Innovative System and Generation of Management and Operation Statistics for Decision Making in Academic Libraries – the Case of the University of Botswana Library

Reason Baathuli Nfila
University of Botswana Library Services
Gaborone, Botswana

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Abstract

The use of information and communication technologies (ICTs) by academic libraries has greatly transformed the generation of management information for decision making. Library automation has provided decision support systems that enable academic libraries to collect and generate statistics that can easily be analyzed to inform management decisions. Based on computer generated statistical data, academic libraries can have readily reports with which they can benchmark their services with those of similar institutions. Online systems have the capability to input data, and generating analytical reports which are used to inform management decisions. They have more advantages over the manual system of collecting data, which is not cost effective given its unreliability and more work involved in compiling data and analyzing reports.

The University of Botswana Library (UBL) has been using the INNOVATIVE Millennium system to handle statistics and management reports, but with almost no application of those reports in management decision making. The statistics reports generated by Millennium system include acquisitions (orders sent, received ordered items, accounting reports, and statistical reports on vendors), cataloguing reports, circulation reports, and collection usage. Reports on database usage are generated from vendor systems, while inter-library loan reports are generated from ILL systems. While the INNOVATIVE Millennium system has the capability of generating different statistical data and reports, UB Library has not fully utilized the data from the system for operation and management decisions. The reason for this being lack of knowledge and expertise among the Library staff. This paper discusses the different statistical data generated by the Millennium system through the different modules. Further, the paper discusses areas where UB Library needs to improve in order to enhance the quality of management decisions, strategic planning, and benchmarking of services. The paper concludes by recommending other relevant systems that UB Library can use to improve collection of statistical data for strategic planning and management decisions in order to improve on service delivery.

Key Words: Academic libraries, INNOVATIVE System, University of Botswana, Statistical Reports, Management and Operation decision, strategic planning

Introduction

The use of information and communication technologies (ICTs) by academic libraries has greatly transformed the generation of management information for decision making. Library automation has provided decision support systems that enable academic libraries to collect and generate statistics that can easily be analyzed to inform strategic planning, operational and management decisions. Based on computer or system generated statistical data, as well as regular customer satisfaction surveys, academic libraries can have readily reports with which they can base their decisions on service provision, and also benchmark their services with those of similar institutions. Online systems have the capability to input data, and generating analytical reports which are used to inform management decisions. They have more advantages over the manual system of collecting data, which is not cost effective given its inconsistency, unreliability and more work involved in compiling data and analyzing reports.

Review of Literature

Academic libraries are known to have been collecting statistics for a long time now for use by library management. According to Sumsion (1997) the Library and Information Statistics Unit (LISU) of the Loughborough University has been involved in collecting and providing statistics about libraries and for librarians from a number of institutions in UK. Similarly in Norway it has been a requirement for higher education to provide tangible results to justify funding, and as a result institutions have put in place systems for collecting "data on students and on outputs from research" (Hoivik, 2006). It is quite evident that libraries have been collecting official statistics for administrative purposes. From the available literature and case studies several authors (Wimmer, 2006; Roswitha, 2007; Liu, 2001; Mundt, 2004; and Ellen, 2006) agree that academic libraries have been collecting statistical data for use in strategic planning and decision making and operational and management levels. Such statistical data has assisted management in libraries through monitoring of achievements and work results and as a result libraries have made informed decisions in improving service delivery to customers. In this era of financial crisis it is even more critical for academic libraries to justify their existence to their funding institutions, be it Universities or Governments, in terms of delivering current relevant and useful resources and services to both students and lecturers. It has become a requirement that each institution and department must justify financial expenditure, number of staff employed, print and electronic resources available, equipment and workstations deployed, in terms of such resources and services being readily and reliably available and benefiting the customer within the agreed turn-around-time. Academic libraries are expected to provide useful resources that have an impact in support of learning and research.

Library statistics provide useful data, which can be analysed to provide library management with useful information that can inform planning of resources and services, budgeting, and staffing. As clearly stated by Wimmer, Ulla (2006) "statistics and performance measurement should make a contribution to strengthen the position of libraries within their funding institutions/bodies and the social field they are set in". Statistics and performance indicators provide evidence which can be used to justify existence of libraries and the need for funding to library users and other stakeholders, particularly funding institutions. Also in agreement with the strategic use of library statistics is Roswitha and Boekhorst (2007) who say that "libraries have tried to measure their economic value" to justify funding for collections, equipment, and staffing to universities, taxpayer, and other funding institutions. Without prove of performance and value for money in terms of resources and services provided there will be no justification for funding and resultantly for existence.

In the research on "The Use of the Statistics in Managerial Process" Liu (2001) came up with a variety of purposes for the use of statistics in library management, which include among others, budget planning, funding support, collection development, technical services improvement, reference services assessment, circulation services assessment, and technical services improvement.

Library statistics are used to measure quality of resources and services. Statistics are used by libraries to find out whether library users have information search skills and whether users can access databases and find relevant resources and information for their learning, teaching, and research. The two main methods of assessing quality of resources and services are qualitative method through interviews, user surveys, and self-assessment of skills and quantitative method through data collection, analysis of citations in course work and research publications (Roswitha and Boekhorst, 2007; Ellen, 2006)

The quality of the library is measured in terms of whether the customers are finding relevant resources they are looking for and whether such resources contain relevant information. This means that the quality of resources and services in academic libraries is determined by customers and stakeholders if such resources and services do meet the needs of students and lecturers, and employers. In order to ensure quality of library resources and services academic libraries have put in place performance measures or indicators to measure effective delivery of services to users and efficient use of resources and ensure value for money for all resources used and services provided.

Automated Systems and generation of statistics

With the advent of information and communication technologies (ICTs) the generation, capturing and collecting of statistical data have become easy and manageable. A number of academic libraries are now using automated systems which are very effective and efficient in generating statistical data for decision making. In addition to collecting statistics from local databases libraries can also host statistics from remote servers. Libraries can have agreement with vendors especially those who provide resources to libraries to access usage statistics of the electronic journals and databases.

According to Grace and Bremmer (2004) the Open University Library obtains quantitative usage data from the library proxy server to all remote resources, as well as obtaining qualitative data through regular surveys from which information was obtained for operational and strategic decisions. Open University Library developed a tool that is being used to obtain data from electronic resources. Information generated is used by management for decision making on collection development and planning of services. Data collected is used to inform strategic and operational development through reports which provide management information for decision making. Also provides data for evaluation, collection management and purchasing decisions, which leads to more accurate service planning.

According to Cheng (2002) the Wesleyan University Library has used information technology to collect "use statistics about how often databases, electronic and print journals, and monographs are used". Wesleyan University Library gathers different statistics which include Journal circulation data, in-house usage for print and circulation of bound volumes, usage of Articles via full-text databases, and citations using ISI citation indexes to discover what journals were cited from articles published by Wesleyan University Faculty. Analysis

from the data collected has been used to make decisions on subscription for both print and electronic resources.

According to Milliari and Kyriaki-Manessi (2007) the University of Macedonia Library in Thessaloniki in Greece have designed an online user study/survey through their Online and Public Access Catalogue (OPAC) to capture data about the general behavior of customers and their satisfaction as they use the catalogue daily. The choice of linking the user study through OPAC was based on the fact that library users have access to print book collection, e-books, journals and other resources through the system. The user survey is designed to capture data on user profiles, their trials, errors, successes, needs, and level of satisfaction from the "OPAC's transaction logs while users are accessing it" as well as from the "questionnaire attached to OPAC at the entry point" (Milliari and Kyriaki-Manessi 2007). Through this survey University of Macedonia Library has been able to generate real-time data on user search types, systems response, users' behavior when searching OPAC, users' knowledge and ability to use the system, problems and failures to use the system. Data derived from OPAC usage survey has been analysed using multivariate statistical analysis system and the information provided has been applied to improve the OPAC software to make it user friendly and undertake user training based on identified problems with accessing information. Milliari and Kyriaki-Manessi (2007) recommend OPAC transaction logs survey because it provides information about date, time, duration of the search, and the IP address of the PC, and the system registers each search session from the time of login in to time of log off.

Performance Indicators and Budget Cuts

Budget cuts of up to 15% have been experienced by the Colorado libraries from 2002 as a result of poor performance in the economy resulting in reduction in service hours by close to nine hours less per week for most libraries. The result of this was reduction in staffing levels at academic libraries. The impact of budget cuts meant that libraries could no longer provide effective and efficient services. However, the libraries kept on recording library usage statistics to help management in planning and decision making especially I situations where the usage of libraries recorded an increase while staffing and service hours where being reduced.

Performance Evidence or indicators

Library statistics should be collected to measure what each library or institution wants to measure. Libraries, therefore, need to make a choice of measurements amongst the variety of evidence that is needed. Available literature (Cheng, 2002; Davies, 2006; Wimmer, 2006; Roswitha, 2007; Liu, 2001; Mundt, 2004; and Ellen, 2006) identifies the following evidence out of which libraries can make a choice of what to measure:

Qualitative: case studies, user feedback, structured notes on user perceptions
- **Inputs**: resources applied in providing a service e.g financial and other data, numbers and grades of staff employed, opening hours of service points, descriptions of the collections made available (including electronic sources), the equipment, including workstations deployed.

Quantitative:
- **Outputs:** What the user gets directly from the service, e.g. visits made to a service, items loaned, requested and reserved items fulfilled, documents or photocopies supplied, items consulted within a library, enquiries received and answered, search sessions performed and end user training events arranged

Qualitative indicators of output: relevance of document supplied, the reliability and accuracy of information provided, enquiries answered within a specified target time or percentage of reservations fulfilled within a specified waiting time.

Qualitative outcome:
- **Outcomes:** Contribution that a service makes to the activities of the user whether they are related to work, learning or leisure. They represent the interaction between user and service.

Quantitative outcome:
- **Outcomes:** The needs/fill rate which measures how often the users gets what they wanted, whether a user found information supplied useful and usable, discovering user satisfaction with particular aspects of the service

- **Impacts:** Describes broader influence that the service has on a community or organization. Interpreted as what difference, in the long run, has the service made. How does it add to social and cultural life as well as economic prosperity? In an educational environment, how does it support learning and research.

Interpretation of statistics

Statistical data are figures which are used to simplify information about a number of activities taking place within libraries. The statistics are then analysed or interpreted to give meaning and information that can be used for decision making, otherwise the figures on their own do not give any meaning. Unless interpreted the statistical data may not provide information to help guide strategic planning for libraries. The same results of statistics can be interpreted differently depending on what a particular library want to achieve. As stated by Wimmer, (2006) statistics reduces complex and detailed information to just enough information which can be acted upon to make an informed decision. Furthermore, Wimmer, (2006) states that "statistics can be used and adopted to many different issues and purposes" and therefore there are various options that libraries can choose to use depending on what they want to achieve.

Developing a Performance Evidence Culture

Davies (2006) states that "managers of Library and Information Services face demand to provide appropriate services of acceptable quality at optimal cost to meet the strategic objectives set by an academic institution" and therefore library managers need evidence that they can use for planning and to justify funding . Library managers also need evidence of achievement of their departments in relation to the strategic planning of the academic institution. Without any performance evidence it becomes difficult for library managers to justify a need to purchase certain resources and services for students and lecturers. It is, therefore, the responsibility of library management to ensure that statistics and performance indicators are put in place in order to generate information that is useful for decision making. As mentioned earlier, statistics are data which may not have meaning if not interpreted or analysed. The mere collection of statistics without a clear picture of what the library management wants to achieve can be very costly if at the end staff members have collected

inconsistent data which becomes difficult to analyse to give any meaningful information for a library to take a management and an operational decision. Availability of standardized collection of statistics and performance measurement can help library managers to have a clear picture of how their library has is performing, and make it possible to compare current performance to previous performance, and even benchmark against institutions of similar size and academic programmes.

According to Davies (2006) libraries need to develop cultures of developing and applying performance metrics and that collection of statistics and performance measurements must be shared and understood by all staff at different levels in the organizational hierarchy. This has to be done if collection of statistics and performance measures is to be effective and efficient, as well as being standardized. Every employee is expected to capture and interpret statistical data at each service point, as well as use the evidence and information for decision making and action. Collected statistics and results of interpretation are submitted as quarterly and annual reports to library management for strategic planning decisions. Egghe and Rousseau (2001) suggest that it is important to involve all staff in collection of statistical data by making them understand the purpose of collecting daily statistics. Their understanding is that library reports based on these statistics must be made public to students and lecturers to make them aware of what is happening in the library and possibly provide constructive criticism to the library activities.

Based on Wesleyan University Library's experience, Cheng (2002) advises that collection and analysing statistics should be made part of each librarian's job, but in case a library has a serious skills and knowledge gap in generating and analyzing statistics, hiring a person "with statistical experience to help with statistical management" would be a viable solution if the library is to collect and interpret the right data.

University of Botswana Library

The University of Botswana's strategic vision document "Shaping Our Future" has come up with a strategic plan of becoming "a leading academic centre of excellence in Africa and the world" through provision of relevant academic programmes of high quality. The University of Botswana Library is linked to the institutional vision through its support to the Academic Division's strategic goals of "building quality research resources and capacity, enhancing knowledge and thereby teaching" and providing support for the development of the research capacity of the institution across all disciplines, the results of which will benefit the nation and the international community.

With the coming up of a number of tertiary institutions, public and private, within the country the Botswana Government has set up Tertiary Education Council (TEC) to "start funding public tertiary institutions" that are funded by government. Through the TEC Policy, funding of tertiary education will be centralized starting 2008/09 and allocated to each institution based on performance and competition system. Under this policy institutions will be encouraged to compete for funding by doing more and relevant research linked to industry. According to Tertiary Education Council Policy (2009) there is a need to improve the quality of tertiary education institutions by strengthening management capacity and ensuring relevance, increased access, and value for money and accountability to communities and society. Given this change in funding policy and the current economic crisis, it is even more necessary now for the University of Botswana, with a trickle down effect to its departments, especially the University library, to justify its existence and the need for funding. Dotson and

Garris (2008) state that for academic libraries it is now a priority to design tools and methodologies for effective and efficient evaluation of libraries in order to justify their existence to parent institutions. UB library will have to do just that if it is to stay relevant to the institution.

University of Botswana Library (UBL) started computerisation in 1993 and thereafter, networked its branch libraries. Access to information is provided through both print and electronic resources and the internet. UBL provides electronic access to an increasing number of electronic journals and databases. Students and lecturers access these resources from each of the libraries, through computer workstations with the help of Library Staff. Currently there are 190 workstations, allowing access to the full time student body of over 15,484. The available resources are provided to support faculties or centres such as Business, Engineering and Technology, Education, Humanities, Science, Social Sciences, Graduate Studies, Centre for Continuing Education (CCE) and Harry Openheimer Okavango Research Centre (HOORC) in terms of providing information for learning, teaching, and research.

The current library collection includes over 382,909 books and 1,130 print periodical/journals titles. There are over 7,000 e-books which can be accessed through NetLibrary, ECHO, and MyiLibrary. In addition there are over 30,428 full text journals which can be accessed from the available electronic and online networked databases in different subject areas.

Current Situation at UB Library and Areas to Consider for Statistical Data Collection

Currently UB Library is automated with its online catalogue, computerized acquisition, cataloguing and circulation services. However, collection wise, it is basically a hybrid library based around traditional print resources such as books and journals, electronic books, multimedia, electronic and online resources (i.e. e-journals and databases) and services. The usage of these resources needs to be measured on regular basis by collecting statistical data and analysing it to inform management decisions and policies that ensure value for money. For the past six years UB Library staff has worked on developing the collection, training users on use of the resources, and developing subject portals on different subject areas in order to provide relevant resources and services to meet the information needs of students and lecturers. The usage of these resources including portals has not been measured in terms of relevance to the customer and value for money given the number of staff and time spent on developing and updating such resources.

UB Library needs to design tools and methods of measuring quality at all service points, including measuring usage of resources (print and electronic), usage of eBooks, usage of materials on the floor (print books and print journals), material loans, suitability of opening hours, interlibrary loans against availability and relevance of collection, utilization of space and equipment (i.e. workstations), reference transactions, and the cost-effectiveness of providing the resources and services given the size of staff and amount of funding. Egghe and Rousseau (2001) have identified the same service areas for daily data collection and analysis and their list includes:
- Collecting statistical data on opening hours for use in deciding extending or reducing the hours
- Collecting circulation data on borrowing, returning, renewals, holdings, sending notices and making decisions on lending criteria and types of borrowers
- Collecting data on books that are reshelved including the ones used in-house, as well as collecting statistics of missing or stolen

- Collecting data on OPAC usage and use the information to determine the number of terminals required
- Collecting data on usage of databases (stand alone & networked) accessible through the library website, by category of users, as well as collecting information on maintenance of the web page and equipment and consider cost-effectiveness of the resources and services provided.
- Collecting interlibrary loan services in terms of outgoing and incoming requests, the success rate, turn-around-time of each library and use information on collection development decisions
- Collecting data on the number of study spaces

As stated by Adams and Noel (2008) **"Library automation has improved access to circulation data"** which has been used to inform decision making on collection development. The advantage with computerization is the ease of collecting statistical data online on all transactions and operations, but the accuracy of data is dependent on how the system has been set to do. The University of Botswana Library is currently using the INNOVATIVE/Millennium System which includes a number of modules such as acquisitions, cataloguing, circulation, ILL and WebOPAC from which statistical data is generated. However, UB Library has not implemented the ILL Module, but instead it is currently using the SABINET ILL System for interlibrary loan transactions, from which statistical data are generated but not integrated into Millennium System for analysis. The Millennium System does keeps counts of all transactions including students' registration, number of materials ordered, received and catalogued, as well as materials circulated or borrowed for reading. The number of databases and electronic journals that the Library subscribes to are accessible through the WebOPAC. Statistical data on usage of databases is obtained from the vendors rather through the UB Library Website. In addition the UB Library also obtains statistical counts from the 3M Security System which keeps counts of user entries into and out of the Library. Such statistics can be analysed to provide informative reports for library management on library usage.

It is one thing for a library to have a good system that gathers statistical data, but it is another thing to have that data interpreted and analysed to inform operational and management decisions. Although the University of Botswana Library has used the Millennium System since 2000, statistical data generated by the System has not been fully analyzed to provide relevant information to guide the strategic planning of the Library. This problem can be attributed to lack of statistical knowledge and expertise amongst the UB Library staff. As a result having the statistical data from the Millennium System has not benefited the UB Library management much. For example, usage statistics provided by vendors on electronic journals and databases have not been used by management to make decisions on continued subscription or cancellation/replacement of certain resources. The UB Library is not aware of how its digital and networked resources are used, and therefore not in a position to make an informed decision about which resources require continued investment or cancellation. If analysed such data would result in useful and informative reports that could be shared with relevant stakeholders such as University management, faculty, and academic departments.

The University of Botswana Library has made attempts to undertake user surveys, but without much progress owing to the lack of expertise in carrying out user surveys and analyzing the data and information from such surveys to inform management decisions. Results of user satisfaction surveys can be useful if they are used to produce informative

reports for library management, as well as sharing such reports with faculties and departments.

Management Information & Strategic planning for UBL

Library managers have a responsibility to direct the strategic planning of their libraries, but without relevant current data and information to inform decision making in terms of what activities, resources, and services are a priority in as far as they are relevant in meeting customer satisfaction, it becomes difficult to make choices. Budgeting for resources and services also can become meaningful if it is linked to the needs of customers. UB Library management needs to put in place all the necessary tools and methods of collecting relevant data for decision making, if the department is to stay relevant to the institution. In order to implement collection of reliable statistical data and get customer feedback on quality of resources and services, UB Library has identified LibQual system for use starting 2010. This will help UB Library receive feedback from users in terms of how it delivers its services. The Library needs to generate reliable and standardized data from all service points to enable easy benchmarking of its performance internally over-time, as well as against set international standards and similar institutions.

Given the lack of statistical knowledge and expertise amongst the UB Library staff, management should think of ways in which management of statistical data and reports for the department can be achieved. Alternatives may include deployment of staff, hiring staff with expertise in generating and analyzing statistics and report writing, or training. While the generation of statistical data and reports is the responsibility of everyone within the department, coordination is very important to ensure generation of standardized statistical data and reports that can benefit academic library management decisions on service delivery.

Acquisitions Statistical Reporting in the Innovative System at UB Library

Mason (2009) suggests that **"**collection development policy must also be written, updated, and regularly reviewed in order to assure that its provisions continue to reflect the current requirements of the academic program, the state of the collections, and the allocation of resources". For a collection to remain relevant there must be a continuous evaluation and analysis to determine its quality in terms of meeting the needs of customers. The collection development policy for UB Library covers the selection of monographs and multimedia, but it is in the process of being reviewed in line with selection of e-books and other teaching aids or software. Materials selected by subject librarians are ordered by Technical Services staff through Millennium Acquisitions with the understanding that these materials are filling a collection pap which has been identified. Upon receipt, the supplied materials are invoiced or received in the system and catalogued for accessibility to customers.

As stated in the Millennium manual in csdirect "Millennium Acquisitions includes the ability to enter and send orders, claim or cancel orders, receive ordered items, process and post invoices, review and order recommended titles, generate and print accounting reports, adjust funds, maintain fund and vendor information, and create statistical reports on vendors". The UB Library has used the Millennium Acquisitions to generate statistical data on number of

orders and number of materials received. The statistical data can be analysed to provide information on turn- around-time taking into consideration date ordered, date received, and date catalogued. Acquisitions statistics has bee used give information on supplier performance which has been used by UB Library management to evaluate suppliers for allocation of tender to supply library materials.

In addition, the Millennium Acquisitions generate statistical data on fund expenditure, commitment, free and cash balance. This information has been used by UB Library to monitor supplier performance from the expenditure as it increases with more receipt of materials from suppliers. An increase in commitment with low increase in expenditure may give information to the effect that the supplier is slow is supplying or materials have been received but not yet received in the system.

A reflection on the UB Library budget over four years as shown in the table below(figure 1), indicates that the Library has faced a budget cut or no increase at different times despite the increase in the price of resources in the market, and despite the increase in the number of students enrolment to over 15,000. Without statistical data and performance indicators it has been difficult for library management to convince University management to provide more funding for books, journals, and databases, which could even be cut further due to world economic recession. On the other hand, the library does not have usage information that could assist in making decisions on continued subscription or cancellation of certain journal titles or databases.

Comparing UB Library Budget over four years (Botswana Pula currency)

Figure 1

Resources	2006/2007	2007/2008	2008/2009	2009/2010
Books	10, 802, 450.00	10, 802, 450.00	10, 802, 450.00	12, 400, 000.00
Journals	6, 000,000.00	6, 600,000.00	6, 600,000.00	7, 590, 000.00
Databases/Multimedia	1, 691, 550.00	1, 691, 550.00	1691550.00	1,691,550.00

A look at the Fund Maintenance table below shows amount allocated per fund code and reflect how each subject librarian is performing in their subject areas. Fund data can further display financial status per faculty or subject, again to reflect on the performance of the subject librarian in terms of commitment of funds and performance of the supplier in terms of delivery and expenditure [figure 2 & 3]. Book total under financial status displays the total commitment and expenditure for all fund codes and subjects, thus providing a monitoring measure for the budget if set properly.

Figure 2

Figure 3

Figure 4: Fund total

Millennium Acquisitions has the capacity to generate vendor statistics in terms of estimated order price, estimated receipt price, estimated cancelled price amount and the total amount paid for each vendor. This information can be used to generate statistical data that can be used again to monitor vendor performance and expenditure [figure 5]. Information on estimated price and estimated receipt price indicates the difference in price at the time of order and at the time of receipt and therefore helping library management to decide whether the items are very expensive or the prices are reasonable. Vendor statistics can be further analysed to give information on number of copies ordered per order, number of orders received, and number of orders still outstanding, as well as percentage of orders received. From this information library management can decide whether there is progress in terms of receiving relevant materials for customers. Further analysis of vendor statistics, as shown in **figure 7**, gives information on average delivery time in terms of weeks. This measures performance of suppliers as per agreed turn-around-time.
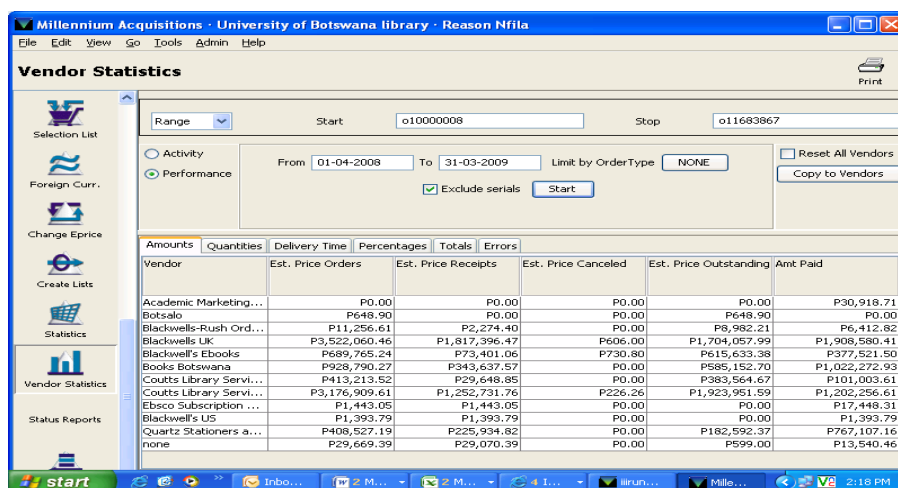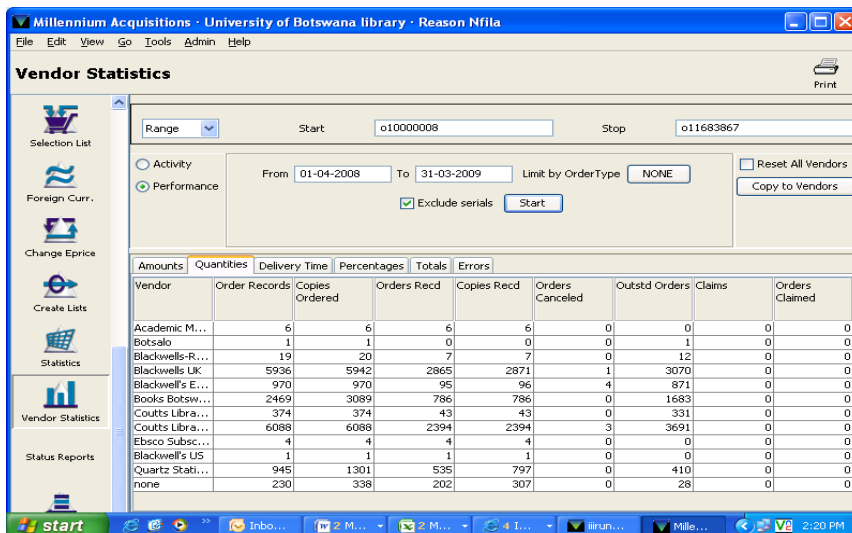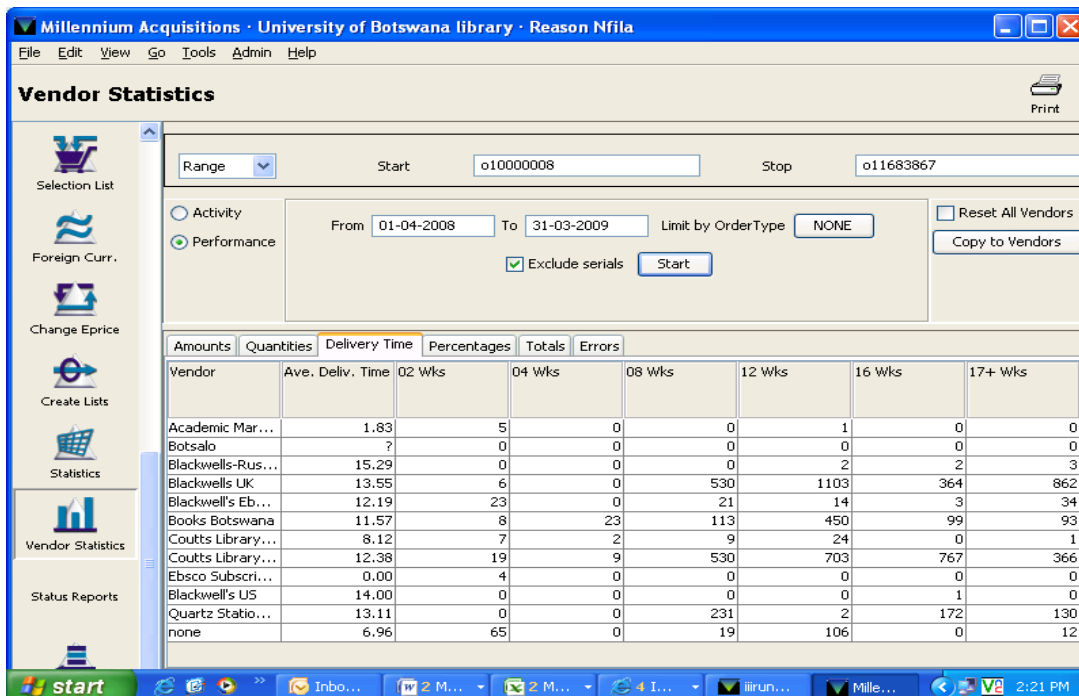

Figure 5

Figure 6

Figure 7: Delivery times or turn-around time

Cataloguing Statistical Reporting in the Innovative System at UB Library

Basically most of the cataloguing work at UB Library is copy cataloguing, with very few materials requiring original cataloguing. Either records are already available in Millennium system for updating to add additional item records or records are downloaded from OCLC for editing in Millennium system. This has reduced staff time and improved productivity and quality of cataloguing since staff no longer spend much time on original cataloguing which requires more time. While this is the case UB Library has not been able to measure performance in terms of number of materials ordered, catalogued and borrowed against the number of staff to determine whether the Library is delivering effective and efficient service to customers.

Millennium System has the capacity to generate different types of statistics. In setting up the system each library must decide on what statistics it would like to generate and how it is going to use the statistics. The Millennium manual clearly guides libraries to decide on which fields of the records to be coded if you want the system to generate effective reports. This means that effectively the system generates what has been decided by a particular library. For example, if a library wants to retrieve records or generate statistics by author or title or call number etc, it means any or each of these fields must be coded. Another example is when a library wants to generate user statistics by type of user it means the system must be coded to generate statistics for each category of user such as part-time students, or full-time students. This will enable the system to generate usage statistics that is linked to type of user.

UB Library can generate collection statistics using the main fields of each catalogue record such as author, title, ISBN, call number, date, barcode, etc, while statistics on users is generated using user name, user ID, category of user, faculty, department, program or course.

Millennium Create Lists

UB Library has used Millennium Create Lists, in Release 2006, to create lists of records, but using different criteria depending on statistical data being generated at a given time. This tool applies Boolean searching to help you create subsets of the database for use in reports. Millennium Create Lists is a tool for creating a wide range of statistical reports on acquisitions (i.e. orders sent and received, funds committed and expended, vendors statistics, and payment), cataloguing (i.e. materials catalogued), and circulation (i.e. materials borrowed and returned). As stated in Millennium manual (csdirect.iii.com 2009) "cataloging activities include creating bibliographic, item, authority, and other records; editing existing records, performing complex global updates or simpler rapid updates; creating lists of records (review files) and deleting records".

UB Library generates statistical data on acquisitions and cataloguing using Millennium Create Lists and applying appropriate Boolean searching strategy, selecting record type (bibliographic, item, or order), and specifying condition and values such as date **(figure 8)** and display the number of records retrieved. Millennium Release 2006, which is currently used by UB Library, does not have an excel spreadsheet interface, and therefore retrieved data can be exported into an excel spread sheet to reflect all chosen fields such as author, title, ISBN, publisher, date, order date, received date, etcetera. Generation of analytical statistics will be enhanced once UB Library has migrated to Release 2007 which has the spreadsheet interface into which acquisitions, cataloguing and circulation reports may be viewed and downloaded (csdirect.iii.com 2009).
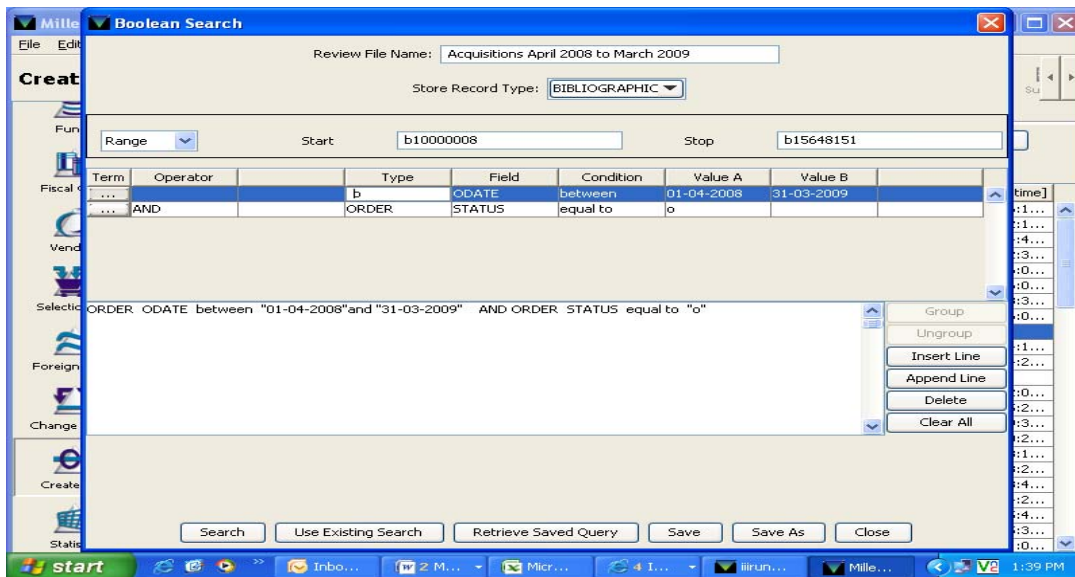
Figure 8: Create Lists

Figures 8 and 9 show creating lists and the results of the search in excel spreadsheet respectively. The search results show materials ordered as indicated by order date, status of the order, and the author and title of each title ordered.

Figure 9: Excel spread sheet of titles on order

Figure 10 below shows session statistics of cataloguing output for created (edited) and modified (updated) records added to the library database over a period from January to March 2009.
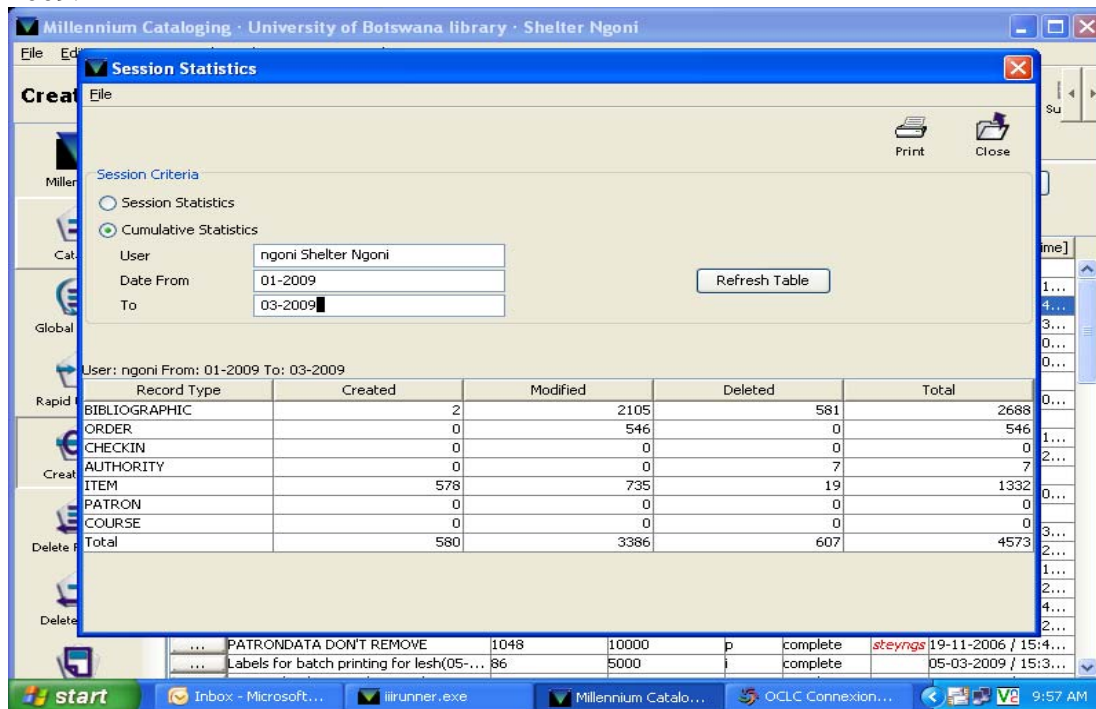
Circulation Statistical Reporting in the Innovative System at UB Library

Circulation statistics are amongst the most important statistical data used by academic libraries to measure quality and relevance of the library collection. These statistics have been used by libraries for collection development by identifying the strengths and weaknesses of the collection, as well as identifying materials for withdrawal or to be sent to remote storage. Circulation statistics tells us about the availability of the material, its accessibility to the customer, and its relevance in terms of meeting the information needs for learning, teaching, and research. Using circulation statistics can give knowledge to a library on resources which are being used and the subject areas which are being used, thus providing library management with information on which areas to improve and which titles to purchase or withdraw.

UB Library uses Millennium circulation module for circulation activities such as circulating materials (i.e. borrowing and returning), managing holds, sending notices (i.e. for overdues, renewals, and for available materials) and assessing and reconciling fines. Millennium manual (csdirect.iii.com 2009) indicates that circulation transactions include the following:

- Check-ins

- Check-outs

- Filled holds (held items checked out to their requesting patrons)

- Holds

- Holds with recalls

16

- Materials booking transactions

- Renewals

- In-House Use counts

The Millennium circulation module is used by UB Library to register users for borrowing collection for use, and therefore it generates statistics reports on patrons and the total number of items they have checked-out, renewed, checked-in, as well as how much money the user is owing. UB Library is able generate different circulation statistics which include:

- Users' checkouts, chechins, renewals, holds, and recalls
- Reports on users who are owing overdue fines and how much is owed to the Library
- Title reports of specific titles checked out or used
- The Requests report showing statistics of automatic requests made by users through OPAC. If properly set these statistics can provide information on usage of OPAC.
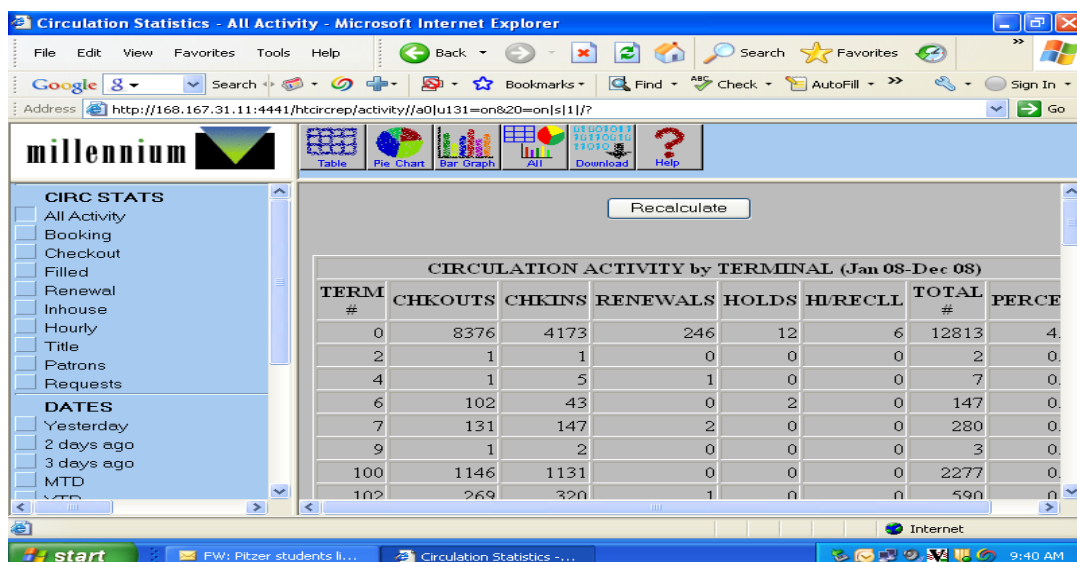

Figure 11: Circulation statistics

Currently the Circulation module has not been set to generate usage statistics per category of users and the courses that students are studying. Such data would be useful to know the usage of the collection by different categories of users, the courses or subject areas and their levels of study.
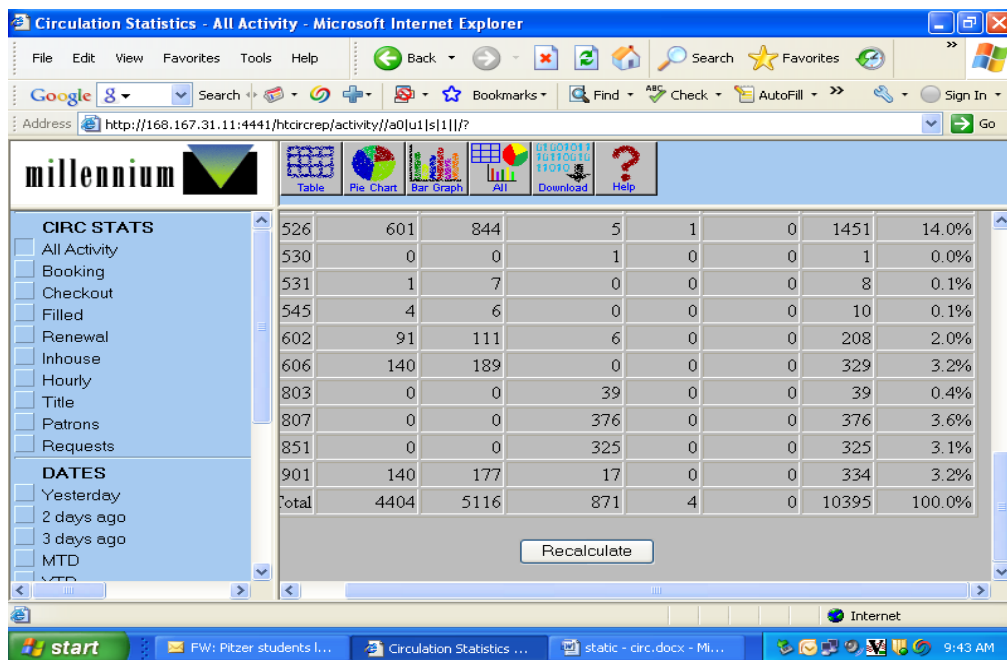
Figure 12: Circulation statistics

Millennium Circulation statistics can be created on a periodic basis to report on transactions based on a specific date or range. Figures 13 shows statistics of checkouts and checkins generated over a period of one year from January to December 2008, where only those records within the specified range are included in the report.

UB Library uses scanners to capture statistical data of the book collection used on the floors. This data is then immediately uploaded into the Millennium system. Analyzing such statistical data to determine usage has been made difficult by scanning both returned and materials collected from the floors, resulting in double counting. Statistical data from scanning, therefore, can only be used to determine amount of shelving, but not usage of collection. If properly done, the statistical data of collection from the floors and circulation transactions can be combined to provide collection usage information for management decisions in terms of collection development, and staffing for collection management.

Statistical Reports on Call Numbers/ SCAT Tables

According to Millennium manual (csdirect.iii.com 2009) "the Innovative system uses the SCAT table to create statistical reports based on call numbers". Each library needs to make a decision on the number of SCAT Tables it should have and the number of indexes to create taking into consideration the statistical reports it wants to generate. SCAT Tables use call number ranges to pick statistics of materials used within a given call number range. The records you want to find may start with the first number and end with the last number. For example, the range can begin and end as shown below:

Searching for records between 100 and 100.9999 (Dewey numbers) will find all the records specified by this range because the search is for everything in the range of these two call numbers. Circulation transactions are then recorded and stored in the SCAT Table and then it can be run to generate statistical reports on collection usage by range of numbers, which represents subject areas. The searches are created using Boolean Searches but using call number field. These statistical reports provide library management with information on usage of collection and the cost of purchase of the collection from which a decision can be made in

terms of collection development. However, UB Library has not fully implemented the use of SCAT Tables in the Millennium System.

Systems that UB Library Could Consider Using to Improve on Collection of Statistical Data and evaluation of resources

As indicated in literature, academic library managers are charged with responsibility to provide quality service to their customers in line with strategic direction and objectives set by their institutions. In order to achieve this academic library managers should put in place relevant tools and methods of collecting relevant, reliable, and standardized statistical and qualitative data that can be analysed to produce reliable reports for management decision making. Strategic planning requires reliable data and therefore assessment tools also must be reliable if the library is to have a clear picture of its current services al all levels and know the future direction it should go.

Bowker's Book Analysis System (BBAS)

As a means to ensure relevant collection to support the University of Botswana curriculum in different subject areas UB Library purchased Bowker's Book Analysis System (BBAS) in 2008. The System can provide customized collection of reports that you can use to fine tune your collection and quickly identify the areas in the collection that have the highest match of recommended titles. The Reports also provide percentages as well as an exact number match. Detailed information about the books selected for a particular subject is also provided. Other details from the reports include view price, binding information, audience level, printing status, and if the title has won an award or has been reviewed.

UB Library has used the System to evaluate the collection and made informed decisions on purchasing relevant titles to fill collection gaps. Information from the analysis can easily be shared with academic departments for them to have an input in collection development in their subject areas. Linking the collection evaluation reports from BBAS to usage statistics from circulation and from the floors can result in very informative reports on relevancy of the collection to user needs.

If fully utilized BBAS could provide a qualitative analysis of UB Library collection holdings on regular basis and provide useful information for the Library to make decisions on collection development (weeding, selection etc), accreditation support, and budget Justification in line with any changes in the curriculum for any department or faculty.

Ulrich's Serials Analysis System (USAS)

Although UB Library has not yet purchased Ulrich's Serials Analysis System (USAS), this is another System that can be used to evaluate the availability and relevance of serials or journals to support the University curriculum. Using this System, academic libraries can upload their serials list and provide analysis reports which can also be downloaded and shared with teaching departments to make their input. Academic libraries can use this System to benchmark their holdings with that of similar University institutions. The System allows library's holdings to compare to either the Ulrich's Core collection or the Universe of serials, and identify the non-match records, duplicates, and redundancies. The comparisons can show

areas where libraries may have gaps in the collection if compared against the Core collection per subjects and thus an overview of how strong your collection is compared to what academic or scholarly publications are available. The System is also able to compare one library to the group/consortium collection, and compare one library to the group's Core collection. It is also capable of comparing collection database to database.

Information from the reports generated can be used to make decisions on selection or deselection of serials. UB Library can use USAS to identify journal title overlaps and get rid of duplicate holdings. The capabilities of the System can also be applied to comparing the journal list of a given database against the combined coverage of all the existing databases and help to provide library management with information to decide on subscription to a new database in terms of whether it adds value or it is just another database to spend money on.

WebFeat Express

EBSCO Information Services has a system called "WebFeat Express", which has the following benefits:

- It allows customers to search a variety of databases at the same time. By so doing this allows the library to be in a position to identify databases that it does not subscribe to, but very useful to customers and databases that are subscribed to but not very useful.
- Results obtained will be shown through the various databases, indication how many records are there within each
- It has the ability to allow one to search by subject. Being subject oriented means that it is can offer researchers information on their specific research areas without generalizing.
- Increase researcher satisfaction through consolidated search of all e-holdings in your library

- Combined with *SMART Usage Tracker* WebFeat Express is a tool that allows a library to identify databases that are popularly used, therefore giving the library the opportunity to do away with unused ones in order to cut costs. It also gives information on the number of full text requests. Due to its ability to search all the electronic holdings it means that library users will be able to collect information from all available sources of information.

Measuring the Impact of Networked Electronic Services (MINES)

Franklin and Plum (2006) identify two data collection techniques, which are initiatives of the Association of Research Libraries (ARL), which have been used to evaluate the usage of electronic resources to help determine the cost-benefit return in light of the ever increasing subscription prices of serials and databases. The systems used by ARL to measure usage of networked electronic resources are basically web survey systems which include "Measuring the Impact of Networked Electronic Services" (MINES) and "Click-Through Mechanism" which is not elaborated here.
"MINES for Libraries" provides the following:
- MINES for Libraries is based on usage or uses
- Is an online, transaction-based survey that collects data on the purpose of use of electronic resources and the demographics of users

- The methodology has collected usage data on the libraries' electronic resources, including electronic journals, electronic books, databases, the online catalog, and services such as interlibrary loan.
- Respondents are presented with a survey upon choosing or selecting a networked electronic resource
- Once the survey is completed, the respondent's browser is forwarded to the desired networked electronic resource
- Survey periods are randomly chosen over the course of the year
- The survey samples usage of electronic resources in the University environment

LibQUAL+ system

UB Library has already considered the use of LibQUAL+ system to help collect reliable data about how customers perceive the resources and services provided at different service points. The statistical data collected from this system is expected to help improve the UB Library strategic planning and provide operational and management information for decision making.

LibQUAL+ system is used to measure library service quality across institutions of higher education and has the following benefits:

- Identifies users' minimal acceptable service, perceived service level and desired service level and gives data about service level.

- Enables libraries to send e-mail messages to users asking them to complete surveys on the Web

- Data collected can be used to compare a library's service quality with that of peer institutions in an effort to develop benchmarks and understanding of best practices across institutions.

OPAC system transaction logs

UB Library should learn from the OPAC system of the University of Macedonia Library in Greece and design OPAC transaction logs to capture data about usage of the system and other online databases. The UB Library OPAC usage surveys could be designed to capture statistical and qualitative data on catalogue usage, database usage, and subject portal usage, and use information from the data analysis to make decisions on improvement of the system, resources, and service delivery based on identified user needs.

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