Report on SIS Vision

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1. Introduction

In August of 2011, Dean Larsen charged the SIS Vision Committee with two tasks: (a) To review the various comments on the SIS Vision Blog and suggest pathways that the school can take going forward. In this effort, the Committee was supposed to identify the decision points and changes that the school needs to make if a particular pathway was adopted. (b) To suggest three signature areas of research that would be the focus of the school. These would also guide the hiring of up to three faculty positions in the coming academic year. This document can be used as a springboard for further discussion by the Dean in the activities related to the long-term vision of the school.

2. Review of the SIS Vision Blog

In this section we briefly summarize the various viewpoints based on the blog posts on the SIS Vision Blog. The SIS Vision Blog was set up in early May 2011 with a draft vision statement by Dean Ronald Larsen, which presented one vision of what an ideal iSchool at Pitt might look like five years from now. Dean Larsen encouraged the SIS faculty to contribute to the blog with their own vision statements. In addition to such vision statements, the blog also included comments and thoughts from SIS faculty on the visioning process and on the directions suggested in various posts. We classified the posts on the blog into four categories (a) a 48 credit unified Masters and a unified Ph.D. (b) a stronger undergraduate program (c) a return to the original departments and (d) a number of posts reflecting on the philosophy of the information discipline. The details of various proposals and comments by faculty are available in the document that contains the posts from the SIS Vision Blog.

3. Potential Pathways

3.1 Research Vs Teaching

One of the challenges facing the school is it being a professional school in a research university. There is a tension between quality research and core academic activities on the one side and teaching for professional degrees on the other side. As part of one of the top research universities, we believe the school has to move towards a research/academic model over the long term. As discussed in Section 3.2 below, one of the potential pathways to take will be to have research active faculty teaching the fundamental classes and classes with research oriented topics, while professors of practice or teaching faculty develop the curriculum and manage the professional courses and other professional aspects (field placement, internships, etc.) of the degree programs.

Several challenges exist in moving toward this model.

- The school has to build on its existing strengths in research and teaching as it moves forward. There is some, but not a large, leeway in shaping the

constitution of the school. As the school exists currently, there is a component resembling the Georgia Tech iSchool and a component resembling the Michigan iSchool. We believe this is a significant differentiator and an advantage to SIS enabling it to bring together a diverse set of research and academic capabilities. The challenge is to nurture this diversity while fostering collaboration across the components. Please refer to Section 4 for potential signature research areas for the school.

- As we emphasize the research/academic model, it is likely that as large as 25% of current student composition may be ill-suited for graduate education in the school. While currently it is possible for a very diverse set of students to find a place within the school, the increasing focus on moving the school forward would place constraints on the set of incoming students in the future. As one example, every graduate student may require a minimum GRE score to be admitted to SIS in the future.
- The current technical graduate programs have a student body that is heavily international in nature. It is likely that graduate student populations will be increasingly international in nature requiring changes in how the school designs and administers its Masters programs.

3.2 Degree Programs

As we develop a new vision for the school, it is useful to consider each degree path separately as the constituent student body, educational focus, and professional opportunities vary widely between the undergraduate, the masters/professional level, and the doctoral/research programs.

Undergraduate Program: The undergraduate program is a viable program with opportunities to expand, particularly in the networking and information systems areas. The faculty can be expanded by having more tenure-steam faculty teach at least partly in the BSIS program on a regular basis. However, the undergraduate program would prosper more by focusing on current and emerging trends in the industry. Thus, it would be preferable to have some professors of practice with industry experience in the non-tenure stream to expose students to the latest trends in application design, network management, enterprise IT operations, mobile application development etc. Additional staffing would be needed to manage any significant increase (say fifty or more) over the current enrollment.

Another possibility with the undergraduate programs is to facilitate *second-degree* applicants who have an undergraduate degree in some other field, but desire a degree in IS for professional reasons. It appears that there is a significant demand from such potential students. They would only require an additional 30 credits from Pitt assuming all of the other BSIS requirements are satisfied. One of the challenges with targeting such students is the need to teach core classes at nights or in an online format. The faculty must be willing to adjust their teaching schedules accordingly.

Another possibility is to explore post-BS certificates or dual degree options with other units on Pitt's campus. Many disciplines have a need to analyze, manage and

display sets of data. In particular, there may be opportunities with Business, Geology and Art to develop partnerships where Information Science courses augment a student's major. Recently, a professor from the Department of Slavic Languages and Literatures developed a course Computer Methods in the Humanities. This course is cross-listed between the departments.

Masters Programs: There has been discussion of replacing the current three 36-master's degrees with a single 48-credit unified master's degree. However, there was concern in the Committee that the single master's degree would not cater to the *professions* that the existing master's degree programs are designed for training students (e.g, librarianship, records management, systems analysis, network administrator). Concerns were also expressed about the mathematical and formal rigor that may have to be modified because of a unified Master's program. Furthermore, the ALA-approved MLIS and CNSS-certified MSIS/MST specialties in Information Security have strong restrictions that make merging the programs difficult. Proposals that merge the three existing degree programs, but leave the current specializations in place, do little to make a structural change in the school and, thus, a full-scale merger is not recommended at this time. For instance, while it is possible to require applicants to have prerequisites that satisfy various concentration requirements, this would create a situation very similar to the different degree programs. If the school were to offer these prerequisite courses, the teaching load may be further increased to bring all of the students to the same background level.

At the same time, it might be worth exploring the creation of a 36-credit Master's of Information, which draws on courses in the central core of the school, as a new degree. One could gauge the popularity for students and nature of job offers for such a degree, before removing existing programs, which have a proven track record. The Committee discussed having a new master's degree along the lines suggested by these proposals that would exist in addition to the existing masters programs. Challenges with this include the lack of clarity on where the responsibility of such a new degree program lies, who would design the curriculum, who would do the admissions, financial aid, graduation, etc. It may be appropriate for such an academic program to have faculty from both the current GIST and LIS programs. This could also make this Master's program an academic program rather than a professional program. This would however increase the administrative overhead in the school.

Yet another option is to create a degree program that would allow the combination of 9-12 credit modules developed around a wider number of pedagogical and research signature areas (e.g., security, library management, social computing, children & youth media, networking, geospatial analysis, etc.). Under this model, Master's students might enroll in an integrated set of core courses that set a foundation for theory and methods in the information sciences, professional practice, and technology skills (9-12 credits), and then assemble the remainder of their program by combining the requirements of 2-3 signature modules (9-12 credits required per module). This approach promotes a finer degree of

customization to students' professional interests, a higher incidence of common ground for communicating across discipline-specific areas (i.e., students may not construct identical programs, but the commonality of at least one module choice will be a bridge to share knowledge and promote interaction.), and potentially more flexibility to adjust modular offerings over time to represent the emerging needs and topics of the information fields. The primary challenge with this option is the varying backgrounds of students. This will necessitate establishing the pre-requisite structures for courses carefully and enforcing it accordingly.

Doctoral Programs: It was acknowledged by the Committee members, as well as many other faculty, that the Ph.D. degree requires research in a specific, focused topic. Doctoral coursework and examinations are tailored accordingly. As such, movement to a single a unified Ph.D. degree would not be beneficial at this time.

That said the three doctoral programs also differ significantly in the logistics, such as committee composition, credit requirements, and the nature of qualifying exams. It would be interesting to explore how to standardize the requirements across the school, while keeping the individual, apprentice nature of the degree programs intact.

It should also still be possible to increase research collaboration across faculty members in the school and encourage explorations that combine the strengths of the two or more programs in the school. One possibility (described in detail in one of the SIS vision blogs) is to look at a larger topic, which has focused sub-problems that span disciplines.

4. Signature Research Areas

As a final task, the Dean the asked the Committee to consider what might be new signature research areas for the school five years in the future. Rather than using a single term to characterize the signature research areas, we decided to use more words to indicate what exactly such a research area means to SIS. This will enable a greater degree of clarity as the same term may mean different things depending on the context and usage. Further, there are potential overlaps between the four research areas. In alphabetic order, the four research areas that we have identified are as follows:

1. **Big Data:** SIS is well-positioned to develop an active research program in big data due to its hooks into the following topics of research – data mining, data analysis, data curation and archiving of large-scale data sets, scalable metadata standards and strategies for finding and sharing of scientific knowledge, and new forms of records management that accompany the creation and storage of data at expanding scales, data management and distributed databases. The expectation is that a faculty member in this area could work with the analysis and management of large data sets, either publicly available or that has potential for being created at SIS so that other faculty members at SIS could collaborate with this person. Examples include protocol development and network management based on analysis of network data and analysis of socio-technical systems based on social networking data.

2. **Information Assurance:** In addition to existing research in security, such as access control, trust, and wireless network security, new areas of exploration, such as privacy and data provenance, would fall under this category. This signature area also supports existing school research and teaching in the areas of information policy and law, information ethics, & digital records management and preservation.
3. **Location Based Information:** This signature area would include mobile applications and data and geographical/spatial information as two major components. Research in mobile applications and data could span problems at the lower layers (spatio-temporal availability of spectrum, wireless networking) and higher layers (social aspects of mobile users and location based information, development of location-aware applications applied to a variety of settings: work, education, interactive references for children and youth on mobile devices, recreation, sociality, etc.).
4. **Web Science:** Broadly speaking, this area looks at the World Wide Web itself as an object of scientific study. Visualization and other new expressions of scholarly knowledge, human-computer interface design, mapping and understanding the social web, and modeling and designing adaptive systems fall into this category. The currently ongoing SIS activities in cyberinfrastructure and cyberscholarship, would fit in this signature research area.

As mentioned above, it is likely that there will be overlaps between these four research areas. For example, visualization and human interfaces have overlaps with mobile devices. Analysis of spatial information has overlap with big data. Privacy has overlap with location based information, etc. Further, these signature areas also have the potential to create bridges to other schools and departments at the University of Pittsburgh. Some examples are as follows:

1. The World Historical Dataverse project (http://www.dataverse.pitt.edu/) headed by Pat Manning of the Pitt History Department, and the AstroShelf/DEEP3/AEGIS projects with the department of Astrophysics (http://www.eurekalert.org/pub_releases/2011-06/uop-prt062811.php) deal with big data. The Katz business school is likely to have an interest in big data in organizations.
2. Research in the Geology department and UCSUR can have overlaps with location- based information.
3. Security already has links with Computer Science, GSPIA, and Electrical Engineering.
4. Web Science could create links with LRDC, the Pittsburgh Supercomputing Center, DM@P (Digital Media @ Pitt), the intelligent systems program and the department of biomedical informatics.