



BOARD OF REGENTS

SUMMARY OF ITEM FOR ACTION, INFORMATION OR DISCUSSION

TOPIC: University of Maryland, College Park: Master of Science in Human-Computer Interaction

COMMITTEE: Education Policy

DATE OF COMMITTEE MEETING: June 18, 2010

SUMMARY: The proposed Master of Science in Human-Computer Interaction (HCI) offers advanced, systematic study of design, evaluation, and implementation of new information technologies that are understandable, usable, and appealing to a wide variety of people. Students develop a fundamental understanding of the technology design process, tool-building technologies, evaluation techniques, application areas for users, and the social impact of technology on the individual and community. The principal objective of the program is to prepare students to become HCI leaders in industry, government, education, and other sectors. In addition, for some students this program will also be a strong preparation for future Ph.D. work in a particular specialization of HCI.

While there exist undergraduate and graduate degrees in Information Systems at UMBC and at Towson University, and the master's program in Human-Centered Computing at UMBC shares some common ground with the program proposed here, the programs will differ in several important aspects. The proposed UMCP program will have a strong library science and information management perspective, while the UMBC program has an information systems perspective. The UMCP program will reflect the expertise of its iSchool faculty in technology-mediated social participation, social networks, technologies for children, information visualization, information retrieval, library and information science, electronic government and information policy. The UMBC program reflects the emphasis of its home department in artificial intelligence/knowledge management, database/data mining, decision-making support systems, software engineering/systems analysis and design, and e-commerce. In addition to these critical distinctions in program perspective and content, it is expected that the two programs will draw from geographically different areas of Maryland and adjoining states.

A recent article in *The Wall Street Journal* (D. Middleton, December 28, 2009) cites the Bureau of Labor Statistics' forecast that more than two million new technology-related jobs will be created by 2019, and describes the types of technology-related jobs that will be in highest demand. User-experience design is named as one of the most important emerging fields; jobs for graduates in this field include experienced specialists and product designers. The article also notes that individuals with a blend of knowledge and skills from a range of fields will be needed.

There was initial discussion of this proposal at the June 2, 2010 meeting of the Committee on Education Policy. At that time, the Committee asked that additional information be provided, with action deferred to June 18, 2010. The original proposal, along with the requested addenda, is attached.

ALTERNATIVE(S): The Regents may not approve the program or may request further information.

FISCAL IMPACT: No additional funding is necessary. The program will be supported through

tuition.

CHANCELLOR'S RECOMMENDATION: That the Committee on Education Policy recommend that the Board of Regents approve the proposal from the University of Maryland, College Park to offer the Master of Science in Human Computer Interaction.

COMMITTEE RECOMMENDATION:

DATE:

BOARD ACTION:

DATE:

SUBMITTED BY: Irwin Goldstein (301) 445-1992 irv@usmd.edu

UNIVERSITY SYSTEM OF MARYLAND INSTITUTION PROPOSAL FOR

- New Instructional Program
- Substantial Expansion/Major Modification
- Cooperative Degree Program

University of Maryland College Park
Institution Submitting Proposal

Human Computer Interaction
Title of Proposed Program

Master of Science
Degree to be Awarded

Fall 2010
Projected Implementation Date

Proposed HEGIS Code

11.0401
Proposed CIP Code

College of Information Studies
Department in which program will be located

Dean Jennifer Preece
Department Contact

(301) 405 2035
Contact Phone Number

preece@umd.edu
Contact E-Mail Address

Signature of President or Designee

April 30, 2010
Date

I. Mission

The Strategic Plan of the University of Maryland at College Park identifies its role as one to *“anticipate and prepare for opportunities that will enhance the State’s economic well-being and social and cultural vitality ten, twenty, and forty years from now”* and to *“create new opportunities...that will reinforce and support Maryland as a state renowned for economic innovation and prosperity and acclaimed for a strong, culturally rich, and vital social fabric.*

As the world grows increasingly more dependent upon new technologies, the need for designs that are easy to use and meaningful for diverse populations of users increases and becomes more urgent. Human-Computer Interaction (HCI), a new multidisciplinary field, has emerged to meet this need. This new field addresses the design, evaluation, and implementation of new technologies that are understandable, usable, and appealing to a wide variety of people. A recent article in *The Wall Street Journal* (D. Middleton, December 28, 2009) cites the Bureau of Labor Statistics’ forecast that more than two million new technology-related jobs will be created by 2019, and describes the types of technology-related jobs that will be in highest demand. User-experience design is named as one of the most important emerging fields; jobs for graduates in this field include experienced specialists and product designers. The article also notes that individuals with a blend of knowledge and skills from a range of fields will be needed.

The College of Information Studies (the iSchool) at the University of Maryland College Park (UMCP) proposes a Master of Science degree program in Human-Computer Interaction (HCI), to educate well-qualified individuals in the theory and practices of HCI, preparing HCI professionals who will become leaders in industry, government, education, and other sectors in this area. The proposed program will strongly support the University’s mission to *“...foster the education, critical thinking, and intellectual growth of its students, the creation and application of new knowledge, the economic development of the State, and the effective engagement of its students, faculty, and staff with the surrounding world.”* Leveraging existing University resources, the program is designed to be financially self-supporting.

II. Characteristics of the Proposed Program

A. Educational Objectives of the Program

The proposed HCI master’s program will support the needs of students who wish to build their understanding of technology, research and evaluation, design, user needs and preferences, and the social impact of technology. Drawing from a diverse set of instructional and research domains, students will develop skills in working with technology specialists on the one hand, and various types of technology users on the other.

While there exist undergraduate and graduate degrees in Information Systems at UMBC and at Towson University, and the Master’s program in Human-Centered Computing at UMBC shares some common ground with the program proposed here, the programs will differ in several important aspects. The proposed UMCP program will have a strong library science and information management perspective, while the UMBC program has an information systems perspective. The UMCP program will reflect the expertise of its iSchool faculty in technology-mediated social participation, social networks, technologies for children, information visualization, information retrieval, library and information science, electronic government and information policy. The UMBC program reflects the emphasis of its home department

(<http://www.is.umbc.edu/>) in artificial intelligence/knowledge management, database/data mining, decision-making support systems, software engineering/systems analysis and design, and e-commerce. In addition to these critical distinctions in program perspective and content, we expect that the two programs will draw from geographically different areas of Maryland and adjoining states.

B. Description of program as it would appear in the catalog

The iSchool's Master of Science in Human-Computer Interaction (HCI) offers advanced, systematic study of design, evaluation, and implementation of new information technologies that are understandable, usable, and appealing to a wide variety of people. Students develop a fundamental understanding of the technology design process, tool-building technologies, evaluation techniques, application areas for users, and the social impact of technology on the individual and community. The principal objective of the program is to prepare students to become HCI leaders in industry, government, education, and other sectors. In addition, for some students this program will also be a strong preparation for future Ph.D. work in a particular specialization of HCI.

C. General Requirements for the degree and total number of credits

The program requires successful completion of 30 academic credits with a B minimum grade point average, with four required elements: (a) core courses (9 credits), (b) elective courses (12 credits), (c) a full-time unpaid HCI internship (3 credits), and (d) capstone design project (non-thesis option) or thesis (6 credits). Electives may be selected from among iSchool courses or from others offered at the University, and will emphasize areas such as access to library systems, sociability and usability, HCI tool design, and policy study. The course progression is structured so that most students will complete the program within a two-year period. Students will also be encouraged to attend monthly HCI research seminars in which faculty, staff, students, and HCI practitioners from industry and government present their work.

D. List of courses by title and number

Required Courses (9 credits)

- LBSC 795 Principles of Human-Computer Communication (3)
- LBSC XXX Human-Computer Interaction Design Methods (3) (new course)
- Research Methods Course (3): one of two courses
 - LBSC 701 Research Methods in Library and Information Studies
 - LBSC 802 Seminar in Research Methods and Data Analysis

Elective courses (12 credits, 4 courses)

- INFM 600 Information Environments
- INFM 605 Users and Use Context
- INFM 702 User Interaction with Information Systems
- INFM 706 Project Management
- INFM 741 Social Computing Technologies and Applications
- LBSC 625 Information Policy
- LBSC 698 Children's Information Technology and Policy
- LBSC 708I Information Ethics

- LBSC 708P Communities of Practice
- LBSC XXX Technology Design: Social, Cognitive, and Developmental Psychology, and Motivational Implications (new course)
- LBSC 622 Information and Universal Usability

With approval of the faculty advisor, a student may select an elective course from other courses offered at the University, or from existing seminar courses, depending on the focus of the seminar.

Other Required Courses

- LBSC XXX Internship (3) (new course)
Students must complete an unpaid internship in industry, government, or an educational institution working on a problem in Human-Computer Interaction. A student with HCI work experience may petition the Master's Committee for a waiver of the internship requirement. A student receiving a waiver will be required to take an additional elective course.
- LBSC 799 Master's Thesis Research (6) **OR**
- (non-thesis option) LBSC XXX Capstone Design Project (6) (new course) *Design project in HCI. Description and defense of the design project in a scholarly paper and oral presentation are required.*

E. Expected Student Learning Outcomes

- A. Students will be able to demonstrate fundamental knowledge of core aspects of HCI: technology design process, tool-building technologies, evaluation techniques, application areas for users, information and visual design, and the social impact of technology on the individual and community.
- B. Students will be able to conceptualize, design, and execute a technology design or evaluation project.
- C. Students will be able to communicate the results of their work in written and oral presentations.

Learning Outcome A will be assessed in the three required core courses. A series of assignments that require application of fundamental knowledge in each of the six core aspects will be distributed among the three core courses. Assessment of this Learning Outcome will be done on the compiled results. Learning Outcomes B and C will be assessed upon completion of the thesis or capstone design project (non-thesis option). Learning Outcome B will be assessed through examination of the quality and completeness of the research or design project. Learning Outcome C will be assessed through evaluation of the effectiveness of the written document (thesis or capstone design project scholarly paper for the non-thesis option) and oral presentation.

F. Demonstrable quality of program faculty

The core courses will be taught by existing iSchool faculty who have diverse perspectives and experiences in HCI. The iSchool faculty includes individuals whose graduate education was in electrical engineering, history, library science, management, instructional design, instructional technology, information systems, linguistics, and computer science. Many of the faculty

members' research is in HCI or closely related areas. The program also includes support for one additional faculty member in Year 2 and a second new member added in Year 3. Resources for teaching sections of the capstone design project are included in the estimate of teaching responsibilities and required resources. It is anticipated that at least half of the students will select the non-thesis option.

G. Student audience to be served by program and faculty

The principal objective of the program is to prepare students to become HCI leaders in industry, government, education, and other sectors. In addition, for some students this program will also be a strong preparation for future Ph.D. work in a particular specialization of HCI. New students will be admitted in the Fall term through the procedures and in accordance with the requirements of the UM Graduate School and the iSchool. Because the proposed Master's program emphasizes professional preparation in HCI, an excellent admissions portfolio will be expected, consisting of a resume, personal statement addressing the role of graduate study in HCI to the applicant's career plans, and response to a question that requires the applicant to reflect upon an HCI problem. The applicant should have some experience with programming, such as a recently completed course, a job that required programming, or a special project accomplished for personal enjoyment. The expected enrollment is 20 students in the first year and 60 students per year when the program is at full capacity.

H. Impact on the student's technology fluency

Students will develop a fundamental understanding of the technology design process, tool-building technologies, evaluation techniques, application areas for users, and the social impact of technology on the individual and community.

I. Library requirements

The President assures that institutional library resources meet new program needs.

J. Facilities and equipment

The President assures that institutional facilities meet new program needs. The iSchool hosts within its facilities in Hornbake Building and jointly administers the Human-Computer Interaction Laboratory (HCIL), an internationally known research center.

III. Finance

Resources and Expenditures

See attached tables.

TABLE 1: RESOURCES

| Resources Categories | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---------------|--------------|--------------|---------------|---------------|
| 1. Reallocated Funds ¹ | \$24,039 | \$6,755 | \$10,897 | \$18,964 | \$12,287 |
| 2. Tuition/Fee Revenue ² (c+g below) | \$189,976 | \$493,937 | \$616,433 | \$641,090 | \$666,734 |
| a. #F.T Students | 0 | 0 | 0 | 0 | 0 |
| b. Annual Tuition/FeeRate | | | | | |
| c. Annual Full Time Revenue (a x b) | | | | | |
| d. # Part Time Students | 20 | 50 | 60 | 60 | 60 |
| e. Credit Hour Rate | \$600/\$1,239 | \$624/\$1288 | \$649/\$1340 | \$675/\$1,393 | \$720/\$1,449 |
| f. Annual Credit Hours | 240 | 600 | 720 | 720 | 720 |
| g. Total Part Time Revenue (d x e x f) | \$189,976 | \$493,937 | \$616,433 | \$641,090 | \$666,734 |
| 3. Grants, Contracts, & Other External Sources ³ | \$0 | \$0 | \$0 | \$0 | \$0 |
| 4. Other Sources | \$54,000 | \$10,400 | \$12,979 | \$13,498 | \$14,173 |
| TOTAL (Add 1 - 4) | \$268,015 | \$511,092 | \$640,309 | \$673,552 | \$693,194 |

1: The reallocated funds indicated were negotiated between the iSchool and the Provost's office, in order to initiate the program. There is no significant impact on existing academic programs.

2: The program is designed for part-time students, therefore all revenue from tuition and fees is shown as generated by part-time students. Approval for the higher tuition rates and program fees will be sought as part of the FY 2012 budget process. The requested tuition rate is 20% higher than regular tuition for state residents and 15% higher for nonresidents. A program fee of \$100 per semester will also be charged.

TABLE 2: EXPENDITURES

| Expenditure Categories | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|------------------|------------------|------------------|------------------|------------------|
| 1. Total Faculty Expenses (b + c below) | \$32,295 | \$164,365 | \$217,307 | \$261,317 | \$275,219 |
| a. # FTE | 1.00 | 2.20 | 2.40 | 2.60 | 2.60 |
| b. Total Salary | \$30,000 | \$130,000 | \$170,000 | \$210,000 | \$221,000 |
| c. Total Benefits | \$2,295 | \$34,365 | \$47,307 | \$51,317 | \$54,219 |
| 2. Total Administrative Staff Expenses (b + c below) | \$21,760 | \$107,520 | \$175,817 | \$182,854 | \$190,168 |
| a. # FTE | 0.50 | 2.00 | 3.00 | 3.00 | 3.00 |
| b. Total Salary | \$17,000 | \$84,000 | \$137,360 | \$142,854 | \$148,569 |
| c. Total Benefits | \$4,760 | \$23,520 | \$38,457 | \$39,999 | \$41,599 |
| 3. Total Support Staff Expenses (b + c below) | \$88,960 | \$130,944 | \$136,184 | \$141,632 | \$147,297 |
| a. # FTE | 1.35 | 2.35 | 2.35 | 2.35 | 2.35 |
| b. Total Salary | \$69,500 | \$102,300 | \$106,394 | \$110,650 | \$115,076 |
| c. Total Benefits | \$19,460 | \$28,644 | \$29,790 | \$30,982 | \$32,221 |
| 4. Equipment | \$35,000 | \$47,500 | \$47,500 | \$30,000 | \$25,000 |
| 5. Library | | | | | |
| 6. New or Renovated Space | \$47,500 | \$10,000 | | | |
| 7. Other Expenses | \$42,500 | \$50,763 | \$63,500 | \$57,750 | \$55,510 |
| TOTAL (Add 1 - 7) | \$268,015 | \$511,092 | \$640,309 | \$673,552 | \$693,194 |



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OFFICE OF THE SENIOR VICE PRESIDENT FOR
ACADEMIC AFFAIRS AND PROVOST

June 8, 2010

Dr. Patricia Florestano, Chair
Education Policy Committee
Board of Regents
University System of Maryland
3300 Metzert Road
Adelphi, MD 20783

Dear Regent Florestano:

As requested, I am pleased to provide the enclosed information related to our proposal for a new Master's degree in Human Computer Interaction.

Appendix A identifies the relevant job market for graduates of the program and reiterates the projected enrollments that were indicated in the proposal.

Appendix B includes a comparison of the proposed program with the most closely related programs at other USM institutions and some of our national peers. In preparing this document, we identified a program at the University of Baltimore which is similar in title, although different in content and focus, so we have included it in our descriptions.

Appendix C includes full descriptions of the courses included in the program, taken from the UMCP Graduate Catalog.

We appreciate the opportunity to provide you with this additional information for further consideration of our program.

Yours sincerely,

Nariman Farvardin
Senior Vice President for Academic Affairs
and Provost

NF:ejb

cc: Irwin Goldstein, Senior Vice Chancellor for Academic Affairs
Theresa Hollander, Associate Vice Chancellor for Academic Affairs
Jennifer Preece, Dean, College of Information Studies

Enclosure

Appendix A: Regional and Statewide Career Options for graduates of the program

The need for skilled information technology professionals continues to grow in an economy fueled by the growth of the Internet. For example *Usability Experience Specialists*, who through observation of users, analysis and iterative prototyping, ensure products and software are pleasurable to use, was named as one of the best careers in 2009 by US News and World Report (2008). The need for specialists in human computer interaction has become a national concern as well: organizations such as National Geographic, the National Park Service, and others have recently come to realize that they need people with this expertise, particularly in web design. Many of these organizations already have a strong relationship with the UMCP's College of Information Studies

While the Baltimore area is served to some extent by the program at UMBC, and to a lesser extent by other University System of Maryland universities, there are currently few options in the Washington DC area for this type of training. Students can consider a psychology-oriented Masters degree in Human Factors at George Mason University or a Graduate Certificate in HCI at Virginia Tech, and Penn State has an HCI track in its Ph.D. program, but no Masters in HCI. Regionally and nationally, Carnegie Mellon University and Georgia Institute of Technology offer Masters degrees in HCI, which are a blended mix of computing, psychology and design/digital media courses. The University of Michigan has an HCI Concentration in its School of Information, and the University of Washington's iSchool, Computer Science, and Engineering programs are currently in the development stages of a Master's program in HCI which is more technically oriented. However, none of these programs offer courses in information policy, and few consider the social implications of new technologies for diverse user populations. Both of these areas are critical to support not just industry and non-profit job opportunities, but the many government agency jobs in this Washington DC region.

"Usability Experience Specialist" is one of several professional titles given to specialists in human-computer interaction. Our HCI graduates will be qualified for a range of industry and government work force needs such as technical project managers, technology evaluators, interaction designers, and user interface developers. Through a combination of course work, internship experience, and a final capstone or thesis project, our proposed HCI Masters program will train students for these positions, but also train them for leadership in industry or government. With our particular focus on information policy and social issues, students will be able to help their organizations understand privacy concerns and legal issues that could impact the design of many online technologies. In addition, an understanding of broadband access issues and universal usability will help to shape new technologies for diverse populations.

Even in the current economic climate, the job market for those with an advanced degree in human computer interaction or related fields is strong in Maryland and the surrounding region. A search for interaction designer jobs in Washington, DC, on June 2, 2010, yielded approximately 170 advertisements on Indeed.com (www.indeed.com), a search engine for jobs posted on thousands of company career sites and job boards. Examples are as follows:

- | | | |
|--------------------------------------|-----------------------------|----------------|
| • UI/UX Designer | SRA International | Columbia, MD |
| • Senior User Experience Designer | Camber Corporation | Ft. Meade, MD |
| • Interaction Designer | Computercraft | Bethesda, MD |
| • Interface Designer/HTML Specialist | Energy Enterprise Solutions | Germantown, MD |
| • User Interface Designer/Developer | Mitre Corporation | McLean, VA |
| • User Interface Designer | Computech | Washington, DC |

Also on June 2, 2010, Monster.com (www.monster.com), a database of diverse job postings, had ads for these positions. Knowledge of the principles of human-computer interaction is the basic qualification for each of these jobs which typically carry salaries in the range of \$70,000 to \$90,000:

- | | |
|----------------------------|--------------|
| • User experience designer | 13 job ads |
| • UI designer | 46 job ads |
| • UX designer | 30 job ads |
| • Interactive designer | 50 job ads |
| • Information architect | 85 job ads |
| • User interface designer | 1803 job ads |

- Online user experience designer 3120 job ads

Companies represented among this sample from Monster.com include local employers such as CyberCoders (Columbia, MD), Clarity Consulting (Alexandria, VA), MKGCS (McLean, VA), Boeing (Annapolis Junction, MD), CQ-Roll Call Group (Washington, DC), The Advisory Board Company (Washington, DC), Cogent Communications (Washington, DC), and employers in other locations such as Amazon (Seattle, WA), Modis, Inc. (Cary, NC and New York), and Johnson Controls (Milwaukee, WI).

Broad industry needs in this area include user needs assessment, evaluation of new technologies, and participatory design. Recently, in response to the question of what the University of Maryland can do to make our graduates more attractive, representatives of Google responded that their greatest current need is for the ability to design, develop and perform HCI experiments.

Student Interest, Background, and Undergraduate Experience

Student demand for an HCI program of study at UMCP is high. Because of our national reputation for research in HCI, for more than two decades prospective students have contacted faculty associated with the Human-Computer Interaction Lab (HCIL) asking about graduate degree program opportunities. Currently we receive inquiries about once per week asking for such a program. Prospective students come from extraordinarily diverse backgrounds. For example, students that graduate with BA or BS degrees from UMCP and other institutions in sociology, music, design, cognitive psychology, and the humanities have expressed interest. In addition we also receive inquiries from international students, particularly from India, China and Europe. While these students are diverse in their experiences, they share a common interest in HCI and how it can help them with the design of new technologies for people to use. Each of these students is what one might call a “non-traditional” student†, not easily accommodated in traditional computer science, psychology, information studies, or education departments. Each is a student that the UMCP currently has difficulty serving. For many years we have offered courses within our Master of Library Science and Master of Information Management programs, that provide some background in HCI, but increasingly we are asked for a full HCI Master’s degree program. In addition we regularly receive inquiries from practitioners working in the many information institutions (e.g., Discovery Channel, National Geographic etc.) who wish to upgrade their qualifications in web usability and interaction design. Typically these are people who qualified before the Internet and the Web became so prominent. We note that two of the most prominent textbooks in HCI are coauthored by faculty members associated with the UMCP’s iSchool and this too is an attraction for students who want a Masters In HCI.

Enrollment Projections

As indicated in the proposal, we anticipate an enrollment of 20 students in the first year of the program, with 25-30 additional students in Year 2. From the third year forward, we expect 30 new students to matriculate each year with a total steady-state enrollment of 60 students. The size of this program is quite similar to those at our peer institutions. We anticipate the enrollment to be a mix of part-time and full-time students and have budgeted accordingly.

Short definitions of the jobs listed above

- **User experience designer:** concerned with how a user conducts a task and specifies the design of new technologies to meet this need. Typically will also be responsible for evaluation of these technologies
- **Online user experience designer:** concerned with creating and evaluating new technologies that make use of the Internet

† In this context, the term “non-traditional” refers to the fact that there is no single undergraduate degree that would be the direct feeder to the MS. This program is more likely to attract students who find their interests between two traditional disciplines rather than those who are directly aligned with a more typical career path for their particular field. For example, psychology majors who are interested in how humans interact with technology, rather than psychology majors who want to pursue an advanced degree in psychology. Computer science majors who are interested in the human usability of technology rather than those who want to pursue straight computer science or software engineering.

- **UX designer:** short for "user experience" designer -- see above
- **User interface designer:** concerned with specifying and evaluating the technologies with which the user will come in contact
- **UI designer:** short for "user interface" designer -- see above
- **Interactive designer:** concerned with how people carry out the actions of a task and how this can translate to the development, and use of new technologies
- **Interaction designer:** similar to interactive designer
- **Information architect:** the person who specifies the structure of the content that may be accessed with a new technology.
- **Web Master:** a person who has responsibility for designing, updating and managing websites.
Usability specialist: a person focuses on the design and evaluation of usability (i.e., ease of use and user satisfaction) of interactive systems

Appendix B: Related Programs in the University of Maryland System

Below is a summary of the programs and courses related to Human-Computer Interaction in five member institutions of USM. The summaries include specializations and differentiate among the various offerings. Also included is a comparison of outcomes and target audiences for comparable programs among some of our national peer institutions.

University of Maryland, College Park. M.S. in Human-Computer Interaction (proposed)

The proposed program will be offered by the College of Information Studies, the iSchool, and will be built upon the expertise of its faculty in technology-mediated social participation, social networks, technologies for children, information retrieval, library and information studies, electronic government, use of mobile technologies, participatory intergenerational design, and information policy. The program is 30 credit hours and includes an unpaid internship; there is both a thesis option and a project-based non-thesis option. Core elements of the program are technology design, tool-building technologies, evaluation techniques, user applications areas, and the social impact of technology on individuals and communities. Elective areas include but are not limited to information policy and ethics, usability by children, usability by older adults, electronic government, technology for teaching and learning, communities of practice, social computing, and management of technology projects. The proposed program will be enhanced considerably by its proximity to the internationally known Human-Computer Interaction Lab (HCIL) that has existed for over 27 years; many of the faculty who will teach in the proposed program are affiliated with the HCIL, which is sponsored by the iSchool and the University of Maryland Institute for Advanced Computer Studies (UMIACS). Faculty from the Center for Information Policy and Electronic Government, and the Center for the Advanced Study of Community and Information will also contribute strongly to this program.

University of Maryland, Baltimore County, M.S. in Human-Centered Computing

This degree program is offered through the College of Engineering and Information Technology, Department of Information Systems. Students study the design, implementation, and evaluation of information technologies to transform data into information and knowledge that is useful for individuals and organizations. Research concentrations include human-centered computing, artificial intelligence, database/data mining, decision making support systems, software engineering/systems analysis design, and others. The program is 30 credit hours with thesis and non-thesis options and is built upon the department's strengths in the design, implementation, and evaluation of highly-usable interactive systems, emphasizing the computer systems perspective. It incorporates coursework from the Visual Arts Department. Core courses include fundamentals of human-centered computing, structured systems analysis, and graphical design. Elective courses include electronic commerce, information systems, information visualization, computer-supported cooperative work, project management, human-computer interaction, and online communities. (www.is.umbc.edu accessed June 3, 2010)

Towson State University

The Fischer College of Science and Mathematics offers master's degree program in Applied Information Technology to prepare graduates to work as software developers, web developers, computer security analysts and e-commerce analysts. The program is a non-thesis 33 credit hour program, targeted towards working IT professionals who wish further credentialing. Areas of focus include Database Management Systems, Information Security and Assurance, Information Systems Management, Internet Application Development, Networking Technologies, and Software Engineering. The College offers one course in Human-Computer Interaction; it appears on the website as follows: COSC 605 HUM FACT/COMP-INT (no course description was given). (www.towson.edu accessed June 3, 2010)

University of Baltimore, M.S. in Interaction Design and Information Architecture

This program emphasizes interactive publications, digital media, virtual worlds, genres, and production of multimedia and is a program in digital humanities rather than human-computer interaction. However, it is included in this summary because of the slight similarity in title to programs in human-computer interaction. The degree program is offered through the School of Information Arts and Technologies and is a 36 credit hour program, with 30 credits of coursework and 6 credits of either a thesis or project. The program combines aspects of computer science

with liberal arts and blends theory with practical application. Students learn to design and develop information technologies to satisfy human needs and desires. There are four focus areas Technical, Arts and Culture, Cognitive and Ethnographic, and Management and Entrepreneurship. (www.ubalt.edu accessed June 3, 2010)

Frostburg State University

According to its website (www.frostburg.edu accessed June 3, 2010), Frostburg State University offers one undergraduate course in human-computer interaction:

ITEC 312 Human-Computer Interaction. Basic concepts of human-computer interaction, human factors, performance analysis, cognitive processing, usability studies, human-centered software, accessibility, emerging technologies, developing effective interfaces.

Comparison of Learning Outcomes in Programs Nationally

There are a number of HCI programs at peer institutions locally and nationally that the UMCP proposed program could be compared to based on their learning outcomes. The proposed UMCP HCI Masters mostly closely resembles the Michigan concentration. Both are hosted in iSchools with a strong history of library science. However, the geographical location of UMCP provides a stronger basis for focusing on the needs of policy, library and information organizations, NGOs and non-profit think-tanks.

| School | HCI Offering | Unique Learning Outcomes | Job Opportunities |
|--------------------------|---|---|---|
| UMCP | Proposed HCI Masters degree | Information policy, social aspects of computing, lab and outside internship experience. Some students are expected to move on to Ph.D. program in the iSchool | Government sector jobs, industry that supports government, library and information institutions, NGOs and non-profit think-tanks, research jobs |
| UMBC | Masters in Human-Centered Computing (HCC) | Information Systems, tool-building, evaluation | More technical industry jobs, particularly in computing companies. |
| George Mason University | Masters in Human Factors | Evaluation with psychology emphasis | Jobs with a focus on user evaluation |
| Virginia Tech | Graduate Certificate in HCI | Computer Science emphasis | More technical industry jobs |
| Penn State | Only Ph.D. track | Only Ph.D. | Research jobs in companies and academia. |
| Carnegie Mellon | Masters in HCI | Interdisciplinary between computing, design, and psych, partnership with Portugal program, lab and outside internship experience | More design focused jobs in industry. Several go on to Ph.D. program at CMU. |
| Georgia Tech | Masters in HCI | Computer Science emphasis but with interdisciplinary, lab and outside internship experience | More technical jobs and interdisciplinary jobs, particularly in computing companies |
| University of Michigan | Concentration in Information Masters program | Information focus, but not strongly policy oriented | Non-profit, information-oriented jobs (e.g., libraries, archives, etc.) |
| University of Washington | Proposed HCI Master's Program in iSchool, engineering, and CS | Interdisciplinary but leaning on technical outcomes | More technical jobs and interdisciplinary jobs, particularly in Microsoft and Boeing |

Appendix C: Course Descriptions for the proposed M.S. in Human-Computer Interaction at U Maryland College Park

I. Required Courses (9 credits)

1) LBSC 795 Principles of Human-Computer Communication (3)

Prerequisite: permission of department and LBSC 790

Principles of human-human and machine-machine communication as a basis for models of human-computer communication. Issues related to input/output devices, conceptual models, levels of control, metaphor and personification, adaptability, and intentionality/extensionality.

2) LBSC XXX Human-Computer Interaction Design Methods (3) (new course)

Methods of user-centered design, including task analysis, low-tech prototyping, user interviews, usability testing, participatory design, and focus groups.

3) Research Methods Course (3)

Students will be required to take an advanced research methods class in qualitative methods, quantitative methods, or both. The course should be appropriate to the methodology to be used in the capstone design project (non-thesis option) or master's thesis. The iSchool offers two research methods courses:

- **LBSC 701 Research Methods in Library and Information Studies (3)**
- *Prerequisite: permission of department.*
- Techniques and strategies of research as applied to the definition, investigation, and evaluation of information problems.

or

- **LBSC 802 Seminar in Research Methods and Data Analysis (3)**
- *Prerequisites: permission of department; .Coursework in statistics and introduction to research methods.* Topics and issues in information studies research. Design and conduct of research project.

II. Elective courses (12 credits, 4 courses)

- **INFM 600: Information Environments (3)**
Role and function of information in organizations. Organizational environment and its influence on internal and external communication, organizational structure and management, organizational culture, information flow, organizational identity. Shared mental models and group decision making. Differences among types of organizations. Information policy.
- **INFM 605: Users and Use Context (3)**
Use of information by individuals. Nature of information. Information behavior and mental models. Characteristics of problems, task analysis, problem-solving and decision-making. Methods for determining information behavior and user needs. Information access. Information technology as a tool in information use.
- **INFM 702: User Interaction with Information Systems (3)**
Interactive user interfaces for information systems, including models of human information processing and decision making. techniques of usability evaluation.
- **INFM 706: Project Management (3)**
Prerequisite: INFM 600, INFM 603 and INFM 605; or permission of the instructor
Management of projects through planning and execution of lifecycle phases. Includes estimating costs, managing risks, scheduling, staff and resource allocation, team building, communication, tracking, control and other aspects of successful project completion.
- **INFM 741: Social Computing Technologies and Applications (3)**
Prerequisite: INFM603 and INFM605 or permission of instructor.
Tools and techniques for developing and configuring social computing applications. Theories and paradigms for

social computing. Strengths and limitations of different application styles and types. Evolution of applications as responses to social computing challenges. Information and organizational systems co-development.

- **LBSC 625: Information Policy (3)**

Prerequisite: permission of department.

Nature, structure, development, and application of information policy. Interactions of social objectives, stakeholders, technology, and other forces that shape policy decisions.

- **LBSC 698: Children's Information Technology and Policy (3)**

Repeatable to 6 credits if content differs. Formerly LBSC 708N.

Topics and issues in information technology and children.

- **LBSC 708: Special Topics in Information Studies**

Prerequisite: permission of department.

Repeatable with different topics, but no student may earn more than 9 credits under LBSC 708, nor more than a total of 12 credits in LBSC 708 and LBSC 709 combined.

- LBSC 708I Information Ethics
- LBSC 708P Communities of Practice

III. Other Required Courses

- **LBSC XXX Internship (3) (new course)**

Students must complete an unpaid internship in industry, government, or an educational institution working on a problem in Human-Computer Interaction. A student with HCI work experience may petition the Master's Committee for a waiver of the internship requirement. A student receiving a waiver will be required to take an additional elective course.

- **LBSC 799 Master's Thesis Research (6) OR**

- **(non-thesis option) LBSC XXX Capstone Design Project (6) (new course)**

Design project in HCI. Description and defense of the design project in a scholarly paper and oral presentation are required.