

School of Informatics at IUPUI

Cumulative Annual Report, 2001-2011

Indiana University President Myles Brand formed a task force in 1997 to examine the need for a major academic and research program in the emerging discipline of informatics. Members of the task force explored the evolution and impact of information science and information technology on business, the arts, and the sciences. Rapidly advancing techniques in computing and the increasing importance of the Internet persuaded the task force to recommend the establishment of a new School of Informatics to promote teaching, research and training in the following areas:

- developments in information science and technology
- distributed information processing
- computer and cognitive science
- social aspects of distributed information
- knowledge retrieval
- distributed teaching and learning
- information dissemination (Report of the Task Force on Informatics, 1998)

The IU School of Informatics was the first school of informatics in the United States. When it was founded in 2000, it was IU's first new school in 28 years. The campus broke ground on the building in which the School now resides in November 2001. Informatics occupied the new building in 2004. The School's growth since that time has been remarkable. The School has two major hubs of activity, one in Bloomington and one in Indianapolis. This report tracks the activity of the Indianapolis/IUPUI portion of the School in six topic areas over the first decade of its operation.

Teaching and Learning

Major Accomplishments:

Teaching activity began at the School in the fall of 2000, with 180 Media Arts and Science students. The School's academic offerings grew rapidly. B.S. degrees are now offered in Media Arts and Science (established 1999), Informatics (2000), and Health Information Administration (2002). There are also undergraduate certificates in Informatics (2000), Medical Coding (2005), and Human-Computer Interaction (2009). Students can pursue M.S. degrees in Media Arts and Science (1999), Bioinformatics (2001), Health Informatics (2003), and Human-Computer Interaction (2003) as well as a graduate certificate in Human-Computer Interaction (2009). In 2005, The School began offering a Ph.D. degree with specializations in Health Informatics, Bioinformatics and Human-Computer Interaction.

The School has discontinued programming when numbers did not justify continued operation: in particular, graduate programs in chemical informatics and laboratory informatics, a certificate in cancer registry, and an associate degree in Media Arts. The rapid growth that might be expected in a new School has leveled off. The existing programs are stable, even in a period of economic recession.

The School began with fewer than ten full time faculty and staff. There are now 31 full time faculty, seven part time (non-adjunct) faculty and 22 staff. Four new faculty and one staff are being recruited. Efforts have been made to reduce the number of split academic appointments that characterized the early years of the School. There has been clear success in hiring promising new tenure-track faculty.

Current Status

The fledgling class in 2000 was 180; in the fall of 2010, there were 597 undergraduate and 206 graduate students. A total of 78 undergraduate degrees and certificates were conferred in 2009-2010 plus 24 graduate degrees and certificates, including the first two Informatics PhDs. Undergraduate credit hours increased from 1,451 in 1999-2000 to 9,323 in 2009-2010. Graduate credit hours increased from 411 in 1999-2000 to 2156 in 2009-2010.

In 2009-2010, the School began a two-year initiative called the Council on Undergraduate Education. Guided by an executive steering committee, six committees involving all members of the faculty are meeting over the course of two years to (1) attract and support a better prepared and a more diverse student population (2) foster a culture of evidence-based decision-making to improve teaching quality and curriculum development (3) monitor, manage, and improve recruitment, retention, and graduation rates (4) develop a distance education plan that expands online course and program offerings (5) initiate or enhance undergraduate research, as well as international, service and experimental learning through the RISE initiative and (6) strengthen offerings in the undergraduate informatics B.S. program.

Plans for the Next Five Years

As the School continues to grow, it is able to bring more of its course offerings "in-house" while expanding its interdisciplinary research collaborations. The School has enrollment targets; two factors that may increase enrollment in the next five years are new health information technology credentials spurred by the American Recovery and Reinvestment Act and new international programs. The School's website is being updated constantly to provide more useful academic planning tools for both undergraduate and graduate students. It has implemented assessment of the Principles of Undergraduate Learning into all undergraduate courses. Student learning outcomes are outlined in the curriculum. Plans to provide multiple opportunities for students within the RISE initiative are being implemented as well as 5 year BS/MS programs to provide bridges to the graduate programs. Work has begun on the integration of the campus' Principles of Graduate Learning and planning for more global assessment of the professional and graduate programs.

Research, Scholarship and Creative Activity

Major Accomplishments

Informatics is applied computing that is used to solve increasingly complex problems in every knowledge domain. Computing tools are transforming most fields of endeavor; therefore, interdisciplinary research is essential. In 2001, the Informatics Research Institute (IRI) was formally approved by the Indiana University Board of Trustees. The IRI has provided a vehicle for organizing a response to grant challenges that require interdisciplinary teams of tenure-track and tenured researchers and talented research associates. The IRI provides individual researchers the additional infrastructure and support needed for complex information technology projects.

The School's first major grant was for \$1.2 million with the Ruth Lilly Health Education Center. That grant helped establish the centrality of health and life science research in the School. Bioinformatics and Health Informatics faculty members are actively involved in research with the IU Schools of Medicine and Nursing, the Center for Computational Biology and Bioinformatics, the Regenstrief Institute, other units and Schools within the IU system, as well as health care entities in the greater Indianapolis area. Human Computer Interaction and Media Arts and Science faculty are creating interfaces for health data applications and advancing understanding of cognition and health issues. Two Signature Centers, the Center for Systems Biology and Personalized Medicine and the Android Science Center, both began operation in 2008.

Current Status

The School has implemented a very comprehensive grant review and governance infrastructure to support faculty members engaged in research. It provides a full time grants specialist; weekly summaries of new RFPs; proposal review by seasoned researchers; statistical support as needed; and investigator travel to meet with program officers and collaborators in anticipation of grant submissions. It returns 10% return of ICR to PIs.

The School has also identified space to support graduate student research groups, in particular the User Simulation and Experience Research Lab (USER) Lab, which hosts the (1) Games for Improving Health (GIH) Research Center (2) Human-Centered Interaction Design (HID) Research Center and (3) the Visualization and Interactive Spaces (VIS) Research Center. The School also hosts the Media Arts Research & Learning Arcade (MARLA), a creative learning community for students interested in 2D and 3D game design, animation and game strategies. MARLA gives students access to a professional-level game studio; students work with faculty engaged in ongoing research, including the development of "serious games" for education, health care and energy conservation.

Plans for the Next Five Years

Plans for the next five years include (1) developing increasingly robust research themes (2) increasing the numbers and depth of research collaborations in keeping with the interdisciplinary nature of the School (3) identifying more funding for graduate students (4) fostering the careers of the several young and promising researchers who are working toward tenure and (5) continuing to hire top talent into tenure track positions.

Faculty will continue to receive encouragement and guidance in the process of publication and acquiring grant funding. An undergraduate class in research will be offered for the first time in the fall of 2011, which will provide a bridge to research opportunities in graduate labs.

Best Practices

Major Accomplishments

The School's best practices cluster around three major themes: providing great Student Services, great communication, and great technology for delivering its educational offerings.

The School's Student Services staff is notable for the numerous retention-specific initiatives, personalized advising, and targeted coaching it has provided for students over the past ten years. The School's disparate programs attract students with very different personal characteristics. Academic advisors and career advisors must have the flexibility and judgment to accommodate students interested in careers in advanced multimedia application to students interested in data-intensive careers such as bioinformatics. They must also attract and recruit the African-American and female students that are so seriously underrepresented in the computing fields.

Explaining the domain and characteristics of a new discipline requires good communication. The bar is high: the School of Informatics must utilize excellent information and communications technology to attract students who have high expectations of technology. In 2008, the School completely revised its website to employ engaging graphics and video, as well as underlying analytics, to help guide current students, future students, and parents who were likely to be unfamiliar with the field as they explored the School's offerings. It continues to invest in a variety of technology-driven tools to assist its students in planning their careers and completing their degrees.

The School also seeks to allow students access to up to date computing tools technology in the classroom as well as to support new forms of distance-accessible pedagogy. It acquired the foundation necessary to simulcast courses at both IUPUI and IUB and taught two classes via web only instruction in 2001-2002. In the fall of 2010, it hosted fourteen distance accessible course sections, working closely with the campus' Center for Teaching and Learning to incorporate new research on best practices in online teaching.

Current Status

The School's Student Services team provides highly personalized services to its undergraduate population, enabling retention rates between 83% and 90% over the past decade. The School retired a public relations position 18 months ago and hired a new communications manager with strong data and research skills. This has allowed for more targeted support for each degree program. Finally, it has instituted a laptop program, which will save \$244,000 over the next three years. It continues to strive to provide the most up-to-date classroom technology and distance education tools.

Plans for the Next Five Years

The School has selected comparator programs for each of its programs. The School's recorder position, part of Student Services, has recently been redesigned to support more data driven management. More effort will be made to engage students in the governance of the School. Work will go forward to continue to communicate the School's identity, to implement a social media strategy, and to create a stronger sense of community for students by blending the efforts of Student Services and Communications personnel. The School will continue to refine its distance accessible programming. Exposure to online environments is important because many students will work in virtual teams and virtual offices in their careers. Finally, plans are being made for a recognition program for excellence in research, tenure and non tenure track teaching, advising, and staff performance.

Campus Climate for Diversity

Major Accomplishments

The School of Informatics is committed to educating women and minorities who might not traditionally consider an education in computing and technology. In 2008-2009, only 11.2 percent of bachelor's graduates in computer science were women. The number of minority students graduating in computer science was 10.1 percent, a decline of 1.6 percent from the previous year. (Taulbee Report)

Of course, Informatics is not synonymous with computer science. Because of its applied nature, it may have somewhat greater opportunity to attract women and minorities. An internal survey of students in the program on the Indianapolis campus indicated that the third most common reason students cited for selecting the undergraduate major was "... *want(ing) to use technology to make a difference.*" This is clearly appealing to women and minorities. The presence of undergraduate and graduate HCI classes, which provide content on human-centered computing and cross-cultural communication, is also attractive to women and minorities.

Current Status

From its inception, the School's Student Service personnel have participated in a number of the IUPUI campus efforts to create a diverse educational climate. The School actively focuses on diversity issues in its themed learning communities. In 2009-2010, 64% of the student population was male; 36% was female, nearly the inverse of the IUPUI campus statistics (57% female and 43% male). The School has a greater percentage of women than might be expected because of the presence of the Health Information Administration program, which has traditionally been 93% female, and the Health Informatics program, in which women are represented at 53%.

In 2009-2010, 12.6% of undergraduate students and 7.8% of graduate students were African American; 3% of undergraduate students and 2% of graduate students were Hispanic; and 4.7% of undergraduate and 23.5% of graduate students were Asian. No other minority groups had significant representation.

Plans for the Next Five Years

System-wide, the School has adopted a goal of being a national example of how a broad, inclusive view of computing and IT can lead to more diverse participation by students and faculty. An incipient women's group is being nurtured. The School's Leadership Council is identifying ways in which faculty can receive recognition for participation in activities related to diversity. The (school-wide) Assistant Dean for Diversity and Education is promoting ways to create inclusive cultures in the classroom and targeting grant support for inclusive community activities. The School is also expanding service learning opportunities that help students design technology solutions for disadvantaged groups. The curriculum will help students explore cultural and societal belief systems about each of these groups.

The School has been successful in recruiting some female faculty (about one third are female). There is, however, a notable absence of African-American faculty. The School does have African-American and Hispanic staff members, but the numbers are not representative of the surrounding population in Indianapolis. All searches will be conducted with special attention to the lack of representation of African Americans and Hispanics in the computing fields.

Civic Engagement

Major Accomplishments

One of the first characteristics to emerge in the new School of Informatics was a commitment to the central Indiana community and its many non-profit agencies. Computing and multimedia expertise is a scarce community resource. Many nonprofit agencies have sought assistance from the School's faculty and students. Requests have ranged from the simplest web page to challenging projects utilizing new, relatively untested information technologies. A partial list of community partners over the years includes: the Ruth Lilly Health Education Center, the Children's Museum, the Little Red Door, the Eiteljorg Museum, the Health and Hospital Corporation, the Fine Arts Society of Indiana, Indiana State Museum, the Indiana Historical Society, Heartland Film Festival, the Indianapolis Humane Society, Indiana Humanities Council, and Indiana Chamber of Commerce, and the Renal Network of Indiana. There are literally dozens of others.

These partnerships and their resulting projects were largely accommodated in classroom settings, through capstones, internships, and, on occasion, through project teams in the Informatics Research Institute. Faculty members have also consulted on many projects, including activities at the Veterans Administration and the American Health Information Administration Association. They have also consulted with state leaders responding to the Obama administration's call for improved health information technology under the American Recovery and Reinvestment Act.

Current Status

During the past ten years, the School has taken an increasingly thoughtful approach to the way it responds to requests for assistance from the nonprofit community. Many nonprofits do not have a good understanding of their own technology needs. They may not know there are simple, low cost, or free solutions to some of their problems. The School assists agencies by helping them identify low cost resources whenever possible. If a more challenging request that would enhance student learning can be accommodated within a course and within a semester, the project may be referred to a student or student team, supervised by a faculty member. A request that involves applied research is reviewed by the Informatics Research Institute and accommodated if the necessary expertise is available and costs can be covered by available funding.

The School started its first formal service learning course in the fall of 2010. It incorporates ongoing partnerships with School on Wheels (homeless children), Volunteers of America (prisoners transitioning to work) and Indiana Organ Procurement Center (terminally ill patients and families donating organs). School resources are being made available to these agencies on an ongoing basis. At the start of each semester, these agencies are asked for technology "wish lists." Projects will be matched to students based on their existing expertise.

Plans for the Next Five Years

Service learning and civic engagement are a good "fit" for the Informatics curriculum. The core of the program incorporates the conscious creation of values of civic professionalism and social responsibility. Faculty members have and will continue to accommodate requests within the context of their classrooms, because the "real world" experience benefits students as well as community partners.

The need in the community far outstrips available resources. The service learning course will add two additional partners this year (the Indiana Historical Society and the IUSM medical program in Kenya). One of the more difficult judgments that may need to be made in the next five years is whether to continue to reach out to so many non-profits or to select a few partners and engage more deeply with each of them.

Collaboration

Major Accomplishments

There are three major types of collaboration in the School of Informatics: research, international teaching, and industrial collaborations. The School has many collaborative research partners including the Schools of Medicine, Nursing, Engineering, Science, the Regenstrief Institute, the VA Health Center and the Center for Computational Biology and Bioinformatics. The School organized an International Symposium on Biocomputing at the National Institute of Technology Calicut in 2010. A brochure featuring the research interests of Informatics faculty has been developed and disseminated to promote collaboration.

The School's educational collaborations include relationships with China, Greece, Mexico, and to a somewhat lesser extent, Kenya. The School's industrial collaborations range from internships for undergraduate students to partnerships that contribute to the state's economic development. Faculty members have collaborated on research projects funded by such companies as Lilly, Biomet, LabKey Software, Logical Semantics, Vectren, Dow Elanco, and My Health Care Manager. The School has regularly offered a class in IT-driven entrepreneurship, which connects students to successful IT entrepreneurs throughout the state.

Current Status

Research collaborations: One of the conclusions of the School's 2008 Self Study was "There are significant opportunities for internal and external collaboration that should be systematically fostered." In 2007-2008, Informatics faculty members were listed as collaborators on two proposals. By 2009-2010, the number of proposals submitted on which Informatics faculty were listed as collaborators had increased to 27.

Educational collaborations: The School is embarking on a joint degree program with the Sun Yat Sen School of Communication and Design in Guangzhou, China. An additional program with Sun Yat Sen's School of Information Management should be concluded in early 2011. The School's first international study abroad class took place during the summer in Paros, Greece. It will be followed by an additional service learning course in Guangzhou. A distance accessible course is in development with the Universidad Autonoma del Estado de Hidalgo (UAEH). The School had provided various kinds of assistance to Moi University in Kenya, but teaching collaborations have yet to solidify.

Industrial collaborations: The School also collaborates with industry through its internship program. The School implemented an online internship and employer software system in 2005. A total of 939 employers are currently registered with the system. Informatics students completed 402 internships with 225 different employers between fall 2000 and summer term 2010.

In 2009-2010, the IU Schools of Medicine and Informatics, along with the Regenstrief Institute, IURTC, Wishard Hospital, BioCrossroads, TechPoint, Clarian Health Ventures and other organizations, formed an unusually broad collaboration in health information technology. The School is also actively engaged with both Biocrossroads and Advancing Health and Life Science IT (ALHIT) to promote the state's health and life science efforts.

Plans for the Next Five Years

Increasing the numbers of interdisciplinary research collaborations will continue to be one of the School's foremost goals. School leadership will maintain its efforts to build the state's economy in the health and life science arena. Successfully implementing the Sun Yat Sen teaching collaboration will help students acquire the necessary international "mindset" needed for jobs in a global economy. Internships and industrial collaborations will be critical to the School's participation in the growth of an IT culture in the state and its contribution to economic development, locally and nationally.