

The Bengal ID Card Office

Along with agreeing to print ID cards and bus passes for all faculty, staff, and students, the library has become the site for the administration of all ID card functions, including dining, vending, and printing.

Professional Development Center

This new space opened in September 2010 and is the site for faculty and professional staff development programming and training. Requests for space in the library continue to be made, again indicative of the excellent reputation of the Information Commons.

StudyQuad and QuietQuad

These areas were constructed in the library specifically because of student requests for late night collaborative and quiet study spaces. These areas are open 24/7 during regular semesters and are extremely popular for those students who have jobs or cannot study in the dorms.

Methodology

This non-experimental, practice-oriented research study utilized the well-established LibQUAL+® survey instrument as the primary means of collecting baseline data in 2003 and for two subsequent tri-annual data collections (2006 & 2009). After the three-year initiative to develop the Information Commons, the 2006 data collection, hypothetically, would highlight positive changes in users' perceptions of overall service quality as measured by the LibQUAL+® instrument. Finally, the 2009 data collection would indicate whether or not users' satisfaction with the development of the Information Commons could be sustained or if it simply was the result of a dramatic short-term effect.

Although LibQUAL+® provides numerous demographic variables worthy of additional study, additional analyses were narrowed solely to differences between undergraduate and graduate students. Examination of these differences happened quite serendipitously, mostly due to one of the researcher's statistical background. Such "data mining" techniques typically are frowned upon in the scholarly community as most sound research is perceived as deriving from theories or models and the development of research questions hypotheses before data collection and analysis (i.e., experimental research). However, for the purposes of practice-oriented library service evaluation, examination of data from a multitude of facets, dimensions, and variables truly gives practitioners a greater understanding of their

users' needs. Ultimately, greater insight into user needs could equate to better provision of library services. Thus, this data, despite being discovered through happenstance, will be presented, too.

Participants

Beginning in 2003, Butler Library utilized a cross-sectional sampling plan to collect LibQUAL+® survey data from its constituents in three-year intervals, the most recent in 2009. Recruitment of volunteers occurred through three primary channels: direct outreach (reference desk interactions, classrooms, student & faculty contacts), marketing (campus newspapers, announcements on the Web site, bookmarks, departmental and campus emails), and incentives (the chance to win an iPod). Volunteers were asked to visit the library's LibQUAL+® survey page to complete the survey. Only fully completed surveys were used for data analysis; imputation of missing data was not utilized. With the exception of undergraduate and graduate student status, most sampling demographic variables were not as crucial for the purposes of these evaluations. Thus, they will not be reported in this paper. However, Table 1 illustrates frequencies of undergraduate and graduate student participation based on year; this demographic variable was found to be important in some analyses.

Formal analyses of other demographic differences for each tri-annual data collection point were never calculated, but demographics in LibQUAL+® reports were reviewed and, roughly estimating, showed no substantive differences from the overall Buffalo State College population.

All participants were from various user groups of Buffalo State College: students, faculty and staff. Library staff members were excluded from all analyses due to the potential for biased results (i.e., vested interests). Faculty were included in analyses related to changes in perceived library service quality over the development of the Information Commons, but they were excluded from other analyses relating to undergraduate and graduate student groups.

Testing Instrument (LibQUAL+®)

Despite methodological flaws inherent to almost any testing instrument, including LibQUAL+®, library faculty at Buffalo State College selected LibQUAL+® based upon its well-documented psychometric properties, which were discussed previously in the literature review, and for its value in collecting the same data over time, longitudinally. Beagle, Bailey, and Tierney point out the lack of explicit evaluative instruments focusing specifically on the effectiveness of Information Commons services (Beagle, Bailey, & Tierney, 2006). Instead, like LibQUAL+®, most evaluative instruments implicitly, or indirectly, measure said services. Technically, LibQUAL+® measures perceptions of *library* service quality, not Information Commons
service quality, yet Beagle and other scholars tend to accept the administration of LibQUAL+® for such a purpose.

Table 1
Undergraduate and Graduate LibQUAL+® Participation – 2003 to 2009

	2003	2006	2009
Undergraduate	**266**	**423**	**380**
Graduate	**50**	**54**	**76**
Total	**316**	**477**	**456**

Score Data

Only the mean adequacy gap scores were selected from LibQUAL+® data for use in most statistical analyses. These scale scores reflect the difference between a user's expected minimum level of service and their perceived level of service. Larger, positive adequacy gap scores indicate greater satisfaction, while negative scores indicate dissatisfaction.

Results

A one-way, between-subjects ANOVA was conducted to compare the effect of the aforementioned service changes on users' perceptions of library service quality between three tri-annual data collection points (2003, 2006, and 2009). The Levene Test of Homogeneity of Variances indicated equal variance and, thus, supports the usage of ANOVA (F [2, 1598] = 2.62, $p > .05$). Results of the one-way ANOVA revealed significant differences between the tri-annual data collection points (F [2, 1598] = 7.07, $p = .001$). Post-hoc comparisons using Scheffe's test indicated significantly more positive perceptions of library service quality for the 2006 data point ($M = .32$, 95% CI [.09, .55]) and the 2009 data point ($M = .307$, 95% CI [.07, .54]) as compared to the 2003 data point. Comparisons between the 2006 and 2009 data points were not statistically significant at $p < .05$.

The impact of these service changes on undergraduate and graduate student groups' perceptions of service quality was explored also using one-way ANOVAs. (Post-hoc comparisons will not be necessary due to having only two factorial conditions: undergraduate or graduate student status. Statistically significant differences will be between those two groups only.) In 2003, results of one-way ANOVA indicated no significant differences between undergraduate and graduate students and their perceptions of library service quality (F [1, 314] = .014, $p < .05$).The Levene Test of Homogeneity of Variance indicated equal variance and supported the usage of ANOVA (F [1, 314] = .724, $p > .05$). However, in 2006, results of one-way ANOVA indicated that undergraduate students' perceived higher levels of service quality after the development of the Information Commons than graduate students (F [1, 475] = 5.024, $p = .025$). Equal variance was indicated through the Levene Test (F [1, 475] = .553, $p > .05$). This difference was maintained in 2009 as well, as shown through one-way ANOVA (F [1, 454] = 4.013, $p = .046$) (Levene Test: F [1, 454] = .163, $p > .05$).

Discussion

As hypothesized, the development of the Information Commons between 2003 and 2006 had a significantly positive impact on users' overall perceptions of service quality, including in each of LibQUAL+®'s three service dimensions. Interestingly, the Information Commons model would seem to fit more into the "Library as Place" dimension, yet scores in Affect of Service and Information Control also improved significantly. Perhaps the physical, virtual, and cultural "repackaging" of services indirectly affected users' perceptions of these two areas. For example, a medical office seen as clean, comfortable, nurturing, etc. may influence patients' *expectations* of the quality and competence of staff there (i.e., affect of service), whereas a less clean, uncomfortable environment would result in a different opinion or expectation of staff and service. A similar effect may have happened with Butler Library patrons. After revitalizing the environment with the Information Commons model of service organization and delivery, patrons' perceptions of library staff and interactions with them (i.e., Affect of Service) may have improved as an indirect coincidence. A similar phenomenon may have occurred with the dimension of Information Control (e.g., perceptions of having better ability to access and retrieve information).

Besides the inferential statistics applied in this paper, the scores for all three data sets were compared against LibQUAL+® norms (Cook, Heath, & Thompson, 2002; Thompson, Cook, & Kyrillidou, 2006). This enabled Butler Library to

benchmark results to that of other libraries as a means of comparison. Also, it enabled the library to self-benchmark longitudinally over three years utilizing the same testing instrument. Figure 1 illustrates this data.

This data further supports the findings from the statistical analysis section. Butler Library showed significant, positive gains in percentile scores between 2003 and 2006.

Difference in results between 2006 and 2009 were not statistically significant. Although the percentile for overall perceived service quality increased slightly, statistical analysis indicates that it could not be ruled out due to chance. However, one very important point should be noted: perceived service quality did not decrease. Despite the economic downturn and subsequent fiscal "crunching" between 2006 and 2009, users' satisfaction with service quality did not diminish significantly. The gains resulting from the development of the Information Commons were maintained, which suggests a long-term, sustained impact from developing such a model of service delivery. The Butler Library staff and administration were pleased overall with this result since it was hoped this model would not be a one-time "shot in the arm" or a dramatic fad. Results from 2006-2009 comparisons support sustained, positive gains.

Statistical analyses for undergraduate and graduate students revealed no differences in their perceptions of service quality prior to the development of the information commons;

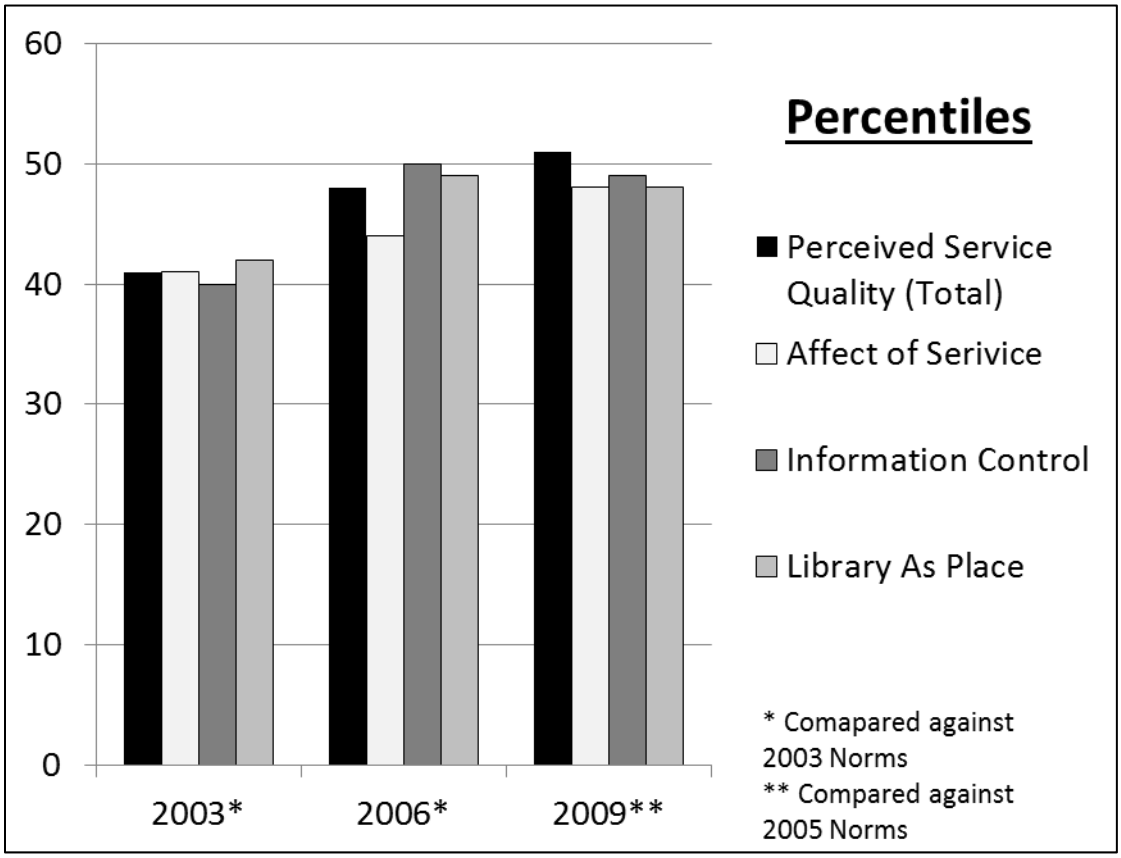

Figure 1
Butler Library benchmarking & self-benchmarking from 2003 to 2009

without disagreement, it was apparent they were both equally dissatisfied with library services in 2003. However, for both the 2006 and 2009 data, analyses revealed that the development of the Information Commons had more of an impact on undergraduate students' perceptions of service quality than graduate students. To help understand this difference, correlations between all 2009 LibQUAL+® survey items and the overall mean adequacy gap scores were computed for both the undergraduate and graduate student groups. For each group, Table 2 illustrates the five LibQUAL+® items that most highly correlate with the mean adequacy gap score:

The development of an Information Commons best fits with the Library as Place service dimension. Using Table 2 as a guide, this dimension appears to be of more value to undergraduate students than graduate students. For undergraduates, three of the top five items stem from this service dimension. One explanation is that undergraduate students see the Information Commons and/or library as a necessity for their learning, study, and research. With a multitude of information, technological, cultural, and recreational services and activities, they may view the Information Commons as a place to "get away" and relax and/or a place to be nurtured when they need assistance.

Library as Place seems to be less relevant to graduate students, as evidenced in Table 2; only one item stems from this service dimension. Instead, more of their top items relate to Information Control and Affect of Service. Many graduate students have families, careers, and other responsibilities outside of the college environment and, thus, might be less reliant on the Information Commons to fill the role of a "second home." Also, since many of their responsibilities and activities may center more

Table 2
Top Five LibQUAL+® Items for Undergraduate and Graduate Students

Service Element	**Service Dimension**	**Pearson *r* Coefficient**
Undergraduate students		
Employees who are consistently courteous.	Affect of Service	0.756
A comfortable and inviting location.	Library as Place	0.755
Library space that inspires study and learning.	Library as Place	0.739
A getaway for study, learning, or research.	Library as Place	0.724
Employees who have the knowledge to answer user questions.	Affect of Service	0.71
Graduate Students		
A library website enabling me to locate information on my own.	Information Control	0.827
Readiness to respond to user questions.	Affect of Service	0.781
A getaway for study, learning, or research.	Library as Place	0.779
Employees who have the knowledge to answer questions.	Affect of Service	0.776
Employees who are consistently courteous.	Affect of Service	0.774
The electronic information resources I need.	Information Control	0.769

on advanced research than undergraduates, the Information Control dimension is more important to graduate students.

These findings sparked much debate among library faculty and staff, and they likely will guide future planning and services for the Information Commons. After all, graduate students are a very important user group too; and the planning of services must take into account their unique needs and interests, particularly in relation to their research interests and information requests. These findings would not have been identified without the LibQUAL+® data and methods related somewhat to data mining. Certainly this information is of critical importance and will be addressed in future endeavors.

Conclusion

The Information Commons has become a popular place for new programming, exhibits, workshops, and cultural events on campus. One exciting new initiative, which has received extensive local and national recognition, was the creation of the Rooftop Poetry Club. Other new initiatives are the implementation of a Digital Commons, the library green initiative, the software virtualization project, Google Docs workshops, and the library blog.

Beagle describes three *manifestations* integral to an Information Commons: the Physical Commons, the Virtual Commons, and the Cultural Commons (Beagle et al., 2006). In Butler Library, the physical and virtual had been deliberately and consciously created. However, it was the cultural component that developed last, almost organically, and likely a result of our physical and virtual changes. Beagle lists creative expression, public speech, popular and academic publishing, and scholarly inquiry as pieces of the cultural commons. Butler Library's cultural developments and progressions include examples such as:

- new programming
- new exhibits (e.g., a faculty publications showcase; campus and community art exhibits)
- workshops (e.g., Google Docs; software programs)
- the implementation of a Digital Commons for scholarly works and publications
- the creation of a Rooftop Poetry Club
- the library's Green Initiative
- a software virtualization project
- the library blog and newsletter

New partners

The Information Commons now partners with Student Affairs, Graduate Studies, Orientation, Instructional Resources, College Relations, Events Management, University College, the Registrar, and Computing and Technology Services to provide ancillary services to the campus.

Recognition

Since the creation of the Information Commons, Butler Library librarians have been awarded a Chancellor's Award for Excellence in Librarianship, an Excellence in Library Service Award, and a Library of the Year Award. Our library director was promoted to Associate Vice President for Library and Instructional Technology. A new reporting structure, split between the provost and the chief information officer, reflects the collaborative nature and common goals of computing and technology services and the library.

Benefits for Students

Seven years ago, a student coming to the library to complete a homework assignment would need to log into the library's computers with her assigned username. If this student forgot her username, she needed to walk across campus to a different building to get assistance at the computer help desk. At this desk the student

would be asked to show her ID card. If this student did not have an ID card, she needed to walk back to the library to the ID card office where she might have to wait until the next business day to receive her ID. The student would then have to walk back across campus to the help desk for a username and then finally back to the library to access the library's computers and use the library's resources.

Seven years ago, there was no place to go for word processing assistance nor was there any equipment such as voice recorders, projectors, or laptops available for loan. There was no place for quiet study during late night hours as the library closed at 11:00 pm. Meal plan services were in another building, the writing center was across campus, and coming to the library for a sandwich and a quick look at e-mail was unheard of.

Today every student has access to all the following services in Butler Library:

- ID cards
- Bus passes
- Meal/Dining/Vending plans and funds
- Computing help, including username look-ups and password resets
- Class registration assistance
- Advisement
- Research paper writing assistance
- Equipment loan
- Specialized software assistance
- Microsoft Office assistance and instruction
- Google Docs assistance and instruction
- Printing assistance
- Library instruction
- And lunch!!

The process of revitalizing E. H. Butler Library through the implementation of an Information Commons has been an immensely rewarding experience for the entire staff. Not only has the Butler Library staff and administration regained the respect of the campus community, they also have regained an invaluable appreciation for user-driven input and feedback and for ongoing assessment and evaluation, including the well-established, multidimensional LibQUAL+® instrument. Most importantly, though, the users of the Information Commons have responded loudly and clearly – they approved of the changes in service structure, and their satisfaction with the Information Commons and its service quality has sustained over time.

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