

## Resistance to ETDs in Academe: Diffusion of Innovation

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### Abstract

*Electronic theses and dissertations are a technological and organizational innovation. As a technological innovation, they may redefine the content, structure or audience of the traditional print dissertation; as an organizational innovation, they may redefine faculty, student, graduate school, and library perceptions of graduate student research and the purposes it serves within the university. The inclusion of content in visual and/or audio form, the use of hyperlinks to provide alternative reading structures, and the potential broad accessibility of ETDs via the WWW are all "new" features typically not associated with the writing of dissertations, which have for many years been almost exclusively text-based. As universities accept the challenge of accommodating students who choose to write ETDs that reflect new content, structure, and audience choices previously unavailable to seasoned faculty, change will inevitably occur. Part of my purpose in researching and reporting on the development of this new academic genre is to examine some of the resistance to its adoption, particularly in the United States where adoption appears to be slower than in several other member countries of the Networked Digital Library of Theses and Dissertations. Innovation produces change, and some resistance to change seems inevitable in the human arena. In this presentation, I examine ETDs as an innovation currently undergoing the diffusion process, as defined and elaborated by Everett Rogers in his seminal work, *The Diffusion of Innovation*.*

## Resistance to ETDs in Academe: Diffusion of Innovation

Electronic theses and dissertations are a technological and organizational innovation. They redefine the content, structure and audience of the traditional print dissertation; and they will redefine faculty, student, graduate school, and library perceptions of graduate student research and the purposes it serves within the university. For many years, dissertations have been almost exclusively text-based. As universities accept the challenge of accommodating students who choose to write ETDs SYSTEMic change will inevitably occur. Traditional faculty/student mentoring relationships may transform; students may realize the opportunity to achieve early notoriety within their fields; graduate schools will need to create new standards for the presentation of research documents that bring new visibility to their programs; and libraries will be charged with creating prominent new collections that showcase their universities' production of new research. In this presentation, I examine ETDs as an

innovation currently undergoing the *diffusion process*, as defined and elaborated by Everett Rogers in his seminal work, *The Diffusion of Innovation*.

According to Rogers: "Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social SYSTEM ... [it] is a kind of *social change*, defined as the process by which alteration occurs in the structure and function of a social SYSTEM". The characteristics of the innovation, the nature of the communication of the innovation among members within the social SYSTEM, and the structure and norms of the social SYSTEM all affect the rate at which the innovation diffuses (15-24). Characteristics of innovations that Rogers outlines include *relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability*. Relative advantages represent the extent to which innovations are viewed as superior to the ideas they supplant. Compatibility requires that they be consistent with potential adopters' requirements, prior experiences, and values. Complexity is determined by the degree to which innovations require adopters to develop new skills and understandings. When they can be tested on a restricted basis, they score high in the category of trialability, and the visibility of their use and its effects determines their observability (15-16).

### Relative Advantages

What are the relative advantages of ETDs perceived by the academic community? What makes them superior to print? First, we will look at ETDs that are archived in PDF.

For the most part, ETDs created in PDF are identical to traditional print dissertations. Internal and external links may appear; color and graphics are sometimes used, and still images may be included or appended. Because the use of color, graphics and images does not require disruption of the hierarchical and linear structuring of information, their inclusion within the larger text is generally perceived as advantageous and non-threatening. They add something to the text, while the written text retains its position as the document's center. The superiority of these online versions lies in their amplified accessibility and the fact that they require only digital space for archiving. Moreover, these two qualities of ETDs provide a boon to developing countries who have always struggled not only to purchase current scholarship in the form of books and journals, but also to construct and maintain buildings in which to archive the books and continuing issues of journals they are able to buy. A substantial number of these books and articles began as disserta-

tions or chapters within them. Providing the developing world with free access to ETDs published by information rich nations gives them access to scholarship that will later be published in the print information carriers that they cannot afford to purchase or archive.

However, as the previous innovations of hypertext and multimedia software have diffused, text-centered ETDs have undergone what Rogers refers to as *re-invention*: "the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (17). Graduate students have begun to experiment with the use of hypertext, sound, animation and video in their electronic dissertations.

Hypertext is text composed of multisequential units of alphabetic text, visual information, sound, animation, and other types of data articulated by electronic links.

Hypertext scholarship possesses an advantage over print scholarship; while the print medium tends to conceal the underlying network of texts within which scholarly work situates itself, hypertext reveals the network of texts from which the dissertation is constructed and makes in-text references easy to navigate (5). For a researcher in academe, the linking capability of hypertext offers distinct advantages over print. Not only does it reveal connections among the work of researchers and speed up the process of accessing reference notes, it also offers new research possibilities by virtue of its de-centered nature.

As readers move through a web or network of texts, they continually shift the center—and hence the focus or organizing principle—of their investigation ... anyone who uses hypertext makes his or her own interests the defacto organizing principle (or center) for the investigation at the moment ... All hypertext SYSTEMs permit individual readers to choose their own center of investigation.

Scholarship published as hypertext allows researchers to navigate their own paths through the document, organizing information according to their own research needs. Moreover, as Macmillan notes, "Scholarly research is not necessarily a linear, highly structured or logical process," but is often "cyclical, organic and intuitive" (*The Digital Library, User Studies*). The hypermedic structure of HTML ETDs can mirror and facilitate the cyclical, organic and intuitive research processes of scholars who access them.

Another relative advantage of ETDs is that critical commentary, as well as chronologically anterior and later texts, can be appended to them; this produces a document that radiates linked texts in a way that allows readers to experience information within a broader context. Continuous appendage over time produces an expanding network of information that reveals multiple connections between theories, facts, investigations and even disciplines. ETD collections that incorporate continuing scholarly commentary can serve as prototypes that help to shape not only the next age of writing, but the next age of research and scholarship as well.

Perhaps one of the most important advantages ETDs offer is their capability to incorporate visual information of a non-textual nature. For centuries, text has labored to transmit information that it simply does not carry well; however, the writeable elements of ETDs may be words, images, sounds, video, or even actions, such as linkages, that the reader directs a computer to perform. This combination of alphabetic text with visual and aural information engages readers on multiple cognitive levels in ways that alphabetic representations of information alone cannot. As Gunther Kress notes: "The single, exclusive and intensive focus on written language has dampened the full development of all kinds of human potentials, through all the sensorial possibilities of human bodies, in all kinds of respects, cognitively and affectively" (Kress "English at the Crossroads: Rethinking curricula of Communication in the Context of the Turn to the Visual" 85). All modes of representation offer both opportunities and constraints for constructing knowledge and meaning; but if the limits of one mode of representation are reached, it should be possible to make use of another mode better suited to the nature of the information a writer seeks to present. If one mode of representation exploits human cognitive potential to only a limited degree, then there is no justifiable reason for sustaining its exclusive use.

Further, HTML ETDs provide greater opportunity for readers to engage in the highly creative, transformative, meaning-making process known as *synaesthesia*—the constant transition and translation between different modes of representation. Focusing exclusively on text as an information carrier suppresses synaesthetic activity and thus, constrains cognitive activity. ETDs with integrated modes encourage synaesthesia and promote cognitive activity.

### Compatibility with Academic Norms

The relative advantages of ETDs, however, are not the only criteria to consider when analyzing their diffusion as an innovation. The social structure of academe affects the diffusion of ETDs in several ways. The academic SYSTEM's norms and values, the positions held by those who act as agents of change (or resistance to change), the communication structure that exists in both the formal and interpersonal networks linking members of the SYSTEM, and the consequences of an innovation to the operation of the SYSTEM all effect the rate of ETD adoption. Academics' perception of ETDs concerning their compatibility with SYSTEM norms, values and objectives, their complexity, trialability, and observability, all contribute substantially to their rate of diffusion.

The desired outcome of a completed dissertation is the certification of a potentially productive scholar within a particular discipline. The dissertation demonstrates that faculty have succeeded in guiding students toward this end, and that students have succeeded in acquiring the skills associated with productive research. Perhaps one of the most salient of these skills is the ability to rep-

resent their work primarily with words—words that are carefully and skillfully arranged according to the conventions of their discipline.

Representation of dissertation research as text has become a well-established norm within the community of academe. Faculty mentors are familiar with it as a genre, most were required to write one themselves, and they are generally comfortable in evaluating its effectiveness as a research report/argument. However, most are not familiar with multimedia ETDs. Their variable, non-linear structure and non-textual elements require changes in the evaluation process—changes that faculty have only just begun to explore. Mentors may find themselves called upon to become students themselves as they follow and learn from doctoral candidates' bold and innovative attempts to include new content and alternative structures in their work. This shift may be perceived by many to be incompatible with established mentor/mentee norms within the university.

But there is an even more important and subtle undercurrent that informs this perceived incompatibility with established relationship norms—the flow of power through the network of social relations in academe.

In her article, "Talking about Research: Are We Playing Someone Else's Game?" Elizabeth Blake suggests that two value SYSTEMs operate within the university: the community of power and the community of learning. In the university's community of power, "scholarship today can become a kind of high-stakes game played for money, power and prestige" (27). In contrast, within the community of learning, competition does not need to be invoked to prove the worth of scholarly research and publication. Instead, both research and publication are viewed as learning activities. In the community of learning, "Scholarly publishing is important ... not because it brings prestige, but because it disseminates ideas, revealing to one scholar how another scholar *thinks*" (33). ETDs represent a new opportunity to "bring today's colleges and universities out of what one might call their captivity to the overly dominant values of the Community of Power and to rethink our work in terms of creating the best possible learning situation for our students and ourselves" (37). Because they furnish global access to new knowledge, promote sharing and collaboration, and engage readers on multiple cognitive levels, ETDs provide improved learning situations for both authors and readers.

However, the community of power to which Blake refers poses a substantial threat to the contribution ETDs can make to the community of learning. As Morton Winston notes,

The dominant academic ethos that values research above teaching, publication above pedagogy, and academic prestige over social relevance has been created and is perpetuated by powerful forces within the academy—mainly by "disciplinary elites" whose members wield power within the academy disproportionate to their numbers within the professoriate ... The power

that the disciplinary elites exercise within their academic communities depends essentially on their ability to perform the "certification function." According to the dominant ethos, since only members of these elites can authoritatively lay claim to being real "experts," only they possess the authority to certify what counts as knowledge. Disciplinary elites use their control over epistemic certification to maintain their hegemony within the academy by deciding which practitioners will be certified as "professional experts," whose works will be published, and, what other activities of professors will be rewarded within academic institutions ... they control the graduate curriculum, and consequently they define what it means to be a scholar in a particular field ... they also control who gets to hold the Ph.D. offered in their discipline and thus control access to the basic credential needed to enter the academic job market ... the greatest rewards go to those students who most completely adopt the values and beliefs of the local disciplinary elites—that is, those who most completely buy into the dominant ethos. (53-55)

Graduate students who choose to transgress the boundaries of alphabetic print text in writing their dissertations do not "buy into the dominant ethos," and thus are suspect in terms of whether or not they can qualify for Ph.D. certification. The norm their advisors impose on them is the traditional publication of dissertations as hierarchical, linear, alphabetic text, which their advisors are comfortable with evaluating. Even those students who simply choose to make their traditional dissertations globally accessible online are repeatedly told that they must restrict access to their work in order to protect their intellectual property rights. Moreover, they are strongly cautioned against incurring rejection by future publishers of respectable print journals and books, as online publication may count as "prior publication." In short, they are routinely admonished to protect their opportunity to achieve prestige as one of the disciplinary elites in the academic community of power (*2000/2001 Author Survey*, 2001).

Students who remain persistent in their efforts to provide broader access to their research and/or to challenge what counts as knowledge in the academy by experimenting with non-linear structure and visual or auditory forms of information in publishing their work defy assimilation to the cultural model of the research professor. However, refusal to assimilate may mean that they cannot earn the terminal degree, secure teaching jobs, receive grants, be published or promoted. They often learn that "unless they pay obeisance to the research ethos and to the members of their disciplines' elite", they will not be permitted to enter the academy. Hence, the dominant research paradigm in the academic community of power—"publish [in print] or perish"—maintains significant resistance to the diffusion of ETDs, even among graduate students themselves.

Established norms governing processing and archiving of dissertations are also challenged by the advent of

ETDs. Graduate school standards for the presentation of dissertation research are all based on the assumption that dissertations will exist in print. Formats for the appearance of these documents include requirements for content, organization, headings and subheadings, text font and size, line spacing, margins, page numbering, and references that may not be appropriate outside the medium of print text. Online, the writing space can evolve in nonlinear and visual ways that cannot be depicted within one-inch margins.

### Complexity, Trialability and Observability

As ETD pilot projects have been launched across the US, those involved have had to consider the *complexity* of the process of adopting ETDs. Because western, text-centered culture has regimentally and consistently worked to suppress any other form of expression than alphabetic text in teaching students to compose, the majority of graduate students (and the majority of publishing research scholars for that matter) have little expertise in composing in visual modes. Clearly, graduate student authors need to be trained in principles of visual design in order to present research that includes visual elements effectively. They need to receive authoritative instruction in how to integrate these visual elements with text and sound so as to cognitively engage other researchers in compelling ways. Faculty training in the evaluation of ETDs will also be necessary. But where will this training come from? Developing programs to train students to create rhetorically effective multimedia ETDs presents a degree of complexity in the innovation diffusion process that can be perceived as quite high by the academic community. Yet, the *trialability* of ETDs may work to mitigate concerns about their complexity. Pilot projects involving small groups of faculty, students, administrators and librarians have been launched at several colleges and universities across the United States. Finally, by their very nature, ETDs themselves as well as their advantages are highly *observable*. Digital collections of ETDs all over the world can readily be accessed and searched online in multiple languages using the NDLTD Union Catalog or the Open Archives Initiative (OAI) Union Catalog at

Those who wish to explore these collections for information and ideas about how to create their own digital repositories for ETDs have ample examples to guide and direct them in their efforts. In addition, international collections that have generally been in place longer than those in the United States are particularly useful.

Understanding the diffusion process and how academic norms and values affect ETD adoption is, I believe, key to understanding how to market the concept of ETDs to academic audiences. Further, research in identifying groups and individuals who possess the characteristics Rogers has identified as typical of early adopters may allow ETD proponents to locate more successfully those pockets of support among their communities which will prove most useful to them in their efforts.

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