The Maryland Modular Method: An Approach to Doctoral Education in Information Studies

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Abstract

As the field of information studies has matured into a broad interdisciplinary and multi-disciplinary field of study, the expectations for and range of students seeking doctoral education have evolved significantly. However, the majority of information studies pedagogical literature continues to focus on the master's level. Building upon efforts of the College of Information Studies at the University of Maryland to develop a new doctoral program, this paper presents a modular approach to doctoral education. We argue for the value of designing doctoral education models that embrace the unique interdisciplinary and multi-disciplinary nature of information studies, highlighting a combination of conceptual lenses and content modules as one way to conceive new approaches to doctoral education that foster students' ability to research in their own areas of interest while simultaneously learning about the array of topics that can be explored in information studies. While the Maryland experience is presented as a case study, the potential relevance of this approach to doctoral education in other information studies programs is discussed in detail.

Key words: doctoral education, information studies, modules, lenses, integrative paper, program development

1. Introduction

The range of schools offering doctoral degrees related to information studies is diverse, ranging from programs emphasizing a particular area, such as library and information science, to programs that offer a very wide range of specializations drawing from disciplines such as library science, computer science, education, humanities, psychology, social science, engineering, media studies, journalism, communication, and public policy. They are unified, however, by the

mission to study information and provide education about information. Given the breadth of roles of information in society, all of these information studies programs are interdisciplinary and multi-disciplinary, indicating the need for the development of new approaches to doctoral education to fit the roles and expectations of such broad areas of study. And, given the range of names used by programs that provide doctoral degrees related to information, this paper refers to the field as information studies in an attempt to be inclusive of all of the different approaches to information education.

In 2004, when the College of Information Studies at the University of Maryland began re-examining its doctoral program, there were very few resources in the scholarly literature to support this re-imagining of the doctoral program. A small number of papers have described the evolution of an doctoral program as a result of department restructuring (e.g., Mokros, 2008), explored whether there existed unifying doctoral cores or perspectives (e.g., Pettigrew & Durrance, 2000; Powell, 1995), and charted the scope of the pedagogy and the backgrounds of the faculty members teaching in doctoral programs (Dillon & Norris, 2005; Weech & Pluzhenskaia, 2005). However, the majority of scholarly literature in information studies that focuses on program building and implementation relates to the master's level.

The end result of this process of revising the doctoral program at Maryland – what we have dubbed the *Maryland Modular Method* – has shown great potential in the first two years of its usage as the heart of our new doctoral program. This paper describes the modular approach Maryland has taken to doctoral education and presents how this program approach may connect to other pedagogical approaches and theoretical frameworks, examining the implications of and lessons from the efforts at Maryland for doctoral programs in information studies. While our program certainly can have application in other programs in information studies, this Maryland approach is presented as a case study, one of many potential approaches to the creation and implementation of a doctoral education program in information studies..

2. Lenses for Information Studies Doctoral Education

Doctoral education across programs in information studies has embraced multi-disciplinarity and interdisciplinarity to bring together multiple, complementary perspectives that can help to solve complex problems. This education philosophy also brings significant challenges, particularly in building common vocabularies and perspectives. Each discipline

traditionally develops and adheres to its own specific way of viewing and describing phenomena, a reality termed “ethnocentrism of disciplines” by Donald T. Campbell (1969). To span the disciplinary boundaries, boundary objects – the synergies between the disciplines – must be created and used by individuals from different disciplines to construct effective opportunities for interdisciplinary communication and interaction (Star, 1989; Star & Griesemer, 1989). Boundary objects are concepts that intermediate across these boundaries and allow individuals to interact with others who come from different disciplinary backgrounds. One challenge of developing doctoral curricula in information studies is to create appropriate boundary objects to facilitate interactions between and among students and faculty who typically come from many different disciplinary and interdisciplinary backgrounds.

Therefore, when developing the new doctoral program at Maryland, we identified four lenses to serve as boundary objects intermediating among the diverse disciplines.

1. People. This lens focuses on the people who access and use information. This lens encompasses the impact that people may have on the types of information accessed, the kinds of systems used, and the context or environments where they may interact with information. In addition, the ways in which information, systems, and environments may impact people in how they work, learn, or live are also critical aspects to understand through this lens. For example, doctoral students and faculty may specifically consider the issues of older adults and how they may have challenges with the use of new technologies (Blythe, Monk, & Doughty, 2005). On the other hand, this lens may be used to consider the needs of companies or organizations (Choo, 1996). The perspectives can be endless. Seeing research through the lens of people colors all that can be studied, including even how the scholarly research is read. For example, understanding the background of the individual(s) who wrote a particular paper can provide valuable insight into the methods for research chosen, and the perspective of the contribution to the field.

2. Systems. The systems lens considers technical and organizational systems, including digital tools such as hardware, software, and networking and processes that help people access and use information. In addition, this lens may consider a system to be both tools and processes used, as well as the human systems related to information. Systems often have a very strong influence on the way people can interact with information, because they necessarily require choices and

tradeoffs regarding what features are supported to connect people to the information. These tradeoffs can be decided based on the needs of the people with the information, or by the needs and constraints of the environment. Studying the way social visualization systems improve understanding of computer-mediated communication or the implementations and applications of Cloud Computing are examples of research through a systems lens (Donath, Karahalios, and Viegas, 1999; Dean & Ghemawat, 2004).

3. Environments. An information environment is the infrastructure that surrounds the people and systems. Environments may be types of institutions, like universities, hospitals, or government agencies, or they may be more general settings, such as educational environments or outdoor public spaces. Environments can also include guidelines and requirements that surround information, including laws and polices and ethical standards. Environments may also bring a focus on the more traditional settings of information access, such as libraries, archives, schools, or museums. Studying the library as a physical space that affects the behaviors of people inside the library is an example of research through an environments lens (Buschman & Leckie, 2007). Environments, and the cultural norms intrinsic to them, affect the way people access and use information through the people who make up the environment, the systems they support, and the information they include and exclude.

4. Information. Information is, of course, at the heart of all problems in information studies. This lens is employed to gain perspective on the other lenses: How people behave in the presence or absence of information? How systems are designed to provide better access to information? How do the functions of environments change in response to information? In addition, the people, systems, and environments shape information just as much as information shapes them. These issues can be seen, for example, in the study of information economics (Stigler, 1961).

These lenses are inclusive concepts that span the range of issues of primary interest to information studies faculty and doctoral students. Further, it is likely that these concepts are also boundary objects with agency – a meeting place for common understanding and interaction (Fleischmann, 2006, 2007a, 2007b), as viewing the world through these lenses likely has consequences that will shape the future direction of research and education in information

studies. Thus, these lenses seem to be sufficiently descriptive and prescriptive ways of defining the domains of primary interest to information studies and of proposing meaningful interdisciplinary interactions and collaborations in information studies.

The lenses that are part of our program are not designed to enumerate each of these perspectives, but rather to capture a high level view. Although there are only four, they provide a broad picture at every level of analysis. Information exists, and it is always used either by people or by systems. Those people and systems often interact. The people and systems exist in environments, and the environments can change in response to the people, systems, and information within it. Research by students in the doctoral program often simultaneously has bases in multiple lenses.

By understanding how each of these lenses relates to a problem, and the interaction between the lenses in that problem, a student can develop a thorough understanding of the problem. This can be done at the level of understanding a research article, or even an experiment within that article. It can be done at a higher level, to understand the perspectives of a course, a conference, or a journal. These lenses can even be used to understand the field of information studies as a whole. Moreover, the lens-based analysis goes beyond simply explaining the perspectives used by others. It enables students to develop an understanding of how their *own* ideas about research (and the lenses they prefer) can be used to analyze problems with which they may not be familiar and which are usually approached by researchers with different viewpoints.

3. The Maryland Modular Method (M^3): A Case Study in Doctoral Education

This approach is built upon the notion that doctoral students will best learn and grow by viewing problems through multiple lenses. Though one lens may take primacy in the dissertation research, many dissertations will balance multiple lenses. It is important that the students learn about the depth and breadth of the field, both for their education and to support their understanding that other approaches are also valid perspectives on the field. To capture the breadth and depth of research in information studies, the *Maryland Modular Method (M^3)* was created for the two required gateway classes for doctoral students. This method uses the lenses to define the modules of study. Each module is a two-week, self-contained sub-course that introduces students to a research topic. A full semester course is made up of a collection of

modules that, together, broadly cover the types of problems studied in information studies. As can be seen in Figures 1 and 2, each module contains a set of five to seven readings and a list of discussion topics. A module primarily uses one lens for the research topic, and also presents perspectives from the other lenses on the topic.

[Insert Figures 1 and 2 about here]

Our modular method was inspired by the modularity paradigm, which itself had been inspired by systems thinking. A modular system consists of relatively independent self-contained components (the modules) that function as an integrated whole (Baldwin & Clark, 1997). In designing each module, some decisions affect the design of other modules; other decisions affect only the design of the local module. Information for making the former decisions must be *visible* across modules so that they can be designed consistently and eventually work together. In contrast, information for making decisions for only the local module does not need to be shared beyond the module and thus the design parameters are hidden within each module. Modules interact with each other through interfaces, which specify how modules connect and communicate. These interfaces, in turn, serve as lenses through which the topic can be viewed.

Over the past few decades, modular design has been found in a wide range of practice and research, such as hardware design (e.g., Amdahl, Blaauw, & Brooks, 1964), software engineering (e.g., Parnas, Clements, & Weiss, 1985), educational instructions (e.g., Goldschmid & Goldschmid, 1973), psychology (e.g., Fodor, 1983), and product and organization design and management (e.g., Baldwin & Clark, 1997). Compared to systems composed of highly interdependent units, modular systems are more flexible – changes made within one module do not affect other modules, significantly easing the design and maintenance. Such modular structure makes modular design particularly effective in understanding and developing complex systems.

The design principles of modular systems have been applied to the development of Maryland's new doctoral program. Specifically in the doctoral seminars, modules carry various topics and specialties. Each module is self-contained in that it is independently designed by students or faculty. A specified set of design standards applies across the modules, with students and faculty being encouraged to modify and improve these standards on an iterative basis.

The modular method enables the development of complex systems for solving complex problems faced in various information-related fields. The method also amplifies the benefits of the interdisciplinary and multi-disciplinary culture at our College. The interactions among modules - e.g., joint development of modules by faculty and students from different fields and presentations of modules at doctoral seminars - are designed to minimize the ethnocentrism of disciplines and implement a true interdisciplinary strategy.

Each semester, the instructor uses different modules, providing students with a wide perspective on the field. Perhaps more importantly, students can learn an information studies approach to analyzing information problems. Each module uses the same techniques for understanding research areas and problems: analysis through the lenses of people, systems, environments, and information. This perspective on the field provides students with a common language for discussing problems. It also encourages students to think about research problems from perspectives they might not otherwise consider. After two doctoral gateway courses and nearly a dozen modules, students will understand what it means to consider each lens and its application to a topic, even if that lens is not used in their own research.

Module development has benefits for the faculty in addition to the students, as the faculty teaching the doctoral gateway courses do not develop all the modules on their own. Each module is developed by a faculty member who has expertise in the area. In information studies, where faculty have very diverse backgrounds, it is likely that any given faculty member has extremely limited knowledge about some research topics. This modular approach enables faculty to teach these new research topics without the need to schedule in-person presentations by colleagues. Instead each faculty member provides the framework, discussion points, and readings for the course through the web. The faculty member who is instructing the course can choose from a variety of modules, and material can be updated easily via an electronic interface designed for maintaining and updating the modules. The M^3 approach also has the added benefit of bringing investment from the entire faculty in the course, since they will have the opportunity to see their own areas of expertise taught from their perspective.

In addition to faculty contributing to these gateway course modules, the doctoral students themselves do as well. First, the students are each asked to add just one reading to a module and present it at the end of the class discussion on that module. In this way, students gain a better understanding of the kinds of scholarly papers that are needed to understand information studies

research. Following this experience, students are asked by mid-semester to create a module of their own. This module creation asks students to consider the breadth and depth of information studies research, and begin to consider their own interests in some part of the diverse field.

The modules that that students develop are a stepping-stone for students to write a final "integrative" paper for the semester, where students integrate literature from several areas of research to suggest a new framework for research. The papers written in the gateway courses can serve as important preparation for the doctoral program milestone of advancing to candidacy. The development of modules and the writing of the integrative papers in the gateway courses help to ensure that the module approach also drives students to focus on their specific area of interest in an in-depth manner, complimenting the breadth of the other elements of the modular approach.

Ultimately, our approach deals honestly with the breadth of perspectives and scholarship in information studies. Each gateway course comprises a series of modules on particular areas of information studies research, with the modules being created by faculty and more advanced students who are experts in the topic areas. Each module is meant to provide a two-week intensive focus on a specific research topic in the field. No modules are repeated for each sequence of the gateway courses, but the modules are constantly being updated and new ones are being added to keep up with the changes in research about information. The topic of each module is viewed through four different lenses – people, systems, environments, and information – to help students see the different problems, opportunities, and perspectives embedded in the problems presented by each module.

In addition, to train students to thrive as researchers, the new program requires an increased number of methods and research courses, including both qualitative and quantitative research approaches. This exposure to many different methods not only provides students an appreciation for the range of research they encounter in information studies scholarship, it also prepares them with a large toolbox of methods to employ in their own research. Students also experience a research apprenticeship through the requirement of an individual research experience in which they work on a study in conjunction with a faculty member who is not their advisor.

Finally, the passage into candidacy was changed by moving from the traditional qualifying exams to an integrative paper. Rather than relying on the memorization and hurried

writing that characterize qualifying exams as a means of demonstrating what a student learned, the integrative paper gives the student one semester to engage in original research, writing, and analysis to bring together what they have learned during their coursework into a solo-authored, publication-quality research paper. The integrative paper is reviewed by the student's committee, and if it is deemed acceptable, the student becomes a candidate and the paper is submitted to a journal for review. The students prepare for this challenge by writing small-scale integrative papers in each of their gateway courses.

4. Lessons and Implications of M^3

As a result of these changes, there is no content that can accurately be called an identifiable core, per se. The program is designed around the philosophy that the best thing to do is to expose students in an evolving, interdisciplinary field to as broad a perspective as possible. As the above sections demonstrate, the essential element to this approach – the element that ensures that students receive a rounding in the breadth and depth of the field – is the combination of modules and lenses.

Though there may not be clear core of fixed content for information studies, approaches like the one at the University of Maryland provide another perspective on what can constitute a core. The M^3 provides a comprehensive picture of information studies to students consisting through a structure that is simultaneously flexible and consistent, fostering critical analysis of research topics in information studies. In helping students to understand the rapidly evolving field and helps them gain a solid understanding of the major principles, a core can perhaps be based not on fixed content but on a pedagogical approach.

While the approach taken at Maryland is one of many different strategies that have been adopted in information studies doctoral education, it does offer some unique benefits and opportunities for the field as a whole. The most obvious is that it is an effective way in which to expose new doctoral students to the vast range of areas of research and means of data collection and analysis that are encompassed within the study of information.

It also is a form of education that empowers faculty and doctoral students to be involved in the development and refining of the curriculum. The modules developed within our method are an important example of standardization from below (Fleischmann, 2007c). Rather than forming a committee to develop a curriculum for doctoral education that would then be

implemented from the top down, this approach involves individual students and faculty in creating modules and thus interactively and cooperatively co-constructing their learning environment. It is in this way that students and faculty can be more fully engaged in doctoral education.

Further, the modules are quite portable across doctoral programs. Though different information studies programs have different education foci, these modules could be shared from one program to another. Doing so would help information studies programs to learn from each other and achieve some degree of common emphasis and standardization without imposing an overarching educational hierarchy to regulate the educational activities of individual schools and colleges. Thus, one of the important features of the module-based approach is the degree to which it can achieve standardization from below both within and across information studies doctoral programs.

Finally, M^3 is an effective means to keep pace with changes in IT, its social impacts, and its impacts on research about information. A great difficulty in education about information is ensuring that the content simultaneously remains tied to the development of the field and includes the most current developments. The iterative nature of this approach allows the content to be constantly reevaluated and updated, with older modules being made more current and new modules added to account for developments that were not previously covered.

This approach employed at the College of Information Studies of the University of Maryland is admittedly new and still being refined. In an initial informal evaluation experience with the nine doctoral students in the first gateway course, students were asked to share what they liked the most about M^3 and what they found the most challenging. What emerged was that students most valued the interdisciplinary nature of the approach, but there was concern that they might not know what to focus on. Perhaps with so many rich areas to explore, they might miss an important area of study. The clear consensus from the students: what they liked the most they found the most challenging.

The faculty and doctoral students at Maryland will continue to evaluate and expand the M^3. A key aspect of the maturation of this approach will be summative and formative evaluations of the program from the students at multiple points while they are enrolled in the doctoral program and when they complete the program. Efforts will also be made to foster the sharing of modules and content with other information studies programs. These efforts, hopefully, will also

inspire more discourse about doctoral education, a topic that is vital to the evolution of the study of information, as well as vital to the growth, development, and sustainability of information studies programs.

As they continue to develop, information studies programs face numerous challenges in establishing and building an identity that fosters their philosophy of education about information. These challenges extend into all levels of education, but also provide clear opportunities, such as the ability to create degree programs unlike those available in any other type of school (Jaeger, 2008). Each information studies program will need to ultimately decide how best to implement a doctoral program, but we hope by sharing our experiences and reasons for the choices made that we can provide a viable option that may help other information studies programs to consider, adopt, and advance some of the ideas that we have initiated.

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Figure 1: Sample Module: Organizations

Description
Organizations of various sorts affect how people access and use information. This module looks at organizations as a lens to understand information, environments, and systems.

Discussion Points
- Organizations design and maintain the right structure and processes that both foster learning local and useful to the practice and effectively disseminate knowledge.
- Power is embedded in organizational structures and affects not only the flow of information but also the acceptance and use of information technologies.
- Organizations exist to create value to the people they serve. Information and information technologies help realize the value.
- Organizational information technology innovations are IT perceived as new by the adopting organizations. Some IT innovations bring competitive advantages to organizations and diffuse widely across and deeply within organizations; other innovations disappear without much impact.
- When organizations adopt and assimilate IT innovations, these innovations shape and are shaped by the organizations' institutional elements.

Lens
- Information: how organizations gather and use information?
- Environment: information is strategically valuable to organizations in their competitive and collaborative environment.
- Systems: an organizational information system is a system of people, information and communication technologies, and processes that transforms data into information used by the origination.

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Figure 2 Sample Module: Values and Ethics

Description: The values and ethics of individuals and groups affect how they access and use information. This module looks at values and ethics as a lens to understand information, environments, and systems.

Discussion Points

- Information technologies are neither good nor bad, nor are they neutral.
- Information technologies contain embedded values.
- Information technology design choices have ethical implications.
- In addition to being sensitive to users' needs and preferences, it is also important to be aware of users' values, and to be certain that they are reflected in information technology design.

Lens

- Information: how is info content and use affected by values
- Environment: the ethical and values norms (mores) in environments
- Systems: how systems & policies for systems are impacted and changed by values/ethics

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