Diffusion Theory and Instructional Technology

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Online: http://www.usq.edu.au/electpub/e-jist/vol2no1/article2.htm
Published by the University of Southern Queensland. Editors-in-Chief: Olugbemiro JEGEDE (jegede@ouhk.edu.hk) and Som NAIDU (s.naidu@meu.unimelb.edu.au)

Abstract

This paper discusses how theories of innovation diffusion have been incorporated into instructional technology. The paper describes general diffusion theory and includes four of the most commonly discussed theories of diffusion. Following this, the authors describe how general diffusion theories have been used to build diffusion theories specific to instructional technology. The paper states that the two major categories of IT-related diffusion theory are Systemic Change Theories and Product Utilization Theories. The paper describes two opposing philosophical views of technology: Determinism and Instrumentalism. The authors use the two philosophies of technology to create two subcategories of IT-related diffusion theory: Developer-Based Theories and Adopter-Based Theories. The authors contend that Developer-Based Theories are flawed in that they overstate the role of technological superiority in the diffusion process.

Diffusion Theory and Instructional Technology

Professionals in a number of disciplines, from agriculture to marketing, have used the theories of innovation diffusion to increase the adoption of innovative products and practices. Instructional technologists, faced with a growing realization that innovative instructional products and practices have suffered from a lack of utilization, are beginning to turn to diffusion theory in an effort to increase the adoption of instructional technologies. The purpose of this paper is to describe how the theory of innovation diffusion has been incorporated into the field of instructional technology.

Diffusion is defined as the process by which an innovation is adopted and gains acceptance by members of a certain community. While a number of factors interact to influence the diffusion of an innovation, the four major factors are features of the innovation itself, how information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995). Diffusion research, in its simplest form, investigates how these major factors, and a multitude of other factors, interact to facilitate or impede the adoption of a specific product or practice among members of a particular adopter group.
The study of diffusion theory is potentially valuable to the field of instructional technology for three reasons.

First, most instructional technologists do not understand why their products are, or are not, adopted. In a very real sense, the underlying causes of instructional technology's diffusion problem remain a mystery to the field. There appear to be as many reasons for instructional technology's lack of utilization as there are instructional technologists. Some blame teachers and an intrinsic resistance to change as the primary causes of instructional technology's diffusion problem. Others (e.g., Schneberger and Jost, 1994) cite entrenched bureaucracies and inadequate funding. By better understanding the multitude of factors that influence adoption of innovations, instructional technologist will be better able to explain, predict and account for the factors that impede or facilitate the diffusion of their products.

Second, instructional technology is inherently an innovation-based discipline. Many of the products of instructional technology represent radical innovations in the form, organization, sequence, and delivery of instruction. An instructional technologist who understands the innovation process and theories of innovation diffusion will have a more comprehensive understanding of the discipline and be more fully prepared to work effectively with clients and potential adopters (Schiffman, 1991).

Third, the study of diffusion theory could lead to the development of a systematic, prescriptive model of adoption and diffusion. Instructional technologists have long used systematic models to guide the process of instructional development (ID). These systematic ID models have resulted in the design and development of effective and pedagogically sound innovations. A systematic model of diffusion could help guide the instructional innovation process in a similar manner and, perhaps, with similarly effective results.

**General Diffusion Theory**

Before discussing how diffusion theory has been incorporated into instructional technology, we will provide a brief background and overview of general diffusion theory. The most important fact to consider in discussing diffusion theory is that it is not one, well-defined, unified, and comprehensive theory. A large number of theories, from a wide variety of disciplines, each focusing on a different element of the innovation process, combine to create a meta-theory of diffusion.

The most likely reason for the lack of a unified theory of diffusion is that the study of innovation diffusion is a fairly recent field. Rogers (1995) points out that a 1943 study by Ryan and Gross at Iowa State University provided the genesis of modern diffusion research. The Ryan and Gross study, from the field of rural sociology, used interviews with adopters of an innovation to examine a number of factors related to adoption. The interview-based methodology used in the Ryan and Gross study has remained the predominant diffusion research methodology ever since (Rogers, 1995).
In the years since 1943, a number of researchers from rural sociology (e.g., Fliegel and Kivlin, 1962) and other disciplines (e.g., Weinstein, 1986) have built on the Ryan and Gross' work to conduct studies and develop theories related to the diffusion of innovations. The researcher responsible for the most significant findings and compelling theories related to diffusion is Everett M. Rogers. Rogers' book *Diffusion of Innovations*, first published in 1960, and now in its fourth edition (Rogers, 1995) is the closest any researcher has come to presenting a comprehensive theory of diffusion. Four of the theories discussed by Rogers are among the most widely-used theories of diffusion. These widely-used diffusion theories are: Innovation Decision Process; Individual Innovativeness; Rate of Adoption; and Perceived Attributes.

The Innovation Decision Process theory (Rogers, 1995) states that diffusion is a process that occurs over time and can be seen as having five distinct stages. The stages in the process are Knowledge, Persuasion, Decision, Implementation, and Confirmation. According to this theory, potential adopters of an innovation must learn about the innovation, be persuaded as to the merits of the innovation, decide to adopt, implement the innovation, and confirm (reaffirm or reject) the decision to adopt the innovation. This theory has been so widely cited in the instructional technology literature that Sachs (1993) writes, somewhat derisively, "after looking at [the literature] in our field, one might get the impression that the only important thing we need to know about how to encourage the adoption of innovations or how to be better change agents is that there are five stages to the innovation adoption process (p. 1)". While Sachs correctly concludes that many other important theories of innovation diffusion are overlooked, the Innovation Decision Process theory remains among the most useful and well known.

The Individual Innovativeness theory (Rogers, 1995) states individuals who are predisposed to being innovative will adopt an innovation earlier than those who are less predisposed. On one extreme of the distribution are the Innovators. Innovators are the risk takers and pioneers who adopt an innovation very early in the diffusion process. On the other extreme are the Laggards who resist adopting an innovation until rather late in the diffusion process, if ever.

The third widely-used diffusion theory discussed by Rogers (1995) is the theory of Rate of Adoption. Rate of Adoption theory states that innovations are diffused over time in a pattern that resembles an s-shaped curve. Rate of Adoption theorizes that an innovation goes through a period of slow, gradual growth before experiencing a period of relatively dramatic and rapid growth. The theory also states that following the period of rapid growth, the innovation's rate of adoption will gradually stabilize and eventually decline.

The Theory of Perceived Attributes (Rogers, 1995) states that potential adopters judge an innovation based on their perceptions in regard to five attributes of the innovation. These attributes are: Trialability; Observability; Relative Advantage; Complexity; and Compatibility. The theory holds that an innovation will experience an increased rate of diffusion if potential adopters perceive that the innovation: 1) Can be tried on a limited basis before adoption; 2) Offers observable results; 3) Has an advantage relative to other innovations (or the status quo); 4) is not overly complex; and 5) Is compatible with existing practices and values.

**Instructional Technology Diffusion Theory**
The study of innovation diffusion is neither new nor rare in the field of instructional technology (IT). For example, Rogers Theory of Perceived Attributes has been used as the theoretical basis for several studies investigating the diffusion of instructional technologies. Perceptions of compatibility, complexity, and relative advantage have been found to play a significant role in several IT-related adoption studies. Wyner (1974) and Holloway (1977) each found relative advantage and compatibility to be significant perceptions among potential adopters of instructional technology in high schools. Eads (1984) found compatibility was the most important attribute among students and school administrators. Surry (1993) studied the perceptions of weather forecasters in regard to innovative computer based training and found relative advantage, complexity and compatibility were important adoption considerations.

In addition to being used by several researchers investigating the diffusion of specific instructional innovations, general diffusion theory has served as the basis for developing diffusion theories specific to the field of instructional technology. It would be impossible for one paper to adequately discuss in detail the techniques and purposes of all of these attempts at theory building. Even providing a brief synopsis of each major application of general diffusion theory to instructional technology would result in a lengthy discussion far beyond the scope of any one paper. We will limit the present paper to a discussion of the broad goals and major philosophical premises of instructional technology diffusion theory.

**Macro and Micro Theories**

Applications of diffusion theory to instructional technology can be grouped into two major categories, each with distinctly separate goals. The first major category focuses on the reform and restructuring of educational institutions. The goal of this category of diffusion research is to develop theories of organizational change, most commonly school change, in which technology plays a major role. Examples of this category include Reigeluth's (1987) Third Wave Educational System, The Schoolyear 2000 Model (Center for Educational Technology, 1989), and the New American Schools Development Corporation (NASDC) (Mehlinger, 1995). These theories, often referred to as systemic change theories, typically involve the adoption of a wide range of innovative technologies and practices. Because of their broad scope, systemic change theories can be thought of as macro-level instructional technology diffusion theories.

The second major category of instructional technology diffusion research focuses on increasing the adoption and utilization of specific instructional products. The goal of this category of research is to develop theories of technology adoption that will lead to a more widespread use of instructional innovations. Examples of product adoption and utilization theories include Burkman's (1987) User-Oriented Instructional Development process, Environmental Analysis (Tessmer, 1990), Adoption Analysis (Farquhar and Surry, 1994), and the Technological Imperative Model (Schneberger and Jost, 1994). Theories in this category are not concerned primarily with large scale, systemic change, but focus on the adoption of a specific innovation by a specific set of potential adopters. Because of their focus on specific innovations and specific environments, these theories are, in effect, micro-level IT diffusion theories.
The two major categories of IT-related diffusion research, which we will call Macro, or Systemic Change Theories, and Micro, or Product Utilization Theories, can each be subdivided into two subcategories. These subcategories represent the two predominant philosophies of technology and technological change: Technological Determinism and Technological Instrumentalism. Before discussing the subcategories, which we will call "Developer (Determinist)" and "Adopter (Instrumentalist)", we will provide a brief overview of the two predominant philosophies.

**Determinist versus Instrumentalist**

From a theoretical standpoint, views of technology range on a continuum from technological determinism to technological instrumentalism. Autonomy and continuity are the key issues in the philosophical debate between determinists and instrumentalists. Technological determinists view technology as an autonomous force, beyond direct human control, and see technology as the prime cause of social change (Chandler, 1995). Determinists also view the expansion of technology as discontinuous. That is, they see technological growth not as a gradual, evolutionary process, but as a series of revolutionary leaps forward (McCormack, 1994).

Among the most widely-cited deterministic works is Alvin Toffler's (1971) book *Future Shock*. Toffler concisely outlines the determinist's philosophy when, after citing several examples of accelerated economic growth, he writes "behind such prodigious economic facts lies that great, growling engine of change -- technology" (p. 25). While acknowledging that technology is not the only force in social change, Toffler adds, "technology is indisputably a major force behind this accelerative thrust" (p. 25) and "by now the accelerative thrust triggered by man has become the key to the entire evolutionary process of the planet" (p. 485).

Technological determinists, united in their belief that technology is an autonomous and revolutionary force, often differ in their opinion of the morality of technology. Determinists commonly have either a radically utopian or radically dystopian opinion on technology (Kaplan, 1996). Figure 1 provides an outline of the respective positions.

Utopian determinists believe that technology is a positive and uplifting force that will, over time, mitigate or eliminate most of the ills that afflict humanity. They believe technology is leading society towards an ever more utopian existence. Segal (1985) writes that early technological utopian philosophers believed the growth and expansion of technology would bring utopia; and utopia would be a completely technological society, one run by and, in a sense, for technology (p. 21). Karl Marx is the most often cited example of a utopian determinist philosopher, although the exact nature of his philosophy is a hotly debated question (Misa, 1994). Other well known, and more recent, utopian determinists include Toffler and Marshall McLuhan. Within the field of instructional technology, proponents of the research-development-diffusion (RDD) paradigm and instructional development (ID) models are good examples of utopian determinists. Many of the most zealous advocates of RDD and ID believe the growth and expansion of instructional technologies can lead to utopian (or nearly utopian) learning environments.

Dystopian determinists believe that technology is an inherently evil, or dehumanizing, force that will lead, inevitably, to the moral, intellectual, or physical destruction of humankind. Jacques
Ellul's (1964) work *The Technological Society* is the seminal writing in technological determinism and provides a classic outline of the dystopian position. For example, Ellul writes[technology] destroys, eliminates, or subordinates the natural world, and does not allow this world to restore itself or even to enter into a symbiotic relation with it (p. 79). Two well-known fictional accounts of dystopian determinist philosophy are the classic novels *Brave New World* by Aldous Huxley (1932) and *1984* by George Orwell (1949). A more recent and tragic example of dystopian determinism is the Unabomber case. The Unabomber saw technology as a ruinous force on humanity and attempted to slow technology's impact through a series of terrorist attacks on scientists and technologists.

Instructional technology has numerous examples of dystopian determinists as well. Among the mostly cited examples are laggards who seek to delay the adoption of innovations such as computers that have gained general acceptance in education and neo-Luddites who fear technology will replace teachers or fundamentally dehumanize the educational process.

<table>
<thead>
<tr>
<th>Philosophy of Technology</th>
<th>Philosophical Premise</th>
<th>Notable Advocates</th>
<th>Examples from IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utopian Determinism</td>
<td>Technology is an inevitable, autonomous force that will lead to prosperity and be the salvation of humanity</td>
<td>Karl Marx, Marshall McLuhan, Alvin Toffler</td>
<td>RDD Paradigm, ID Models</td>
</tr>
<tr>
<td>Dystopian Determinism</td>
<td>Technology is an inevitable, autonomous force that is morally corrupt and will lead to the destruction of humanity</td>
<td>Jacques Ellul, George Orwell, Aldous Huxley, Unabomber</td>
<td>Laggards, &quot;Educational Luddites&quot;</td>
</tr>
<tr>
<td>Instrumentalism</td>
<td>Technology is under human control and its use can lead to beneficial or disastrous consequences</td>
<td>Daniel Chandler, Paul Levinson, Donald MacKenzie</td>
<td>Ernest Burkman, Martin Tessmer</td>
</tr>
</tbody>
</table>

Figure 1. The three prevailing views of technology and their relationships to instructional technology.

Opposed to the determinist philosophers are the instrumentalist philosophers. Human control over technology is the issue that most dramatically divides instrumental philosophers and determinist philosophers. Technological instrumentalists, as their name may imply, view technology as a tool. The instrumentalists often cite the knife as an example of their philosophy (Levinson, 1996). A knife is a tool that can be used for either good or evil, depending upon the intentions of the person employing the tool. Extrapolating from that simple example, instrumentalists believe that all technology is a tool, largely under human control, that can be used for either positive or negative purposes.

While determinists see technology as the most powerful force for change, instrumentalists see social conditions and human aspiration as the primary causes of change. The other major
difference between the two philosophies is that instrumentalists view the growth of technology as an evolutionary process, not as a series of revolutions or technological leaps (Levinson, 1996). Heilbroner (1972) equates technological advance to natural evolution (a common theme in instrumentalist writing) when he states that most advances, particularly in retrospect, appear essentially incremental, evolutionary...if nature makes no sudden leaps, neither, it would appear, does technology (p. 31). Instrumentalists see technological growth as the ultimate culmination of a long history of slow, gradual expansion. We will provide examples of how instrumentalist philosophy has been incorporated into instructional technology (e.g., Burkman, Tessmer) later in this paper.

As mentioned above, the two major categories of IT-related diffusion research can be subdivided into two subcategories based on their philosophical view of technology. The result is a breakdown of IT-related diffusion theory into four areas. The areas are shown in Figure 2. We will now describe the two subcategories, Developer-Based and Adopter-Based, in more detail.

<table>
<thead>
<tr>
<th>PHILOSOPHY</th>
<th>Systemic Change (Macro)</th>
<th>Product Utilization (Micro)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developer</td>
<td>Focus on the structure and establishment of an effective organizational framework.</td>
<td>Focus on the needs and opinions of potential adopters and characteristics of the adoption site.</td>
</tr>
<tr>
<td>(Determinist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adopter</td>
<td>Focus on the social, political, and professional environment in specific organizations.</td>
<td></td>
</tr>
<tr>
<td>(Instrumentalist)</td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 2. Overview of Instructional Technology Diffusion Theories showing diffusion goal and philosophical view.

**Developer-Based (Determinist) Theory**

The goal of developer-based theory is to increase diffusion by maximizing the efficiency, effectiveness and elegance of an innovation. Developers-based theories focus on the technical characteristics of an innovation in order to increase diffusion. The developer, or architect, of superior technology is seen as the primary force for change. The underlying assumption of developer-based theories is deterministic because they imply that technological products and systems will, by virtue of their superiority alone, replace inferior products and systems. Developer-based theories of diffusion see change as following directly from a technological revolution or quantum leap.

Developer-based theories in instructional technology assume that the best way to bring about educational change is to create a system or product that is significantly, quantifiably superior to...
existing products or systems. Potential adopters are viewed as being predisposed to adopt innovations that are quantifiably superior. Top down school reform efforts such as the Goals 2000 initiative (Mehlinger, 1995) are excellent examples of developer-based IT diffusion theories. These top down reform efforts seek to diffuse educational change by proposing educational systems that are superior to existing systems. By specifying goals, organizational structures, managerial philosophies, instructional products, and fiscal strategies that have been proven to be, or at least theorized to be, superior to existing practice, top down school reformers are counting on technological superiority to bring about change.

Instructional development (ID) models are another example of developer-based theories of diffusion. Diffusion is not an element overtly described in a typical ID model (Andrews and Goodson, 1991), but the adoption of an innovation does have an implied place in the ID process. Diffusion through technological superiority is the implicit goal of the process. Andrews and Goodson (1991) list four purposes of systematic instructional design: improved learning; improved management (of the ID process); improved evaluation (of products); and theory building. Three of the four purposes center on the creation of technologically superior products. The instructional development process assumes that technological superiority is a sufficient condition that will lead directly to the adoption and diffusion of innovative products and practices.

Limitations of Developer Based (Deterministic) Theories

Instructional development is a process based on the research, development, and diffusion (RDD) paradigm (Burkman, 1987). Saettler, in the first edition of is classic work A History of Instructional Technology (1968) provides an insight into the thinking of those who were early advocates of the RDD approach when he writes:

In the education sector, it is becoming increasingly apparent to scientifically oriented educators that education must discard the folklore approach to instruction and move forward to new frontiers, this includes the development of instructional systems based on behavioral science theory, research, and development. (p. 270).

As Saettler describes, one of the hallmarks of the RDD approach is to abandon "folklore" approaches to education and, in their place, to develop systematic, scientific alternatives. Saettler writes that the systems engineering approach has been the foundation of industrial engineering since the beginning of the industrial revolution and that "one of the most successful applications of the systems concept . . .was the development of the atomic bomb" (p. 269).

While there can be ethical debate as to whether the same process used to develop the atomic bomb should be used to develop human minds, there can be little argument that the continuing refinement and wider use of the RDD paradigm have resulted in the creation of instructional products that are pedagogically sound and technically advanced. Instructional technology's greatest challenge, therefore, is not developing effective products, but developing effective products that people want to use. Hall and Hord (1987) point to the failure of many large-scale
curriculum reform projects in the 1960s as evidence that instructional technology has failed to meet the challenge of utilization. As Dalton (1989) writes, "although we can fill instructional gaps with fervor, we never seem to examine our solutions in light of the wants of the implementors" (p. 22).

The primary limitation of instructional development theory, and the RDD paradigm upon which it is based, is their inherent deterministic bias. There is a general consensus in the diffusion and adoption literature that technological superiority alone is not enough to guarantee the adoption of an innovation. In fact, some would argue whether technological superiority is even a necessary condition for widespread diffusion, at least at the beginning of the adoption process (MacKenzie, 1996). If technological superiority is not sufficient to increase adoption, where does that leave us? Several instructional technologists suggest that the ultimate answer to this important question can be found in a more instrumentalist approach to diffusion.

Adopter Based (Instrumentalist) Theory

Adopter-based theories focus on the human, social, and interpersonal aspects of innovation diffusion. Adopter based theories are inherently instrumental in philosophy because they view the end user, the individual who will ultimately implement the innovation in a practical setting, as the primary force for change. These theories reject the assumption that superior products and practices will automatically be attractive to potential adopters.

Segal (1994) states the importance of adopter based theories when he writes "all structures and machines, primitive or sophisticated, exist in a social context and, unless designed for the sake of design itself, serve a social function" (p. 2). Adopter-based theories seek to understand the social context in which the innovation will be used and the social function the innovation will serve. Tenner (1996) describes the concept of revenge effects which is central to many adopter-based theories. Revenge effects occur when "new structures, devices, and organisms react with real people in real situations in ways we could not foresee" (p. 9). Predicting and accounting for probable revenge effects caused by an innovation is a defining component of many adopter-based diffusion theories.

Adopter-based theorists (e.g., Tessmer, 1990) argue that a variety of factors, most unrelated to technical superiority, influence the decision to adopt or reject an innovation. Adopter-based theorists such as Burkman (1987) often site the QWERTY and Dvorak keyboard example.

The Dvorak keyboard configuration was shown in early studies to allow for more efficient and rapid typing. However, since most typists learned to type using the QWERTY configuration and are comfortable with that configuration, there is great reluctance to adopt the Dvorak configuration, despite its greater efficiency. This is a classic example of how human, interpersonal, and social factors often play a more significant role in adoption than technological superiority.
Examples of adopter-based theories can be found in both the Macro and Micro categories of IT diffusion research. Ernest Burkman (1987) was the first major author in the field to suggest a Micro (Product Utilization) theory based on an instrumentalist view of instructional technology.

Burkman's theory of a user-oriented instructional development (UOID) rejects the idea that technological superiority is a sufficient condition for the adoption of an instructional product. In UOID, the opinions, needs, and perceptions of the potential adopters are seen as the primary forces that influence adoption.

Burkman's User Oriented Instructional Development process consists of 5 steps each of which is concerned about the characteristics of the individual adopter:

1. Identify the potential adopter
2. Measure relevant potential adopter perceptions
3. Design and develop a user-friendly product
4. Inform the potential adopter (of the product's user-friendliness)
5. Provide Post Adoption Support

Burkman's UOID is representative of instrumentalist philosophy because UOID assumes the end user is the most important force in the adoption of a new product.

A product utilization approach also resulted from research conducted at the University of Minnesota's Telecommunications Development Center. This research led to the design of a technology adoption process that considers the interface between the need, user, content, and organization (Stockdill and Morehouse, 1992). The process involves identifying factors of a new educational technology following a complete analysis of the educational need and user characteristics. The Stockdill and Morehouse model recognizes the critical roles of the user and organization in product adoption and recommends a process of selecting appropriate products.

Tessmer (1991) emphasizes the social factors of implementing an instructional product within the context of its use. He proposes the use of an analysis procedure to ensure that a product "is actually used, correctly used, and continually used" (p. 9). Conducting such an Environment Analysis involves identifying the physical and use factors of both the instructional and support situations. Tessmer recommends analyzing the environment as a unique stage of front-end analysis contributing critical adoption information.

Furthering a Micro (Product Utilization) perspective of the instrumentalist philosophy is an approach called Adoption Analysis (Farquhar and Surry, 1994). Similar to the Environment Analysis procedure, this process takes a slightly broader approach in considering adoption factors from the perspectives of both users and organizations. The end result of an Adoption Analysis is an effective implementation plan that specifies a process of successful adoption. Key
decisions throughout the design and development of the product will also likely be impacted by the analysis of user-perceptions and organizational-attributes.

Hall and Hord's (1987) Concerns Based Adoption Model (CBAM) is a notable example of a Macro (Systemic Change) theory of diffusion that is instrumentalist, rather than determinist, in philosophy. Hall and Hord describe a process in which change facilitators understand change from the point of view of the people who will be affected by change. The idea of CBAM is to bring about systemic restructuring by understanding the social, political, and interpersonal aspects of the school. The Coalition of Essential Schools, and many other Bottom Up reform strategies (Mehlinger, 1995), are other examples of adopter based, systemic change theories.

| GOAL |
| Systemic Change (Macro) | Product Utilization (Micro) |
| Adopter (Instrumentalist) | Bottom Up Reform CBAM Coalition of Essential Schools | Burkman’s UOID Environment Analysis Adoption Analysis Stockdill & Morehouse |

Figure 3. Major theories representative of each of the four areas of instructional technology diffusion research

This section described the incorporation of diffusion theory into the field of instructional technology in ways both subtle and overt. The goal of a diffusion theory in instructional technology can be the total restructuring of an entire instructional system or the adoption of a specific instructional product by a specific group. In addition, theories of adoption and diffusion can represent either a determinist or instrumental philosophy. Figure 3 shows examples of instructional technology diffusion theories in each of the four resulting areas.

Conclusions and Recommendations

Instructional technology is a broad and diverse field incorporating theories from, among others, the fields of communication, cognitive psychology, management, computer science and behavioral psychology. This paper has demonstrated that instructional technologists have begun to study and apply the theories of innovation diffusion. An increased awareness and expanded use of diffusion theories are of potentially great benefit to instructional technology.

The Developer-Based or Determinist philosophy of innovation diffusion has dominated instructional technology processes and perspectives. Instructional technologists have largely
been seduced by the simplicity and basic logic of technological determinism. The decision to adopt an innovation, however, often defies simple logic. Successful products must meet a myriad of considerations beyond simple instructional effectiveness or user wants. As MacKenzie (1996) writes: "Technologies . . . may be best because they have triumphed, rather than triumphing because they are best" (p. 7).

In order to maximize the potential benefit of diffusion theory, we encourage the acceptance of increased instrumentalist philosophy and Adopter-Based approaches. No reasonable diffusion theorist (nor instructional technologist) would suggest that technological superiority is the only necessary condition for diffusion. Yet, we often fail to implement approaches that consider other key factors.

Superior technology does not always steam roll inferior technology, as the determinists believe. Nor does a superior technology explode onto the scene in a glorious, perfect form -- it creeps along in fits and starts. Technology's advance may be inevitable, but it is gradual. Instructional technologists should, therefore, look to the potential adopters to show us ways to gradually introduce our innovations into their societies.

Of course, while a less determinist philosophy would be beneficial to instructional technology, a totally instrumentalist philosophy would be disastrous. Turning out technically inferior and pedagogically weak products that people want to use is not the answer. Every technologist is inherently a determinist. There is no danger in being driven to improve society by improving instructional technology. The danger is to ignore the society we are attempting to improve.

References


