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Contents

Introduction

Not all of our library users have "grown up digital" and many of us have found the need to take a slightly different approach when dealing with established library patrons. Medical librarians have developed programs to successfully train physicians and researchers to use new library resources. Academic librarians have found new ways of reaching faculty and essentially "train the trainers". And, corporate librarians have found ways to keep managers abreast of new developments, all of this outside the realm of the one-hour BI session. The following two papers accepted for the 2004 Biomedical and Life Sciences Division Contributed Papers Session exemplify these efforts.

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Paper 1

Managing Nostalgists: Extending Information Services Infrastructure

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Introduction

The use of technology in Information Services has significantly increased since the advent of the Internet. Globalization and competition has created a need to effectively manage and have timely access to the torrent of information that is generated globally. To gain a strategic advantage, corporations must leverage the use of technology in Information Services for improving their business performance while overcoming the resistance of some nostalgists to the new technologies. This paper addresses some of the technology deployment needs in bio-pharmaceutical companies that have mature business processes and legacy systems and presents the tools and survival strategies successfully used in influencing information users (customers) who have been persuaded to accept new technologies. Demonstrating the value of varied technology-based resources through a partnership approach will help the "old dogs" to tap into newer technologies and learn new tricks.

In this technology-based knowledge era, the information needs of corporate users have diversified, as information has become available in various multi-media formats. Today's information managers must align Information Services to their organization's operational priorities and strategic goals to design information services unique to each functional group, i.e. A Research & Development Group may have requirements significantly different from a Manufacturing or a Marketing Group. Therefore, it is challenging to meet the needs of the diversified users that demand information from multi-media formats. While some users embrace the newer technologies, still others remain proselytized. There may exist resistance to the introduction of new technology and the resulting change amongst the functional groups. The customers who are not happy to accept a technology or to adopt an innovation are classified as "Nostalgists." They yearn for the past when life in the corporate information world was simple and easy. The Information Services infrastructure that is necessary to meet these challenges requires a business process re-engineering that involves people, services, technology based tools and products. The new infrastructure must be able to quantify and show its alignment to the corporate goals, as well as adapt to the continuous quest of reduction in time and cost of its services.

The objective of this paper is two-fold: a) to provide successful strategies for influencing nostalgists (teaching old dogs new tricks) and, b) to propose a model that provides insight into the complex constructs associated with the technology acceptance or use by nostalgists. The model that is proposed will help gain an understanding on the following questions:

1) What prompts users to use or not use digital information?
2) What is their preferred medium to access information?
3) What characteristics and expertise is required from information professionals to influence users to accept or use new technology?
4) What methods or techniques need to be deployed to avoid a detrimental domino effect of wrong perceptions?

This paper highlights "creative and successful programs" including, but not limited to, advertising, product demos, well planned rollouts, customer/user partnerships, customer intrinsic awards, and targeting of users by a segmented approach. It concludes with some suggestions for changes in approach to achieving excellence in teaching nostalgists by using the right mix of information products and technology.

Background

In Library and Information Services (LIS), researchers have studied psycho-behavioral factors affecting information seeking and information use. Yet, there has been limited application of the Technology Acceptance Model (TAM) or Theory of Reasoned Action (TRA). Since there has not been much empirical research in the LIS field, this paper uses a TAM model as a framework by drawing constructs used in the Management Information Systems (MIS) literature. Several studies provide valuable insights in MIS literature that focuses on IT acceptance and computer use. The most common theories based on the development of TRA (1975) and TAM (Davis, 1989) models have been widely accepted in the literature.

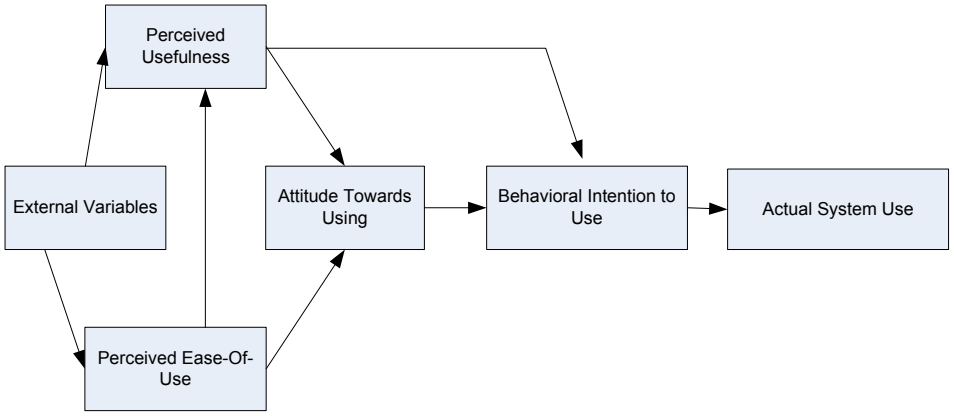

Figure 1- Technology Acceptance Model (TAM)

The dimensions of these popular models were either applied to specific groups of users or they were extended using many other constructs that can be found in the literature. Davis (1989) developed TAM and it is based on TRA. This was developed mainly to address the problem of human behavior toward computers in the workplace. The 'Theory of Reasoned Action (TRA)" model comes from social psychology research and was first proposed by Fishbein & Ajzen (1975). The model is used to help understand and predict human behavior in making decisions. The components of the model are beliefs, attitudes, intentions and behaviors. One's beliefs shape one's attitude. The attitudes in turn cause intentions that drive behavior.

TAM focuses on two key elements in addition to adopting the constructs from TRA. They are Perceived Ease of Use and Perceived Usefulness (PEU and PU). The degree of acceptance of a computer-based technology is primarily a function of their perceived usefulness of the technology and their perceived ease of use of the technology. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance," (Davis, 1989). Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort." TAM asserts that the technology acceptance by a user has to do with the attitude, belief, behavior and other external variables. Ultimately, all these factors influence an individual towards acceptance or actual use.

Successful Strategies for Technology Acceptance in Information Services

A successful strategy takes into account all the elements of cognitive and social factors that influence acceptance or rejection of new technologies. In

environments that have strong social factors at play (old corporations, legacy systems, outdated business processes), it is important to give added emphasis to human factors. The major areas of importance for a successful introduction of new information service technologies are listed and discussed below.

1. Define User Community and Know Your Customers
2. Self Assessment/Knowledge Audit (Know Yourself)
3. Marketing and Product Rollout Strategy
4. Training
5. Feedback
6. Measurements of Success and Critical Success Factors

1. Define User Community and Know your Customers

The first and foremost survival strategy for a service organization lies in identifying and understanding the customer base. An understanding of customers involves knowing their culture, work processes, group or department, specific research areas, current problems, and other needs. In other words, knowing your customer requires understanding the similarities and differences that exists among various groups. It is also important to understand how their performance is measured and what motivates them to reach their business goals. Such understanding can be sought by conducting an Information and Knowledge audit using surveys and interviews.

2. Self Assessment/Knowledge Audit (Knowing Yourself)

A knowledge audit may be conducted to determine existing knowledge, and the knowledge gaps that can be filled within the Information Services department. Areas of self-assessment include topical/technical, and technology knowledge, training capabilities for hosting workshops, conferences, product demos. Experts need to be identified who are champions, facilitators, moderators, communicators, and good speakers who can portray a professional image. These experts must understand the existing infrastructure of the tools and technologies, and their roles and responsibilities with accountabilities. Finally, it is critical to document and quantify the economic value added by the Information Services Group to the business enterprise.

3. Marketing and Product Rollout Strategy

a) Customer Segmentation

A segmentation of the customers based on their functional groups (R&D, Marketing, Sales, Manufacturing etc) needs to be performed. Within these functional groups, it is necessary to identify nostalgists, influencers, advocates, naysayers, etc., so that targeted messages specific to each of these groups and

subgroups can be developed. It is important to tailor a program specific to every individual in the corporation making heavy investments in R&D and whose survival depends on a strong pipeline of new products.

Using segmentation, early adopters having a natural bent toward new technologies can be identified. The early adopters should be used as test beds for a phased introduction of new information resources based on new technologies. As the model indicates, the opinions and comments of the selected early adopters will serve to alter the image and subjective norm (social factor) of other members, so they may begin to perceive the usefulness favorably. The next phase of rollout should focus on the nostalgists, naysayers, and other skeptics who by this time have heard positive stories from the early adopters. It is also useful to have the early adopters act as partners who will field questions from the customer base.

b) Advertising and Promotion

Established organizations rely on multiple means of communications because of the varied levels of technology acceptance. New initiatives in Information Services must use all of the available channels such as emails, posters, flyers and electronic bulletin boards and present a clear theme and a separate flyer for each program. The message must convey the new technology, process, or product as an innovation that directly affects a measurable objective of the customer base. A well-designed and timely distributed advertisement acts as a catalyst to speed up changes in customer's perception.

c) Intrinsic Awards

Recognition plays an important role that affects perception. Instituting various forms of awards at various stages can increase customer acceptance of technology. Recognition of early adopters gets the attention of the nostalgists who may be prompted to spend time investigating the new programs. Food is universally accepted as an inexpensive incentive. Information Services departments in general operate on tight budgets and offering incentives as part of promotion is often viewed as " spending too much" on customers. Some customers may be given access to a specialized database as a gift to enlist their support. As Gandhi said "make your enemy your friend." An award category may be created to include these nostalgists. A change in the attitudes can be seen as a result of the recognition leading to adoption of new technologies.

4. **Training**

An effective promotion alters the perception of the nostalgists about Information Services towards attending a training program. In corporations, customers often

work on the unrealistic schedules are burdened with excessive workloads due to hiring freezes and suffer from information overload. As a result, they have less time to spend learning new tools and resources. The training programs must leverage multiple instruction mediums such as WebEx, Sametime, Classroom, and Self Study. Teaching methods should be customized to varied levels of learning.

Group culture plays a significant role in influencing perceptions. Scientists and engineers as a group place a high value on technical as well as technology expertise. It is important to leverage this influence to change the attitudes of the nostalgists. It would be useful to take advantage of the early adopters to assist as partners in training and product demonstrations.

5. Feedback

The TAM Model and its variants do not use feedback as an element for sustaining acceptance of new technology. In practice, it is an important mechanism that helps to modify and reinforce those factors that assist in altering perceptions. Many new programs fail after the initial novelty fades and many users including nostalgists relegate new initiatives as "just another flavor of the month" and revert back to their old ways. Feedback should be used as an iterative process for teaching nostalgists and training should be continuously modified based on the feedback. A database of "Lessons Learned" will serve to develop targeted promotion and training for the various functional groups in organizations.

6. Measurements of Success and Critical Success Factors

A good measurement system must be established to quantify the results of activities that are undertaken to roll out a new Information Services technology. The measurement system must have multiple metrics that can be viewed from users' perspectives as well as the Information Services Professionals perspectives. The results must explain and correlate how perceptions have been altered in a positive way to move users to accept new technology. It is also important to have metrics that captures the benefits of the new technology in real dollars. Involving the users in designing a measurement system may reinforce their desire to achieve their targets of performance.

Critical success factors for a successful adaptation and implementation of technology-based information product would include:

- a good understanding of the organization's goal
- an understanding of the business processes

- a good knowledge in streamlining the segmented user-base to match the right technology based resources to the right users.
- having an executive champion who can help in aligning the measurable goals of the Information Services group to the corporation

All the above factors have been proven invaluable in the launch of new technologies.

a) Domino Effect &Voice of the Customer

The domino effect is, "The idea that some change, small in itself, will cause a similar change nearby which then will cause another similar change and so on in linear sequence, by analogy to a falling row of dominoes standing on one end," (Wikipedia, 2003). In scientific terms, this could be called a chain reaction. This effect can be seen in organizations where co-workers influence one another to follow their path. The domino effect can lead to both positive and negative outcomes. The negative domino effect can be avoided when nostalgists are identified early during the user audit phase. Using early adopters as partners can often trigger a positive domino effect that can move the majority of the users into accepting technology based services very rapidly. Information Professionals must always be on the lookout for a positive domino effect that will result in the least cost means of deploying technology based services.

Information Services Technology Deployment Model

This paper uses TAM as a framework for identifying factors that prompt digital information use and proposes a model to influence nostalgists. While other popular models provide useful insights, we still need a new perspective to help us understand TAM better in relation to Information Services' customers.

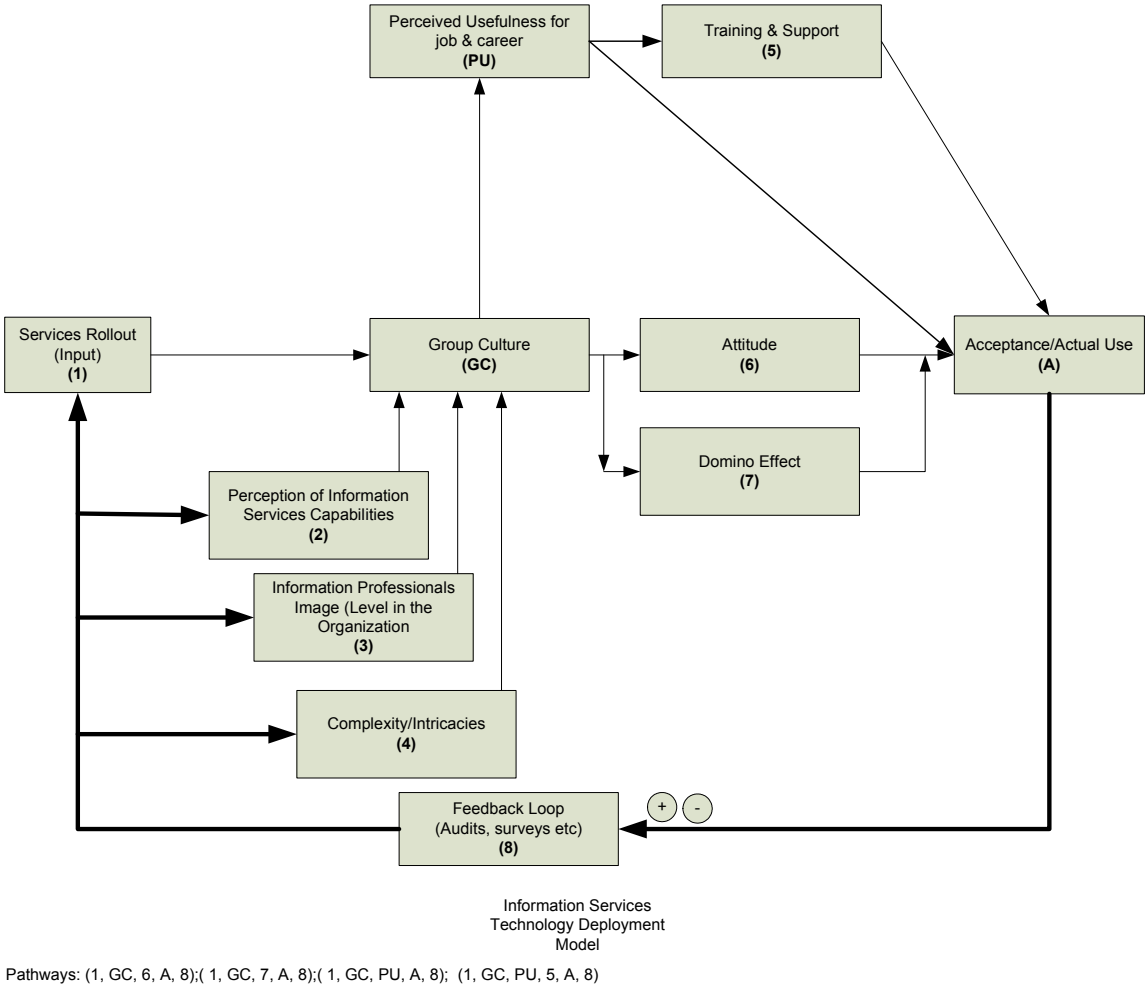

Figure. 2 Information Services Technology Deployment Model

The proposed model above (Fig.2) depicts the relationships and pathways that impact perception of usefulness or ease of use depending on the user functional groups (R&D, Marketing, Manufacturing etc.). In long term bio-pharmaceutical organizations, the group culture plays a dominant role in shaping the perception of technology based information products and their usefulness. Because the user community is diverse, the pathways of factors that affect acceptance varies. Four main pathways have been identified in the study. They are depicted in Fig.2 as (1,GC, 6, A, 8), (1,GC, 7, A, 8), (1, GC, PU, A, 8), (1, GC, PU, 5,A, 8).

Pathway (1, GC, 6, A, 8) is when the group perceives readily the need for technology, changes its attitude and becomes an immediate user. This is typically the situation when the users have an immediate need and approach the Information Services department for a solution. Pathway (1,GC, 7, A, 8) exists

when a few early adopters who are influential users within a group have advanced skills and can set the example for others. Because of their position within the organization, others are forced or influenced to adopt and therefore, a domino effect occurs leading to full acceptance. This pathway is the ideal for rapid deployment of new technologies and added emphasis must be given to identify this pathway. Pathway (1,GC, PU, 5, A, 8) is the normal TAM step that is characteristic of reasoned behavior of users who are savvy enough to move toward acceptance without any training. Pathway (1,GC, PU, A, 8) is the traditional path where the groups perception is changed because of its perceived usefulness, who in turn are trained and ready to use new technology. Group Culture (GC) is the main variable that is influenced by many other factors that ultimately determine perception of the group, leading to final acceptance through additional intermediate steps. GC also is the factor that requires change in an established organization where there are many more nostalgists and few early adopters. The domino effect is categorized as those factors that short circuit reasoned behavior steps. Again, group culture can trigger a domino effect that leads to all barriers being broken for technology acceptance, or if it is negative, can doom the project for failure before it has begun. Guarding against the negative effects of the domino effect is critical for success in technology deployment.

Feedback loops are a characteristic of control systems. In a typical control system, a set point is the input to a system that results in an output. The output is fed back for a comparison with the input. If they are the same, then no further action is taken on the system. If there is a difference, a correction is sent to the system until the difference between the input and the feedback is zero. Negative feedback is used in a control system to reach steady state so no further inputs are required. Behavioral systems can be modeled as control systems that have very long response times. It may take months or years to see some changes in the group culture. Mechanisms to shorten response times need to be studied to increase the pace of acceptance of new technology. The concepts of feedback can be used effectively to make the course corrections for technology deployment. In this paper feedback is used in a generic sense as it may be positive or negative. The feedback loop (Block 8)(Fig.2) plays an important role in sustaining the use of technology-based Information Services and it serves to correct the perceived image of the services department as well as the Information Services department professionals. A continuous feedback of data from surveys, audits, and other informal means will help to change the group culture. In turn, it results in a permanent change in the use and acceptance of technology based Information Services. The suggested model currently is subjective, however a subsequent paper will attempt to quantify the pathways of reason and behavior for successful acceptance and deployment of technology based services.

Summary and Conclusions

This paper has attempted to provide some ideas and strategies that are effective in converting nostalgists into believers and users of technology-based information services. Important communication pathways and factors affecting group behavior were identified and studied. Some of the methods used to deploy new services were explained. A follow-up paper will provide the details of analysis and the findings along with the revised (tested) model.

It is clear from the initial findings that changes in approaches are necessary for better use of technology and acceptance of technology-based Information Services. Other reasons for not using technology include: a) lack of understanding of the changing roles and capabilities of the Information Services department, b) negative image, and c) lack of training. There are also cultural barriers within organizations to accept information service products as contributing directly to innovation and to increasing number of patent filings.

In sum, effective implementation of any service requires knowledge of the technologies, understanding of customers, and alignment to the strategic business goals of the organization. As illustrated in the model (Fig.2) information professional's image, user perception of Information Services capabilities along with external variables affects the acceptance or rejection of new technology. In this information age, it is important to consider Information Services as another economic resource, (like a financial, manufacturing, or natural resource) and elevating their role in organizations with a separate reporting structure is needed. Too often Information Services Departments are buried within other functional groups with no clear mandate or direction. In the recent spate of business consolidations within the bio-pharmaceutical industry, "Intellectual Property and Goodwill" are valued in the millions. The success or failure of the global corporations of the future will depend to a large extent on the management of information resources that are really the real property of corporations as opposed to land and buildings.

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Paper 2

"Partnerships in Instruction: Teaching Dogs Old and New, Local and Distant"

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Abstract

The University of Florida Health Science Center Libraries serve the information needs of six health-related colleges as well as associated programs from elsewhere on campus. To that end, the HSC Libraries provide a comprehensive educational program, focusing on course-integrated instruction, but providing alternative modes of instruction for both on- and off-site clients.

In the late 1990s, the library developed a Liaison Librarian Program to facilitate partnerships with academic faculty and programs. These relationships, and others created by 'visible' librarians, have increased the opportunities to provide library instruction to the library's clients.

This paper will present a brief history of the HSC Libraries' Education Program, provide examples of the categories of instruction provided (course-integrated instruction, orientations, 'stand-alone' classes and others), and enumerate some benefits and challenges of each. It will describe the relationship between the liaisons and library instruction, and provide suggestions for developing partnerships with academic faculty and programs. Finally it will discuss a recent evaluation of the Education Program, and steps that will be taken to move the program forward.

Introduction to the Health Science Center Libraries and the HSCL Educational Program

The University of Florida Health Science Center Libraries (HSCL) serve the academic, research, clinical, and administrative information needs of the six Health Science Center (HSC) colleges (Dentistry, Medicine, Nursing, Pharmacy, Public Health and Health Professions[1], and Veterinary Medicine) and associated centers and institutes. In addition to the main library in Gainesville, the library system includes the Borland Health Science Library (a branch on the Urban Campus in Jacksonville) and the Veterinary Medicine Reading Room on the

[1] Formerly College of Health Professions.

Gainesville campus. The HSC Libraries serve a primary clientele of nearly 15,000 potential library users, including over 1500 faculty, 7400 staff, and 5500 students. More than 8300 Shands Health Care workers are eligible for courtesy services, and many clients from biomedically-related departments and programs outside the Health Science Center also make the HSC Libraries their primary information provider (Health Science Center Libraries, 2003).

The Gainesville library was established in 1956, and over the years has developed a comprehensive educational program. In the 1980s, basic classes taught the CINAHL, MeSH, and Veterinary Index controlled vocabularies using state-of-the-art technology – overhead transparencies. Library tours and demonstrations of the new online catalog were also offered. In 1990 a reference librarian was named Education Coordinator (a half-time commitment) and soon after computers with CD-ROM access to health-related databases were obtained for the new computer laboratory/classroom. Teaching then involved both lecture and hands-on practice for class attendees. Two classes in particular, "Basics of Searching MEDLINE for Health Professionals" and "GRATEFUL-MED", were in high-demand by faculty and researchers (Hsu, 1993).

In 1991, the HSCL performed a major assessment of its existing educational program. It was concluded that the library should develop and deliver its educational services based on the academic model, and thus established the HSC Libraries' Curriculum Committee. The committee's charge was to "design the library's curriculum, review all existing and recommended courses in terms of priority, objectives, prerequisites, course and instructor evaluation, resources, instructor qualifications, and user population targets" (Hsu et al., 1994). The committee exists to this day, although membership and goals have somewhat changed.

In the mid-1990s more course-integrated instruction (CII), the library's primary focus, and additional classes were developed as new databases or 'hot' areas (the Internet; AIDS resources) grew in relevance and popularity. In 1996, the HSCL began work on a five-year strategic plan utilizing a 'staff-driven' approach (Kuntz et al., 2003). User education was deemed an important area of focus, and over a six month period, a User Education Task Force (UETF) gathered information on best practices for all aspects of peer institution instructional programs; examined the University of Florida and HSC environments to learn as much as possible about new academic programs, departmental trends and user needs; and examined and evaluated all aspects of the existing HSCL Education Program.

Several strengths were identified. The teaching librarians were a diverse, energetic, knowledgeable and enthusiastic bunch. The library possessed an excellent instructional setting -- a computer classroom with web access for 10

student computers and one instructor's computer. Several classes in literature database searching and Internet use and resources had been developed, and several student groups received instruction through library orientations. The HSCL had a strong curriculum committee, composed of teaching librarians and those from other departments in the library. And several librarians had been appointed to the curriculum committees of their various colleges (Francis and Fisher, 1997).

However, several limitations were also identified. The existing education program's infrastructure lacked a strong foundation. No philosophy statement or core values existed to guide course content or teaching methods. There was no formal training program for new teaching librarians. Once hired, they were expected to observe classes taught by the other librarians. That was the extent of their training. No teaching evaluation process existed. Few teaching librarians kept abreast of trends in education or attempted new methods of teaching, such as active learning strategies. Although course-integrated instruction was presumed to be the model for reaching students in the program, only four patron groups (dental residents, nursing students, and undergraduate genetics and psychology students) truly received such instruction, and the library was not integrated into the College of Medicine at all, aside from an orientation series provided to the Ph.D. students. Although database courses did exist, there was little diversity and fairly poor attendance for most of the classes taught. The library was not taking advantage of the web in instruction for either onsite or distant library users. No cohesive marketing program existed to assess user needs or promote existing educational opportunities.

Based on this evaluation, the final UETF report presented more than 70 recommendations, centered primarily on the following broad themes: user needs, staff needs, physical products, trends in education and patron relations. These recommendations were subsequently represented in the final strategic plan through four objectives covering 23 recommendations (Johnson et al., 1997). An Education Work Group was created to develop and implement the formal education program, including philosophy, core values, training, and a core curriculum. This paper will concentrate on aspects related to patron needs (new classes), physical products (web-based resources) and patron relations (building relationships and marketing).

Role of the Liaison

The library's 1997 Strategic Plan stressed the development of stronger relationships between librarians and patrons through the creation of a formal Liaison Librarian Program. At the same time the new Education Plan was being implemented, the HSC Libraries' Liaison Librarian Program Work Group was developing its liaison program (Tennant et al., 2001). User education is one of

the seven focal areas of the program, which strives to meet the needs of library users through intense subject-specialization by librarians and extensive communication with clients. Over the last five years, liaison librarians (who also tend to be the library's teaching librarians) have nurtured close relationships with their colleges, departments and units (see http://www.library.health.ufl.edu/services/liaisons.htm for a list of current liaisons, their assignments, and contact information).

Liaisons are assigned to various units based on the attributes of those units (size, subject diversity, research vs. clinical) and when possible, the background and interests of the liaisons. The colleges of Dentistry, Nursing, Pharmacy and Veterinary Medicine each has its own liaison librarian. The College of Nursing is a special case, in that since 2000, the Nursing Liaison's salary has been paid for by the college, and she is considered a faculty member in that college as well as in the library (Sherwill-Navarro, 2004). The College of Public Health and Health Professions, with its diverse array of departments, has liaisons assigned at the department level. The College of Medicine, which houses the largest number of faculty, students, departments and programs, is served at the department and program level. Seven liaison librarians have responsibility for the mostly clinical departments and professional students, while one liaison serves four basic science departments and the graduate student programs. The HSC Libraries' Education Program states as one of its core principles and values that "The liaison to a college/program should be the primary contact for education." Focus Area 3 (Education) of the Liaison Librarian Program (Tennant et al., 2001, Appendix C) provides 11 potential client-education activities. Without a doubt, once a formal liaison program was developed for the HSCL, liaisons and education were inexorably linked.

Course-Integrated Instruction

All of the HSC Libraries' planning groups stressed the need for course-integrated instruction. Allegri's (1985/86) review of CII required such classes meet three of the four following criteria: "1. faculty outside the library are involved in the design, execution, and evaluation of the program, 2. the instruction is curriculum-based, in other words, directly related to the students' course work and/or assignments, 3. students are required to participate, and 4. the students' work is graded or credit is given for participation." CII suggests obvious benefits. Because CII requires a certain level of participation by the academic faculty member, such courses generally have built-in buy-in and commitment from these faculty members. Because librarians usually work with the faculty member in developing assignments, it is more likely that such assignments will be 'doable' – the information exists and is accessible, the library owns the materials, etc. Because the instruction is related to an assignment or a required skill set, students may more easily make the connection between what

is taught and why it is useful to them. Finally, because the assignments are often graded, or attendance is required, students may take more seriously the library instruction. CII is also an excellent match for a liaison program in which liaisons are expected to build close relationships with their faculty, students and programs.

Prior to strategic planning and the formal development of the liaison program, four programs at the HSCL received true course-integrated instruction per Allegri (1985/86) -- nursing students, undergraduate genetics and psychology students and dental residents. The instruction for **nursing students** was considered the library's "crown jewel", as library instruction was integrated at the entry point for all levels of nursing student – incoming undergraduates, registered nurses enrolled in bachelor's programs, and graduate students at the master's and doctoral levels (Francis and Fisher, 1995). Hands-on instruction covered materials and resources appropriate to the student level, and classes were held on the Gainesville campus, as well as in-person at a remote site in Orlando.

Undergraduate genetics students (then and now) receive four hours of library and database instruction in support of a term project. Hands-on instruction covers literature and genetics-related databases and websites, and the librarian writes and grades three searching assignments in addition to assisting in the grading of the final paper on an assigned genetic disorder (Tennant and Miyamoto, 2002).

Since 1999, a librarian with a background in psychology has provided database instruction for undergraduates in PSB4104, **Laboratory Physiology/Psychology**. Students learn to search PubMed, PsycInfo, Current Contents Connect and Web of Science databases. The academic faculty member has been quite involved with the course, attending the sessions (student attendance has been nearly perfect), and preparing search topics related to the class.

Since 1989 the library has been involved in information training for **dental residents** during their orientation (Tennant and Francis, 1999). Since 2001 dental fellows have also attended. This series has evolved over time, and currently consists of one two-hour hands-on session per week for four weeks. Residents are required to complete the three librarian-written and -graded assignments (Appendix A). Session 1 includes a library tour and introduction to remote access and the online catalog. In the second session the residents are introduced to basic PubMed searching. Session 3 advances to more complex PubMed search tools (MeSH Database, History, Journals Database and Clinical Queries). The final session introduces a few additional databases that may be

useful during their residency: Web of Science, Evidence Based Medicine Reviews, Clinical Pharmacology Online, and Journal Citation Report Web.

These early successes, in existence prior to the HSC Libraries' formal liaison program, were the result of tenacious librarians either contacting academic faculty directly, or working through a college-level curriculum committee, as in the case of nursing (Francis and Fisher, 1997). While impressive, they were few in number. As soon as the Liaison Librarian Program was launched, liaisons were set loose to build relationships with their clients, assess educational needs, and develop courses relevant to their programs. Course-integrated classes are now available for five of the six colleges in the Health Science Center (all but Veterinary Medicine), as well as for one additional program in the College of Liberal Arts and Sciences. A sample of the library's CII opportunities is listed below.

Taught every fall and spring semester, CHM4413L **(Biophysical Chemistry)** is an upper division course for chemistry majors. The Bioinformatics Librarian teaches a two-hour hands-on course covering PubMed, the nucleotide and protein sequence databases, and the Molecular Modeling database, all from the National Center for Biotechnology Information (NCBI). The librarian writes and grades a searching homework assignment covering these resources (Appendix B).

Each fall semester 12 undergraduate students enter the College of Medicine's **Junior Honors program**. These students have been accepted into an accelerated track in which they will complete their first year of medical school and their last year of undergraduate study simultaneously. For several years the Junior Honors Liaison taught a one-hour introduction to the library and PubMed. Students now receive six hours of hands-on database instruction; two for PubMed and four for NCBI's bioinformatics resources. Each student prepares and presents a PowerPoint lecture on the genetics/molecular biology of an assigned disorder. The librarians do not grade any portion of the final project but do hold office hours to assist students with their searches.

First semester **pharmacy students** take a required course (PHA5722, Pharmacy Systems and Resources) that includes an assignment to find a practice guideline for a disease using PubMed and the National Guideline Clearinghouse website. The Pharmacy Liaison meets with these students twice, providing a general orientation to the library and instruction in the use of MeSH, PubMed,

and practice guidelines.[2] The librarian works with the course coordinator to plan the sessions and select the diseases the students investigate.

First year **medical students** now receive library/database instruction four times during their second semester. College of Medicine liaisons teach hands-on sessions on MeSH, PubMed searching, and the use of PubMed Clinical Queries. The Bioinformatics Librarian meets with the students for two hours during their biochemistry module, providing hands-on instruction in the use of NCBI's research databases. Database examples concentrate on molecules important to biomedical research and human disease. PubMed and the NCBI resources are covered in a librarian-written and -graded searching assignment, which counts for 15 percent of students' biochemistry examination grade (Appendix C). The Bioinformatics Librarian meets with the students again for 30 minutes during their genetics module, this time providing a lecture on several clinical genetics resources.

The **Science of Clinical Research** is an NIH-funded course attended by junior faculty from any of the six health-related colleges at the HSC. The two-week course introduces attendees to the principles and tools involved in clinical research. The goal is to help these faculty members become competitive for research grants. Academic faculty teach the attendees how to develop a clinical research project, and introduce them to biostatistics, onsite core molecular research facilities and services, the ethics of research, etc. The library provides a two-hour session on its information resources and services, and how to find information on research grants. Although no assignment is written by the librarians, the session is required, and is held in support of the final class project for the attendees – the development of a research grant.

Traditional Library and Database Orientations

Several academic programs receive traditional orientations to the library and its resources. Requested by the faculty, these orientations differ from CII in important ways. The sessions are generally offered at the very beginning of a degree program, and are not tied to any assignment or any information point-of-need. Attendance at sessions is rarely required. Academic faculty usually have little to no input into the information the librarian provides. Sessions are customized to the academic program, and may be as short as a 15-minute demonstration, or as long as a three-part hands-on series detailing database searching. Groups currently receiving such orientations include incoming veterinary medicine students (Tennant and Cataldo, 2002), surgical residents,

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[2] These classes were hands-on until students at remote sites were included in the program; lectures are now presented electronically (see below).

third-year medical students entering surgical rotation, and incoming College of Medicine Ph.D. students (Tennant and Francis, 1999).

'Stand-Alone' Courses

Although the HSCL have deemed course-integrated instruction a priority, librarians have not yet broken through to every faculty member that could use such instruction in their classes. Therefore it has been essential for teaching librarians to create additional learning opportunities for their clients. Even when library and bibliographic instruction is integrated into the curriculum, the time provided for such instruction tends to be quite limited. Frequently, only basic instruction in the use of particular resources can be covered in the time given; students are rarely provided with information on advanced searching options, or granted time to delve into the material for their special interests. It is often impossible to introduce narrowly-focused resources in these course-integrated classes. A large portion of an academic health science center library's potential user base is made up of people who are not enrolled in educational programs – faculty, post-docs, staff, administrators; it is often the case that these potential clients are neglected (Hurst, 2003). The library also has an obligation to educate these clients.

For these reasons, the HSCL teaching librarians have developed a series of 'stand-alone' classes that can be attended by anyone in the University of Florida community. These classes have been designed to fill specialized information needs of the HSC Libraries' clients, but they are not officially tied to an academic program or course. Some of the classes cover material likely to be of interest to faculty, students and staff from any discipline served by the HSCL. For example, nearly every program could use instruction in PubMed searching or finding grants resources. Other classes have been developed by liaisons specifically for their clients, or to cover a widespread but subject-specific need in the HSC (e.g., genetics). Prior to the development of the formal liaison program, approximately 11 stand-alone classes were offered; the list has now expanded to more than 30. Most of these courses are taught no more than once per semester, unless a second session is required due to high enrollment. Exceptions to this rule include the PubMed classes, which are routinely taught multiple times per semester. Stand-alone classes fall into one of four categories – literature databases, NCBI resources, other subject-specific resources, and task-based courses.

Literature database courses are generally one to two hours in length, and are taught hands-on in the computer classroom. Fairly traditional in nature, this category includes classes on Web of Science, Current Contents Connect and BIOSIS Previews. Based on feedback from attendees and the perceptions of the

librarians, the PubMed class has now been split into two one-hour sessions, one basic and one more advanced.

A series of **NCBI Resource classes** is now offered. "Survey of NCBI Resources" introduces the novice user to a variety of resources, allowing attendees to decide which additional classes to attend later in the semester. "NCBI's Information Hubs" covers GenBank and other sequence resources. "NCBI's Structures" provides attendees a chance to search NCBI's Molecular Modeling Database, and try advanced techniques using the Cn3D structure viewer. Two classes cover BLAST and similarity searching, one basic and one advanced. Finally, NCBI's variation, expression and genomes resources are taught in three separate advanced courses. Attendees come from throughout campus, including the Health Science Center, the College of Liberal Arts and Sciences, and the Institute for Agricultural Sciences, and are split fairly evenly between graduate students, faculty and post-docs. These NCBI courses are now possible due to a new position at the HSCL, Bioinformatics Librarian. The 1997 strategic plan recommended such a position be created to meet the needs of researchers in the burgeoning fields of genetics, genomics and bioinformatics. In 2002, funds became available from the University of Florida Genetics Institute to develop the new position of Bioinformatics Librarian (Tennant, 2005). User education is currently the major focus of this position.

Subject-related classes tend to cover a multitude of resource types for a particular subject area, including literature databases, websites, and print resources. A variety of classes have been developed by liaisons in their particular subject areas, including **"Alternative Medicine Resources", "Genetics Resources for Clinicians"** and **"Statistical Resources." "Molecular Protocol and Model Organism Resources"** begins with instruction in searching the Current Protocols Online resource. Next, attendees survey a variety of free, high-quality, web-based resources covering molecular protocols and model organisms, including those providing step-by-step instructions for experiments, e-mail help lists, online discussion forums, equipment and reagent vendors, and associated tools. Finally, attendees learn the MeSH terms and search strategies employed in PubMed and BIOSIS Previews to find protocol and model organism information.

Task-based classes are not related to a particular subject area, and are designed to be useful for all of the programs covered by the HSCL. In **"Exciting Citing",** attendees use PubMed's Single Citation Matcher to locate citations from incorrect or incomplete information; learn how to find the full name of a journal from an abbreviated title or how to correctly abbreviate the full title with PubMed's Journals Database; use Web of Science's Citation Search to find out who is citing whom; and peruse online and print resources that help with specific formatting styles and publishing information. **"Library Skills for**

Secretaries & Research Assistants" was developed to help support staff locate journal articles and obtain library materials. The library's physical layout, procedures and policies are discussed, and literature databases are introduced. In both of these classes, scenarios covering incorrect or incomplete citations and searching methods are discussed, useful handouts are provided, and a list of fun, fabricated questions is distributed to help the students practice material covered in the classes. **"Grants Resources"** walks participants through Dialog's Grants database, e-mail alerting services, a sample of the library's print resources on grants, and websites that identify grant sources and offer grant-writing advice. Generally, the course is timed around popular grant deadlines (October, February, July). **"E-Journal Madness"** teaches participants to locate electronic journals in the university's collections, to access full-text information from several databases, and various trouble-shooting techniques. Finally, four new classes have been added to the mix in the last year – **Reference Manager I and II, and EndNote I and II.** In 1997 the User Education Task Force recommended that the library assume responsibility for teaching such courses. Other librarians were thinking along the same lines. Owens (1997) points to how librarians can cash in on the "broader issues of personal information management skills in the electronic era." From the intellectual side, it made perfect sense for librarians to teach them – successful instructors need strong literature searching skills and a vast knowledge of electronic resources, in addition to knowing how to use the program effectively. From a practical standpoint, it was reasoned that the classes would be quite popular and would raise the visibility of the library. However, it was determined that such teaching was the responsibility of the HSC's Information Technology (IT) Center instead. The library has sponsored yearly hands-on workshops taught by vendors' trainers, and response to these sessions was overwhelming. A senior librarian would also teach the resources individually or in groups of users by request. In 2003 the library reversed its position and now offers the four classes listed above. These classes have proven to be as popular as expected.

In the 2002/2003 academic year, 44 stand-alone sessions were taught, with a total of 334 attendees. Attendance at stand-alone courses is highly variable. For every well-attended PubMed or EndNote session, there is a poorly-attended counterpart (Table I). The HSCL have tried a number of activities to determine why people attend some classes and not others. For each stand-alone class, librarians have the option of asking attendees to complete a survey evaluating the course (Appendix D). These surveys are meant solely for the edification of the instructing librarian, and are to be used to improve the class, or perhaps develop a new course if attendees indicate the current content does not meet their needs. Although librarians have used this information as intended, it has not provided many insights into 'what the users really want.' In 2003, the library collaborated on a survey with the HSC IT Center that was sent via e-mail to the entire Health Science Center workforce. This survey asked questions

concerning which IT and HSCL classes people would be interested in attending, which times of day worked best for potential attendees, etc. Although 168 responses were received, the majority of them appeared to be from support staff (secretaries, administrative assistants, etc.), rather than the faculty, students and clinical/research staff for whom the majority of HSCL stand-alone classes are designed. Thus, the data were not as revealing as initially envisioned.

In 2004, librarians surveyed attendees of each 2002-2003 academic year stand-alone course (Appendix E). Although the response rate was low (18 responses from 145 attendees; 12.4 percent), every respondent indicated that they learned something new in the class, that they have used what they learned, and that they would recommend the class to others. Repeat customers may also be suggestive of satisfaction with a product. The HSCL has recently required attendees to sign-in at the beginning of class. These data indicate that of the 231 individuals who attended at least one stand-alone class from July 2003-April 2004, 38 percent came back for at least one additional class in that time period. One individual attended 11 different courses! Both the survey and the class lists, limited as they are, seem to indicate that those who take stand-alone classes find them useful and effective. The trick for librarians is to determine how to reach those individuals who do not take advantage of these offerings, and/or how to offer the information in formats that those clients are more likely to use.

Team-Teaching For-Credit Courses

Some HSCL librarians recently worked with faculty from the ground-up to develop and teach for-credit academic courses. One of the experiences was fraught with frustration for librarians and students alike, and library participation has ended. The other course has been successfully repeated for three semesters and is expected to continue.

In 2000 two College of Health Professions liaison librarians were invited by the dean to teach one credit of a four-hour **"Introduction to Health Sciences"** class for 84 juniors in a brand-new Bachelor of Health Science program. One-third of the students' semester grade was based on three librarian-written and -graded assignments: a one-page essay with a three-source bibliography; a short exercise in evaluating websites by librarian criteria; and a 'half paper' consisting of search history print outs from two of the three databases taught and a three-to-five item student-annotated bibliography. Librarians met with students five times: three period-long lectures on remote access, using the online library catalog and services, reading bibliographic citations and evaluating websites; and two hands-on small-group sessions, one covering PsycInfo and CINAHL, the other PubMed. Minimal involvement by the academic faculty member, combined with criticisms in student evaluations and

librarian frustration, led to one more try the following year, but after this second semester, the library involvement in the class ended.

A more recent example is GMS6014 – **"Applications of Bioinformatics to Genetics"**, created by two faculty from the College of Medicine and the Bioinformatics Librarian. This one-credit elective course meets for a total of 15 hours in a five week time frame in the fall semester. Graduate students from the College of Medicine's Ph.D. program make up the majority of registrants, with a few also coming from the College of Liberal Arts and Sciences. The librarian teaches three of the 15 sessions, writes and grades homework, and is involved in determining the students' final course grades.

Other In-Person Educational Opportunities

Even with an extensive and diverse program of CII and stand-alone courses, some users' needs would not be met without additional learning opportunities. Many factors contribute to this situation. Some clients cannot attend classes when they are scheduled. Some academic faculty members have reported being uncomfortable attending stand-alone classes with their students. Sometimes a large group of clients have a very specific information need, so a specially-scheduled group session is more appropriate. Library clients may not realize that classes already exist to help them fill their information gaps. To meet these various needs, the HSCL teaching librarians go wherever they are needed to get the message across. It is with these specialized needs that liaisons' contributions to education really shine – clients who know their liaisons can make appropriate requests for assistance; liaisons who know the information needs of their clients can 'invite themselves' to meet these needs.

Departmental meetings, journal clubs, and student groups: Several liaisons have been invited to speak at departmental and faculty meetings for their clients, while others have asked for the opportunity to do so. Information provided at these sessions tends to revolve around the liaison program and library resources/services updates. The College of Veterinary Medicine Liaison was asked to provide such an orientation to the faculty in the Department of Pathobiology; she managed also to slip in instruction on MeSH terms and searching PubMed. She was then asked to repeat the session for the Veterinary Medicine Graduate Student Association. The Nursing Liaison now provides brief presentations at general nursing faculty meetings. She uses the time to highlight new library services or products, and informs faculty of new features of old products or other areas of information that are likely unknown to them. The Bioinformatics Librarian liaises to four departments in the College of Medicine. She now visits the faculty meetings of each department once a year to update faculty on services and resources. She always includes approximately ten 'Library Tips' that cover database searching and library services. On occasion

she speaks by invitation in genetics-related journal clubs and departmental research conferences. One faculty member was so inspired by attending a PubMed stand-alone class that he requested his liaison librarian present a condensed version at OB/GYN grand rounds.

Specialized information needs: Occasionally very specialized information needs will arise, and liaisons will receive invitations to provide such information. Recently the head of the university's Institutional Animal Care and Use Committee (IACUC) contacted the Veterinary Medicine Liaison Librarian to ask for assistance. The educators and researchers that use live animals needed training and assistance on searching the literature for **research alternatives to live animal use**. These searches are required by the Animal Welfare Act and the IACUC makes sure the university is in compliance. The liaison librarian first prepared a five-minute presentation for the IACUC and then prepared two one-hour sessions to train the researchers on the proper search procedures, databases and the process for requesting a librarian to perform the search. The faculty member who heads the IACUC was very much in tune to what the library could provide in terms of liaison services. He knew exactly where to turn when this particular information need arose – his liaison librarian. Other such special requests from colleges recently went to the Pharmacy Liaison to teach grants resources to faculty and post-docs from the college, and the Nursing Liaison to provide instruction in the use of EndNote for faculty.

One-on-one sessions: All liaisons allow clients to make appointments with them for instruction in resources, and many of those who are involved with course-integrated instruction either have scheduled office hours or make appointments with students to answer specific questions. A more formal type of one-on-one session has evolved from the College of Medicine's **morning report,** a commonly used forum for resident and intern training. At morning report, patient case reports are presented, and faculty physicians highlight important aspects of the cases. The internal medicine residency requested that HSCL librarians join them in a pilot program during morning report to promote the use of evidence-based medicine in their practice. For one year librarians attended morning report weekly, and on the library's laptop performed literature searches relevant to the case being presented. Over time, these sessions evolved such that one of the residents on the patient treatment team would assist the librarians with the search. In the final model, residents performed the searches with the librarians functioning as coaches. This final model was the most effective for both the librarians and the residents, as it provided many teachable moments.

Brown-bag lunch seminars: Librarians noted the popularity of lunchtime information sessions sponsored by other university departments and decided to try their hands at it. Two classes, **"E-Journal Madness"** and

"Grants Resources", were identified as those least needing hands-on instruction. Sessions were set up in a comfortable conference room rather than the computer classroom. High attendance numbers suggest the sessions are a viable alternative to the usual formal hands-on classes. The lunch hour is a popular free time, though participants rarely brought lunch with them. Participants certainly appreciated being able to bring their coffee and soda, something not allowed in the computer classroom. The more relaxed and open venue has proven a highly positive setting for attendees and instructors alike.

Making Those Connections …

Before the Liaison Librarian Program was formally developed, most contacts for course-integrated instruction or library orientations were made one of two ways: 1) librarians at the reference desk would receive multiple requests for the same information, determine that homework (usually poorly worded or undoable) had been assigned by a professor, and inform the Education Coordinator so she could counsel the faculty member and request instructional time with their students; or 2) some sort of strong connection was made by the librarian serving on a college curriculum committee (in the case of nursing), or a tenacious subject specialist or the Education Coordinator would make contact with the appropriate faculty member (in the case of dental residents and undergraduate genetics and psychology students).

In the first case, the partnership between the library and academic faculty/class tended to be short-lived, and rarely survived from semester to semester or when the faculty member retired or turned the class over to a colleague. However, in classes in which a librarian was involved at the curriculum committee level, or was otherwise closely involved, the partnership was much more likely to survive across years and faculty changes. This boded well for liaison librarian participation in developing the library's course-integrated curriculum and other educational offerings.

Visibility is key to developing faculty (and student) buy-in to the HSC Libraries' Education Program. Although strong partnerships can be created between the library and faculty without a formal liaison program, liaisons at the HSCL, almost by definition, provide this visibility. They have built relationships with their clients in a variety of ways. Introductory e-mails to their clients establish their presence and the existence of the program. Regular e-mails throughout the year provide information on new library services and resources. Liaisons notify their clients of instructional opportunities each month, and during years in which money is available for adding journals, poll their clients for their insights as to which new journals should be added to the collection. In stand-alone classes, many teaching librarians introduce themselves to attendees by indicating that they are liaisons, and at most course-integrated classes and

orientations, the liaison program is discussed in some detail. Faculty in the Science of Clinical Research class are introduced to the liaison program and directed to the library's website for contact information for their liaison. Some liaisons attend social events, seminars and department meetings held by their academic units.

Exciting opportunities such as the Veterinary Medicine IACUC session and morning report for the College of Medicine's residents would never have come about without the liaison program. In the former, the liaison was so well-established and valued that a faculty member immediately thought of the liaison and library as a means to solve a difficult problem. In terms of morning report, a tenacious College of Medicine Liaison made this possible by constantly seeking out opportunities and contact people until she found someone who wanted to 'play.'

Partnerships with faculty have developed outside of the liaison program as well. Some of the HSC Libraries' course-integrated opportunities have arisen because faculty have taken stand-alone courses in their areas of interest. For example:

- The faculty coordinator for the first year medical student genetics module attended the 'Genetics Resources for Clinicians' class and immediately asked that a similar (but shorter) session be provided to those students. The librarian approached was NOT the liaison to the medical students.

- The faculty coordinator for the Junior Honors program attended several of the library's stand-alone NCBI resources classes, and came to the conclusion that these resources would be beneficial to the students. He then approached that librarian, who was NOT the Junior Honors Liaison.
- The faculty member teaching general undergraduate psychology requested course-integrated work with his students after he had attended a general stand-alone MEDLINE class. A formal liaison to that unit had not yet been assigned.

Additionally, another form of visibility has provided many opportunities for the HSCL librarians – the visibility of librarians participating in campus-wide activities outside the library.

- In 1997-1998, the HSCL led the development of an Integrated Advanced Information Management Systems (IAIMS) Planning Grant, and as part of the planning process, librarians served on a variety of committees and task forces with HSC faculty. One such

group, the Research Task Force, included a biostatistician faculty member who later recommended the library be included in the Science of Clinical Research class, based on interactions with the librarians on that Task Force.

- The HSCL was instrumental in developing a campus-wide Bioinformatics Initiative, with several librarians participating in various workgroups. Two academic faculty on the Curriculum Work Group were interested in developing the aforementioned for-credit bioinformatics class; one of them asked the librarian to speak at his journal club; following this, the librarian was invited to participate in class development and teaching.
- An HSCL librarian worked with other campus faculty on an undergraduate biological sciences education grant. A faculty member on the team was the coordinator for the first year medical students' biochemistry module. From this interaction, the library was finally invited to provide instruction in searching PubMed in the first year curriculum.

The College of Medicine first year curriculum has been a tough nut to crack in terms of library integration. Success in the early 1990s through personal contact with an anatomy/physiology professor ended when he turned over the class to a colleague who would not relinquish class time for library instruction. Although it is the largest onsite program of the six health-related colleges, and although the Association of American Medical Colleges in 1998 recommended that informatics instruction be integrated into all four years of the curriculum, it has only been in the last few years that such integration through the library has been re-established for first year students. The PubMed and Bioinformatics Resources sessions have been presented for two years, while the half hour in the genetics module has completed its third. But the library has only become re-integrated 'through the back door', not through liaisons or official channels. Instead, biochemistry and genetics teaching faculty independently came to appreciate what the library could do based on their experiences taking stand-alone classes and working on outside projects with librarians.

Another effective way to involve liaisons in the educational efforts of a college or program is to integrate them into the curriculum committees of those groups (Brown and Nelson, 2003; Francis and Fisher, 1997; Layton and Hahn, 1995). Even prior to the HSC Libraries' formal liaison programs, librarians were members of curriculum committees in the colleges of Dentistry, Medicine and Nursing. Francis and Fisher (1997) enumerated the various activities that librarians could provide to such committees, including performance of literature searches to support the curriculum; identification of modes of bibliographic instruction for individual classes; integration of library skills instruction into academic classes; assignment design to reinforce library skills; instruction to

keep faculty abreast of the new technologies; acquisition of new materials needed by the college curriculum committee; collection and dissemination of requests for grant proposals; and consulting services. Additionally, the authors noted that such participation may lead to "visibility of the library and credibility of the staff." Since the development of the formal liaison program, liaisons have been added to the curriculum committees of the colleges of Pharmacy and Veterinary Medicine. These appointments were made due to lobbying by the library director and individual liaisons. Most liaisons report performing at least one of the activities proposed by these authors. Several liaisons suggest that curriculum committee is a place to 'see and be seen.' Liaisons are able to meet the faculty most likely involved in curricular matters, and demonstrate the library's commitment to partnering in education. Attendance at curriculum committee meetings has also been instrumental in learning about new programs and classes that colleges had 'forgotten' to mention to the library. This has kept the HSCL Libraries from being blindsided by new onsite and distant degree programs.

Negotiation is a key skill in integrating the library into the curriculum, as well as the actual implementation and teaching of the classes. Although the HSCL are now integrated into the classes described above, many of these courses experienced growing pains in their early stages. What does a teaching librarian do when she finally breaks into the curriculum, only to find that the faculty member has deemed the session 'optional' and only 10 percent of the students shows up? Or when the faculty member has decided that the librarian is to teach a non-hands-on detailed searching class to a mob of 120 medical students, in a large lecture hall, the period before a test? These scenarios (and many more) have happened at the HSCL. Thus it is important to be able to negotiate with faculty, provide expertise in what tends to work in terms of both sessions and assignments, and have pre-existing successful models in place. If all else fails, counting on student course evaluations can be useful. Although evaluations given by librarians can provide much useful information, we have found that the evaluations provided by the programs themselves tend to carry more weight with academic faculty. In both the biochemistry and genetics modules for medical students, student feedback has been essential in making changes to the sessions; the PubMed and Bioinformatics portions of the classes are now hands-on in relatively small groups (30 students per session), and instruction in the genetics module occurs at the beginning so students can make use of the information throughout the duration of the module.

The User Education Task Force had recommended the development of guidelines for academic faculty who request educational sessions. It is important for both the academic faculty and teaching librarians to understand their responsibilities in the library instructional process, and guidelines may facilitate the negotiation process. Before guidelines were formalized, librarians had often

found themselves facing unrealistic faculty expectations, with no authoritative means to negotiate, or even say 'no.' Faculty often requested basic library orientations rather than the more effective course-integrated instruction, requested new classes with only a few days' notice, or attempted to cram 40 or 50 students into a library classroom with a maximum capacity (two students per computer) of 30. Formal guidelines have been developed to deal with these issues, and librarians now have the authority to make recommendations and to decline teaching the class if short notice is given or classroom capacity is exceeded. The guidelines are sent to all new academic faculty when they first request instructional sessions, and are posted on the HSC Libraries' website.

Sometimes despite a librarian's efforts and negotiating skills, a partnership does not develop as planned. During these cases the best skill an instructional librarian can develop is learning to bow out gracefully. In the Health Sciences class described previously, the librarians were able to negotiate direct e-mail access to students (for sending assignment reminders and conducting time-of-need individual assistance) following the first semester. But the faculty member resisted changes in assignments suggested by the librarian to unify library and course content. Librarian involvement in the course ended after the second semester with the offer to co-teach the course in the future if changes were made in course design.

Distance Learning and the Use of Technology in Instruction

Like most large academic institutions, the University of Florida offers multiple academic programs distant from the main campus. The College of Nursing has students in Jacksonville and Tallahassee, the College of Pharmacy has over 600 students enrolled in two separate distance programs, the College of Medicine has satellite clerkships in a number of locations and several of its basic science faculty researchers and their graduate students are housed at the Whitney Laboratory, a marine biology laboratory a 90 minute drive away near St. Augustine. Obviously, Gainesville's onsite educational programs are of little use to these clients.

Additionally, there are many times when in-person educational efforts may not be the best choice even for onsite clients. Instructional information should be made available to all library users regardless of time or location. Students in their dorms at 2:00 in the morning should be able to access useful instructional materials. Clients who learn better working through materials at their own pace should have means to do so.

Earlier evaluation of the education program found little use of technology in instruction at the HSCL. The library struggles to provide equivalent instruction to distance education students (and onsite clients who do not attend our classes), and the use of web-based technology may help meet this growing demand. Although the web seems an obvious choice for providing instruction, little

research thus far conclusively demonstrates its superiority to traditional onsite research, or even if there is any difference at all in effectiveness. The direction that distance education research has taken during the last two decades is very similar to the direction that media research followed during the 1970s and 1980s. Media research initially focused on comparative studies, attempting to establish which media type was more effective at delivering instruction. These studies, often riddled with confounding variables, yielded confusing findings: some produced evidence supporting certain media types over others, while many studies failed to produce significant differences at all. This prompted Clark's (1983) assertion that media types have no more effect on learning than the effect a grocery truck has on the nutritional value of the produce it delivers to market. However, media research quickly changed directions and began focusing on media attributes, relationships with instructional methods, and learner attributes. This new direction produced findings that have more practical value for educators.

Distance education research has thus far followed the same progression taken by media research. Most early distance education studies focused on comparisons of traditional, face-to-face classrooms and distance instruction. These studies frequently produced un-interpretable findings, confusing conclusions, or no significant differences (Foust and Tannery, 1999; Holman, 2000; Simonson et al., 2003; Sonner, 1999; Souder, 1993). Like the earlier media studies, later research of distance education has taken a more practical approach, focusing on the factors that determine student success in distance education programs. These factors include student learning styles and attitudes, student demographics, programmatic support, and instructional delivery methods and systems (Germain et al., 2000; Henner, 2002; Nichols et al., 2003; Pival and Tunin, 2001). The generalizations made by this body of research concerning predictors of student success have more utility for practitioners and provide guidance in course design and delivery. Generalizations about learner characteristics suggest that students who are older, self disciplined, highly motivated, likely to initiate communication with instructors, and have high goals and high expectations perform better in distance education environments (Bernt and Bugbee, 1993; Schardt et al., 2002; Schlosser and Anderson, 1994). Generalizations about delivery of distance education suggest that the use of timely, formative evaluation, a high level of support and guidance through instructor-student interaction, and a high degree of course organization are strong determinants of student success (Egan et al., 1991; Threlkeld and Brzoska, 1994).

However, in cases with offsite clients, the use of distance learning may be the only practical solution. The library's first major attempt at using a distance technology to deliver instruction was the development of a web-based **PubMed tutorial**. Because PubMed is freely available, offsite users need not worry about site licenses or passwords when accessing the database. When PubMed was first introduced the developer (National Library of Medicine) had not yet made

available any tutorials or teaching materials. The challenge was to design a self-directed, web-based tutorial that could be used on- and off-campus without the need for direct, onsite instruction. In 1999, several members of the HSCL collaborated to build such an interactive tutorial. It includes examples and review questions to test one's understanding of the search concepts. The tutorial (http://www.library.health.ufl.edu/PubMed/PubMed2/index.html) was launched in February 2000 to coincide with the public release of a new PubMed interface. Originally intended for our clients, the tutorial has received excellent reviews and was quickly adopted by librarians and others around the world (Dixon, 2002). An online feedback form regularly provides high evaluative marks for the tutorial.

The HSCL are now in the process of creating a comparable online tutorial for **CINAHL** (the Cumulative Index for Nursing and Allied Health Literature). In this case, funding to develop the tutorial was received via a competitive grant through the UF Office of Academic Technology. All of the five grants awarded from 37 applications were chosen for funding because they use technology in instruction. However, the HSC Libraries' grant was unique in that the tutorial will have an impact on more students than the others; it was outside the formal classroom and it will provide support to distance learners and all learners 24/7. The library's tutorial team will develop the resource with the University of Florida's Center for Instructional Technology and Training (CITT). The librarian team is meeting monthly with an assigned CITT instructional designer; both have clear deadlines with deliverables. The project process will take a year and the resource will be presented in November 2004 at a showcase event with the other successful proposals. The tutorial will be designed in modules so that students may select the search skills they need. As with its PubMed predecessor, the CINAHL tutorial will be maintained on the library's website so that it will be kept up-to-date with changes in the database.

The Occupational Therapy Liaison Librarian meets each fall in Gainesville with any **OT distance learning** students able to attend a one-day onsite orientation held by their academic department. To serve the students when they are offsite, the liaison has developed an online pathfinder, covering topics such as remote access and finding electronic books and journals. The pathfinder is hosted and maintained on the HSC Libraries' website and linked to from the Department of Occupational Therapy's website. The coordinating faculty member for the OT distance program recently requested the liaison develop a more interactive tutorial focusing on evidence-based practice. The OT Liaison Librarian, HSCL Education Coordinator, and Distance Learning Librarian are working collaboratively to create this tutorial.

The use of other distance technology tools has also been attempted at the HSCL, specifically for offsite students in the colleges of Pharmacy and Nursing.

The **College of Pharmacy** has expanded its distance program to three sites, which will have approximately 200 students at each. The college also offers a PharmD program for pharmacists who are working after graduating with a bachelor's degree in pharmacy. This program is international and is completed online with periodic small group meetings. A new course was developed to introduce the students to research, the college and its resources, and the library. The Pharmacy Liaison was responsible for the section on the library. She created a narrated PowerPoint presentation that the students were required to view. The presentation is totally integrated into the course and details how to access the library's electronic materials. It also includes a brief section on database searching and provides some resources for free electronic journals.

In 2002, these library instruction lectures were videotaped for offsite students. Students at the Gainesville campus could either watch the video or attend the lecture. Poor resolution of the online search visuals hampered the effectiveness of the presentation. In 2003 the liaison instead prepared narrated PowerPoint presentations for the class Blackboard site. Again, technical difficulties were encountered -- there was no quiet, soundproof place to record the narration and the resulting large file needed to be compressed. The liaison was listed as a Teaching Assistant on the course's Blackboard site and monitored the questions that were posted, answering the ones that involved the library assignment. One difficulty encountered dealt with the 'required' nature of the viewing. As opposed to an onsite in-person class, there was no way to determine whether or not students actually viewed the presentation (a newer version of Blackboard will solve this difficulty in 2004). Given the e-mail questions the liaison received, it appears that a substantial number of students did not view the presentations prior to attempting to complete their homework. The class has been a learning experience for the librarian in both teaching methodology and technology.

The web has now been used to facilitate entrance to the HSC Libraries' educational resources. An 'HSCL User Education' link has been added to the library website (http://www.library.health.ufl.edu/services/instruction.htm). After viewing peer institutions' library education webpages, it was clear that in comparison the HSCL was burying its educational resources too deeply into the existing webpage, and that the education site had very little content of use to library patrons. This new link includes stand-alone class descriptions, calendars, online class registration forms, interactive tutorials and printable handouts. One of the last additions to the site was a link for faculty contemplating course-integrated instruction – the link describes how to schedule classes, how to build effective homework assignments, provides examples of course-integrated sessions and orientations, articulates deadlines for requests and describes the computer classroom and its hardware/software capabilities.

Where We Are Headed

As detailed in the introduction to this paper, periodic evaluation of the existing program is a hallmark of the HSC Libraries' instructional efforts. In the summer and fall semesters of 2003, the HSCL Curriculum Committee met several times to discuss the current state of its Education Program. There were several positives to consider. The teaching librarians are still a diverse, energetic, knowledgeable and enthusiastic bunch -- however they are a new bunch. Nine of the 13 librarians on the HSCL Curriculum Committee had not been employed by the library during the 1997 program evaluation. The excellent teaching facility had been upgraded to 15 student computers. The liaison program had facilitated the development of partnerships with faculty, creating more opportunities for the HSC Libraries' priority – course-integrated instruction. Subject-specialization through the liaison program and an interest in task-based approaches had facilitated the development of additional stand-alone classes. Alternative modes of instruction – presentations at faculty meetings, brown-bag lunches, specialized presentations, etc. had been explored, both at the librarians' instigation and by academic faculty request. Librarians now served on curriculum committees for five of the six colleges in the Health Science Center. The HSCL had begun to explore the use of technology in delivering instruction to distant sites, and had successfully created a well-received PubMed tutorial and been awarded a grant to create one for CINAHL. Progress had been made!

However, as in 1997, several limitations were also identified. Although most of the librarians involved in the 2003 evaluation were not on staff for the last large-scale program evaluation, many of their concerns mirrored those presented in the late 1990s. The half-time Education Coordinator had retired, and her position had not been advertised or filled. Peer reviews that she had coordinated for teaching librarians had fallen by the wayside, and no real training for newly hired instructional librarians existed. Without an education coordinator, there was no one to keep abreast of trends in education, and the HSC Libraries' few experiences with technology, aside from the online tutorials, had not been as successful as hoped. Although librarians were teaching more stand-alone classes from a more diverse repertoire, attendance for some was quite low. Was the Education Program really giving attendees what they wanted (and needed)? Earlier attempts at assessment had been less than effective, and no one on staff had the appropriate experience to perform a more valid assessment.

Based on this evaluation, the curriculum committee recommended that a full-time education coordinator be hired. The HSCL had come full circle, back to 1997 when the User Education Task Force recommended the creation of such a position! This time the position was funded, and advertised in the fall of 2003 (Appendix F). The HSCL decided to accept applications from both librarians and those with other degrees related to education. The successful candidate was not a librarian but a master educator who is completing his Ph.D. in instructional design.

Bibliographic instruction, just like any other comprehensive educational program, can be greatly improved with the knowledge and experiences of an instructional designer. Instructional designers have the ability to partner with subject specialists, such as liaison librarians, and work through content to create a task analysis. This task analysis can then be organized into a hierarchy of cognitive objectives that guide the sequencing of instruction. Next the designer can match instructional strategies to those specific objectives and create assessment measures to evaluate learning outcomes. Additionally, an instructional designer brings skills and knowledge to the tasks of learner analysis, needs analysis, project management, message design, web design, and the production of resources.

The HSCL instructional librarians envision that the new fulltime Education Coordinator will provide insights into areas currently lacking such as the effective integration of technology into instruction and emerging trends in education, and will bring sorely needed skills in needs assessment, program evaluation, and staff training. Combined with the partnerships that liaisons have developed with their academic faculty, and the strong foundation created following the 1997 strategic planning process, the HSCL are poised to take the Education Program to the next level.

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Database List:

Database and Software List

BIOSIS Previews

Thomson, subscription information at http://www.biosis.com/products_services/previews.html .

Bibliographic database covering over 5,500 resources in the life sciences; provides citations from journal articles, meetings and conference reports, books, and patents.

Blackboard

Blackboard, Inc. information and purchasing information at http://www.blackboard.com

This is an online course management system used for the delivery of courses via the Internet.

BLAST (Basic Local Alignment Search Tool)

National Center for Biotechnology Information, http://www.ncbi.nlm.nih.gov/BLAST/ , free resource that searches nucleotide and protein sequence databases to find sequences similar to the query sequence. Multiple versions of BLAST are available to solve specific biological questions, and to deal with specific sequence attributes.

CINAHL **(Cumulated Index for Nursing and Allied Health Literature)**

CINAHL Information Services, subscription information at http://cinahl.com

This is a bibliographic database that covers 1,700 current nursing and allied health journals publications dating back to 1982. This database covers nursing,

biomedicine, health sciences librarianship, alternative complementary medicine, consumer health and 17 allied health disciplines. It also offers access to health care books, nursing dissertations, selected conference proceedings, standards of practice, educational software, audiovisuals and book chapters.

Clinical Pharmacology Online

Gold Standard Multimedia, subscription information available at http://www.gsm.com/ . Provides information about prescription, over the counter, herbal, nutritional products, new and investigational drugs. Also contains drug photos and identification information. Drug interaction and adverse reaction reports can be created. Patient education handouts are available in English and Spanish.

Cn3D Structure Viewer

National Center for Biotechnology Information, http://www.ncbi.nlm.nih.gov/Structure/CN3D/cn3d.shtml , free viewer software used to visualize protein structures in three dimensions. Software is available for Mac, PC, and Unix.

Current Contents Connect

Thompson, ISI. Subscription information at http://www.isinet.com/products/cap/ccc/

Current Contents Connect (CC Connect®) is a multidisciplinary current awareness Web resource, providing access to complete bibliographic information of over 8,000 scholarly journals and more than 2,000 books.

Current Protocols Online

Wiley Interscience. Subscription information at http://www.interscience.wiley.com/c_p/index.htm

Online version of the loose-leaf Current Protocols series; presents step-by-step experimental methods. Available for bioinformatics, cell biology, cytometry, human genetics, immunology, MRI, molecular biology, neuroscience, nucleic acid chemistry, pharmacology, protein science and toxicology.

Dialog's Grants Database

Thompson / Dialog subscription information at http://www.dialog.com/

Provides information on over 8000 grants offered by federal, state and local governments; commercial organizations; associations and private and community foundations.

EndNote

ISI Research Soft, purchase information available at http://www.endnote.com/

This is a bibliographic database that allows users to organize references in a database, search bibliographic Internet databases, and assist in citing publication and the production of a bibliography.

Evidence Based Medicine Reviews

OVID, purchase information available at http://www.ovid.com This is a collection of databases (Cochrane Database of Systematic Reviews, The Database of Abstracts of Reviews of Effectiveness (DARE), ACP Journal Club *Article Reviews*, and Definitive Controlled Trials).

GenBank (Entrez Nucleotides)

National Center for Biotechnology Information, http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Nucleotide , free database of nucleotide sequences. GenBank is actually just one of the databases available from the "Nucleotides" data domain; Entrez is the search interface.

Journal Citation Report Web

Thompson / ISI, purchase information available at http://www.isinet.com/products/evaltools/jcr/
It is unique resource for journal evaluation. Coverage is both multidisciplinary and international, and incorporates journals from over 3,000 publishers in 60 nations. There are two editions; science and social science.

Molecular Modeling Database

National Center for Biotechnology Information, http://www.ncbi.nlm.nih.gov/Structure/MMDB/mmdb.shtml , free database of three-dimensional protein structures. Searched via the Entrez search system, structures retrieved may be viewed using Cn3D (see above).

National Guideline Clearinghouse

National Guideline Clearinghouse

http://guidelines.gov/, free database of clinical practice guidelines. The database links to the full text of the guideline when it is available.

PsycInfo

American Psychological Association, purchase information available at http://www.psycinfo.com/library/index.cfm, This is a bibliographic database of the psychological literature from 1872 to the present. Coverage includes material published in English and more than 30 other languages.

PubMed

National Library of Medicine, http://www.pubmed.gov, free database access to MEDLINE, the world's largest biomedical database. Database coverage is from the mid 1950s. The database that is searched via the Entrez interface presently contains more than 14 million citations.

PubMed's Clinical Queries

National Library of Medicine, http://www.ncbi.nlm.nih.gov/entrez/query/static/clinical.html, free database of evidence based medicine citations. This database uses search filters to locate this specialty information from the MEDLINE database

PubMed's Journals Database

National Library of Medicine, http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=journals,

The Journals database can be searched using the journal title, MEDLINE abbreviation, NLM ID, ISO abbreviation, or ISSN. The database includes the journals in all Entrez databases, e.g., PubMed, Nucleotide, Protein.

PubMed's MeSH Database

National Library of Medicine, http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=mesh, free database of medical subject headings, the controlled vocabulary of MEDLINE.

Reference Manager

ISI Research Soft, purchase information available at http://www.refman.com/

This is a bibliographic database that allows users to organize references in a database, search bibliographic Internet databases, and assist in citing publication and the production of a bibliography.

Web of Science

Thompson / ISI, purchase information available at http://www.isinet.com/products/citation/wos/,

Provides access to the *Science Citation Expanded®*, *Social Sciences Citation Index®*, and *Arts & Humanities Citation Index®..*

Appendix A – Dental Resident Assignments

Assignment #1

1. It's raining and you don't want to come to the library. Is there another way you can activate your Gator One card? If so, how?

2. You're at a conference in Gary, Indiana and need to use the HSC Library's resources to show a colleague a full-text article. You have a computer with internet access. Which would be the best method of accessing the resources, Gatorlink or the EZProxy? Why?

3. You have the following citation from PubMed (Medline).

   Gorski JP, Marks SC Jr.

   Current concepts of the biology of tooth eruption.

   ***Crit Rev Oral Biol Med.* 1992;3(3):185-206.**

A. In the Basic Search screen of WebLuis, what search type would you use to determine if the library carries this journal?

B. Does the UFHSCL own the issue that this article is in?

Yes No

4. Which library tool can you use to find the two different sources where you could access the electronic version of the journal *Evidence-based Dentistry*? Name the sources.

5. If you had a citation for a Cochrane Systematic Review, where would you get the full-text of the review?

6. Search the SUS Union catalog for the *Journal of Dentistry for Children*. What library/libraries **currently** subscribe to it?

7. In which database will you find the <u>most</u> citations to the dental literature?

8. Where else can the copy card be used besides at the UFHSCL?

    a. Campus Credit Union ATM machine
    b. Sun Terrace Restaurants

c. All UF Libraries
d. All of the above

9. It's 1am and you just found the perfect reference for a presentation you'll be doing in a couple of weeks. The HSCL does not own the journal and you want to interlibrary loan it. Can you do it online? If so, where?

10. In Clinical Pharmacology 2000, under what "tab" can you find Drug Interactions?

Assignment #2

1. Name 2 advantages of controlled vocabulary.

2. Boolean Logic:

Fill in the correct Boolean term (AND, OR, NOT) for each of the following search strategies.

a. To find articles that must contain both terms.

tobacco _____ oral health

b. To find articles that contain either term.

tobacco _____ oral health

c. To find articles that include the first term, but exclude the second term.

tobacco _____ oral health

3. You want to find articles published by *Dr. Kenneth J. Anusavice*. In PubMed, how would you type in your search? How many citations did you find?

4. Run a search in PubMed for articles that contain the term *overbite* in their **titles**.

a. What did you type into the search box to find this?

b. I'm only looking for Review articles written in English – what tool can I use to quickly do this?

c. What is/are the title(s) of the English Review article(s) that you located on this topic?

5. What is the difference between the Abstract display and the Citation Display?

6. What display type would you use if you were downloading citations to a reference management software like End Note?

7. *True or False:* If I am looking at a citation in the Abstract display and I do not see an icon for the UF HSC Library that means we do not have a subscription to that journal.

8. Is there a place in PubMed where I can set aside only the citations that I am interested in? If so, what's it called?

Assignment #3

PubMed Tools

1. Use the Journal Browser to find the PubMed abbreviation for the following journals:

   A. *Annals of the Royal Australasian College of Dental Surgeons*

abbreviation :_____

B. *Practical Periodontics and Aesthetic Dentistry*
abbreviation :_____
C. *Dental Therapeutics Newsletter*

abbreviation :_____

2. In 1990, Dr. Timothy Wheeler was a co-author of a literature review about malocclusions in children. Use the Single Citation Matcher to find out what journal this was published in (journal abbreviation is sufficient).

PubMed Searching

3. **Select one** of the following queries to search in PubMed (please circle the one you choose):

   A. Review articles that discuss malnutrition as a cause of caries in children 6-12 years old.
   B. Articles published between 1998 and 2003 that discuss the use of antidepressants in the treatment of orofacial pain.
   C. Review articles that discuss thumb sucking as a cause of malocclusion. I would only like citations with abstracts.

4. **Circle** or **underline** the main concepts in the query you've selected above. Are there any synonyms for the main concepts that you can think of? If so, list them in the spaces below.

   _____ _____
   _____

   _____ _____
   _____

5. Using the **Mesh Database**, execute your search in PubMed. Write down the **MeSH heading(s)** that correspond with the main concepts in the following

table. Pay close attention to the subheadings. Do any of them help you refine your search? If so, write them down too. You may not need to use all of the blanks.

MeSH Term	**MeSH Term**	**MeSH Term**
_____ AND	_____ AND	_____
subheading:	subheading:	subheading:
_____	_____	_____

6. Use the **History** screen to combine your searches with the proper Boolean operator and then apply the **Limits** that are needed for your search.

7. Use the **Clipboard** to select and print only **3** records on your topic. If you only read English do not select articles in another language. When printing, use the **Citation format** so that the MeSH terms and abstract will print. **Circle** the MeSH terms which were instrumental in retrieving these articles. Also **print the History screen**, so we can see your search strategy.

If you do not do all of these things points will be taken off, so please follow the directions closely ☺.

Appendix B – Undergraduate Biophysical Chemistry Homework

For questions 1-3, please perform your searches and print out the search history, as well as any requested citations/records. On your search history, please highlight and label the correct searches.

1. Search PubMed for papers that report on "cancers caused by genetic mutations that disrupt the role of chaperonins in protein folding".

(Hint - you will need to do two searches - one using MeSH and the other to pick up the newest papers that do not yet have MeSH terms attached).

Print off the five best citations for each search. Print your search history and label the two searches "1A" and "1B"

2. Search PubMed for papers on the topic "advancements in magnetic resonance imaging (MRI) using optical pumping techniques (Xenon-129 or Helium-3 in particular)".

(Again you'll need to do two searches). Print off the 5 best papers for each search; print your search history and label the two searches "2A" and "2B".

3. Find the "best" nucleotide and "best" protein sequences for human leptin.

Print out your search history and the resultant records. Label the nucleotide search "3A" and the protein one "3B". How do we know these are the best sequences?

4. In "Structures", locate a protein structure of your choice.

Annotate one half of the molecule - change to ball and stick; add sidechains; and label every third amino acid with the one letter code. Export as a png file, and send as an e-mail attachment to Michele@library.health.ufl.edu.

5. In "Structures", find the structure for another of your favorite proteins.

Using the "structure neighbors" option (click on "Chain"), find a similar structure and view them superimposed on each other. Under "style" change the "coloring shortcuts" to "aligned" so you can easily distinguish one protein from the other. Export as a png file, and send as an e-mail attachment to Michele@library.health.ufl.edu.

Appendix C – Bioinformatics Homework for First-Year Medical Students

Please work in groups of four, and list all team members' names on the homework you turn in. For questions 1-2, print out your search history and highlight the correct search statements.

1. Mutations in the human BRCA1, BRCA2, and CHEK2 genes have been implicated in breast cancer.

   In the last few years, one study screened for BRCA1 and CHEK2 mutations in patients with breast and/or ovarian cancers. Use the MeSH Database in PubMed to find this paper (*hint, MeSH terms exist for only three of the four topics above*).

   In this study, did any of the women tested have the CHEK2 (1100delC) mutation? _____

   If you wanted to search for information specifically on the BRCA2 gene, what MeSH term would you use?
   _____

   If you were instead interested in the corresponding protein, what would be the appropriate MeSH term?
   _____

2. Search Entrez nucleotides to find the absolutely **best** non-contig sequence record (and only that record) available for the mouse leptin gene (LEP). *[Hint – perform the search using a complex Boolean strategy].*

What is the accession # for this best mouse leptin nucleotide sequence? _____ What is the chromosome location for this gene in the mouse? _____ The coding sequence begins and ends at which base positions? _____

3. Search for the human obesity gene OBS in Entrez Genes.

What is the official gene name for this gene? _____
What is the name of the protein that is encoded?
_____

What GO term is used to describe the "function" of the protein?
_____

What is the accession number of the best protein sequence link that could be retrieved from this Entrez Genes record?
_____

YES/NO - Is the human nucleotide sequence more definitively characterized than the nucleotide sequence for mouse that you found for question 2? What piece of information in the Entrez Genes record answers this question? _____

4. Warfarin is an anticoagulant with a narrow therapeutic range. Variability in patient response (efficacy/toxicity) is due to a number of factors, including genetic variation in the enzyme CYP2C9. CYP2C9 plays a key role in warfarin metabolism.

Use Entrez SNP to find records for variants in the CYP2C9 gene that have been mapped to a structure*. [Hint – take advantage of the limits*

screen and choose human, coding nonsynonymous, and record has structure.]

You should retrieve seven reference SNP records – what is the refSNP accession numbers for the first one? _____

Retrieve the first record. Which nucleotides have been observed at the SNP location? _____

What is the IUPAC code for such variation? _____

Now pull up the link to "3D Structure Mapping". Display the two common variant alleles – R144C and I359L on the protein structure map. Save as a png file and send as an e-mail attachment to Michele@library.health.ufl.edu.

5. Missense mutations in BRCT sequence repeats in the BRCA1 protein have

been implicated in breast cancer. A recent paper describes a Met-1775 → Arg-1775 amino acid substitution. The substituted amino acid has a sidechain that extrudes from the hydrophobic core of the protein, thus altering the protein surface. Locate this substitution on the 3D-structure of the BRCA1 protein (PDB no. 1N5O).

To do this, use the structure database to locate record 1N5O. View the 3D structure. Search on the pattern NRPTDQLEWMVQLCG .

The first R if this pattern is the location of the Met → Arg substitution. On the sequence window, highlight just that R.

Change the global style of the molecule so you can clearly see the sidechains and their hydrophobicity (add sidechains, change style of sidechains to ball and stick, and color sidechains for hydrophobicity; remove helix and strand objects, change color of protein backbone to user selected – black). Your highlighted sidechain should still be yellow; all the others will be colored in blue or red shades to illustrate their levels of hydrophobicity.

We can now annotate this residue. Go to annotate, create a new annotation record, change the label option to every amino acid, three

letter code, PDB numbering system. You have now labeled the amino acid that is substituted in the Met → Arg substitution. Save as a png file and send as an e-mail attachment to Michele@library.health.ufl.edu.

Appendix D - Stand-Alone Course Evaluation Survey

(created by Dwight Bennett, HSCL webmaster, Generated by EvalCGI v4.0.2 (SSL))

1. Class

2. Librarian's name

3. Date

Help us make these courses better for you. Please take a few minutes to fill out this evaluation.

4. The class covered the material as stated in the objectives.

Strongly Agree Agree Disagree Strongly Disagree

5. The class materials were clear and easy to understand.

Strongly Agree Agree Disagree Strongly Disagree

6. The course instructor seemed knowledgeable in the subject.

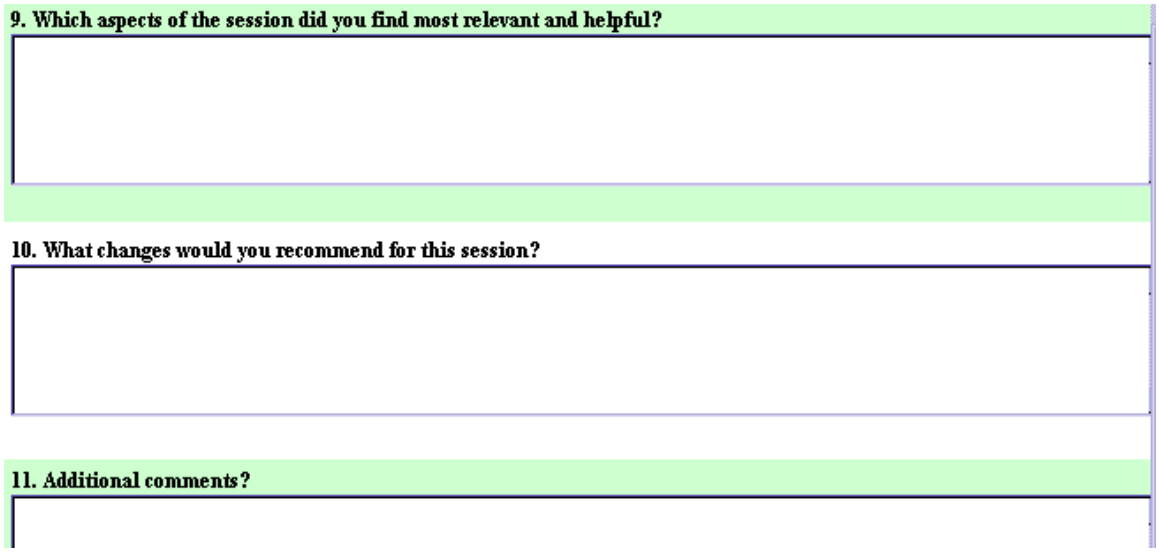
Strongly Agree Agree Disagree Strongly Disagree

7. This class met my expectations/needs.

Strongly Agree Agree Disagree Strongly Disagree

8. I would recommend this class to a colleague.

Strongly Agree Agree Disagree Strongly Disagree



Appendix E – 2002/2003 Class Attendee Survey

Dear Former Class Attendee,

Our records show that you completed an NCBI Info Hubs class October 2003, offered at the Health Science Center Libraries. In an effort to improve our services to you, we would appreciate you taking the time to complete our Library Class Attendee Survey, available at:

http://www.library.health.ufl.edu/amy/NCBI_info_hubs.html. Your responses will be forwarded ANONYMOUSLY to the HSC Libraries' server. The survey should take approximately 2-4 minutes to complete, and we will use your responses to evaluate the instructional program and subsequently improve library classes.

If the results of this research are published or presented at professional library or other meetings, your identity will not be disclosed at any time. None of the researchers involved in this study will benefit from your participation in this study.

Please complete the survey by **26 Mar 04**. If you have any questions about the survey, or the Libraries' instruction program in general, please contact Amy Buhler at Amyb@library.health.ufl.edu, or 352-846-2271.

Thank you!

The HSC Librarians

NCBI Info Hubs Class Attendee Survey

1. **Did you learn anything new in the NCBI Info Hubs class?** Yes ○ No ○
   If yes, please tell us what you learned.

   If no, please skip to question 3.

2. **Do you use the information that you learned in the class?** Yes ○ No ○

3. **What suggestions do you have for making this particular class more relevant or appealing?**

4. **Would you recommend this class to others?** Yes ○ No ○
   Why or why not?

Thank you for your time!

Submit

Appendix F – Education Coordinator Position Description

Position Title: Assistant Director Library Educational Services

Overview: The University of Florida Health Science Center Libraries seeks an Assistant Director for Library Educational Services to plan, manage, teach and evaluate within the library's education program. The ideal candidate will be a dynamic, forward-thinking master educator with a sincere love of teaching. An enthusiastic team of librarian instructors is ready for an individual who will elevate their program and skills to a model for United States libraries.

Responsibilities:

1. Administers and coordinates the library's education program

    - Facilitates the creation of a vision and defining goals for the education program
    - Leads a team of instructor librarians in the assessment, planning and evaluation of education programs
    - Provides and coordinates in-service training for library professional staff
    - Provides instruction in the use of educational technologies via traditional and non-traditional classes and designs and prepares instructional materials
    - Provides annual evaluations of each librarian instructor regarding teaching performance
    - Provides instructional classes for library patrons
    - Chairs the library Curriculum Committee
    - Works closely with team of library instructors to determine class schedules, organize publicity and maintain education statistics
    - Works closely with Marketing Coordinator to develop marketing strategies for education program
    - Keeps abreast of trends in adult education, bibliographic instruction and health education by reviewing the academic literature and through attendance at conferences

2. As a part of the team of instructor librarians:

    - Develops new information and computer literacy education programs and curricular materials, including online and print-based educational tools
    - Produces user guides and information pathfinders
    - Assists in library staff training

3. Performs liaison services to assigned departments in the Health Science Center
4. Serves on appropriate committees
5. Other duties as assigned

Required Qualifications:

1. Master's degree in Library and Information Science, Education, Instructional Design, or equivalent

2. 2-3 years experience in an academic institution or health science setting
3. Demonstrated teaching experience and ability to communicate with a variety of academic audiences
4. Instructional design skills and experience with technology applications in support of multiple education platforms
5. Computer and telecommunication skills, including proficiency with Internet and Web-based information tools, MS Office and basic HTML editors/ web-authoring tools
6. Excellent interpersonal, written and oral communication skills
7. Team player

Desired Qualifications

1. Experience in a library setting
2. Demonstrated ability or interest in leadership and team building
3. Experience collaborating with clinical and academic faculty in developing education programs
4. Demonstrated experience providing user education to distance learners

Table I – Stand-Alone Course Attendance, 2002/2003

	Times Offered	Total Attendees	Ave. Attendees
1. Alternative Medicine Resources	1	1	1
2. Biological Abstracts and BA/RRM	2	9	4.5
3. Basic Local Alignment Search Tool	1	9	9
4. CINAHL	1	7	7
5. Current Contents Connect	1	2	2
6. Drug Information Resources	1	3	3
7. E-journal Madness	5	45	9
8. Electronic Resources Survey	1	2	2
9. Grants Resources	4	18	4.5
10. IACUC Resources	1	28	28
11. Library Skills	1	3	3
12. Molecular Protocols/Model Organisms	1	10	10
13. NCBI Genome Resources	1	2	2

14. NCBI InfoHubs (incl. GenBank)	3	27	9
15. NCBI Structures	3	27	9
16. NCBI Survey Class	2	11	5.5
17. Public Health Resources	1	1	1
18. PubMed	9	74	8.22
19. PubMed: Beyond the Basics	1	14	14
20. Reference Manager I	1	11	11
21. Reference Manager II	1	14	14
22. Statistical Resources	2	16	8
Total 2002/2003:	**44**	**334**	**7.77**