Diffusion of Innovation Theory

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Theory in Nursing Informatics Column

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> This feature is the first entry of our new column – *Theory in Nursing Informatics* written by our Editor in Chief, June Kaminski. Theory is an important aspect of nursing informatics – one that is often neglected due to time and context. In each column, a relevant theory will be presented and applied to various aspects of informatics in nursing practice, education, research and/or leadership.

OVERVIEW

The Diffusion of Innovation Theory was first discussed historically in 1903 by the French sociologist Gabriel Tarde (Toews, 2003) who plotted the original S-shaped diffusion curve, followed by Ryan and Gross (1943) who introduced the adopter categories that were later used in the current theory popularized by Everett Rogers. Katz (1957) is also credited for first introducing the notion of opinion leaders, opinion followers and how the media interacts to influence these two groups. The Diffusion of Innovation theory is often regarded as a valuable change model for guiding technological innovation where the innovation itself is modified and presented in ways that meet the needs across all levels of adopters. It also stresses the importance of communication and peer networking within the adoption process.

In simple terms, the diffusion of innovation refers to the process that occurs as people adopt a new idea, product, practice, philosophy, and so on. Rogers mapped out this process, stressing that in most cases, an initial few are open to the new idea and adopt its use. As these early innovators ‘spread the word’ more and more people become open to it which leads to the development of a critical mass. Over time, the innovative idea or product becomes diffused amongst the population until a saturation point is achieved. Rogers distinguished five categories of adopters of an innovation: innovators, early adopters, early majority, late majority, and laggards. Sometimes, a sixth group is added: non-adopters. The original five categories are illustrated in the bell-shaped curve image below. As you can see. Rogers estimated the percentage of each category, which in fact, are very similar to the proportions found in a normal bell-curve.

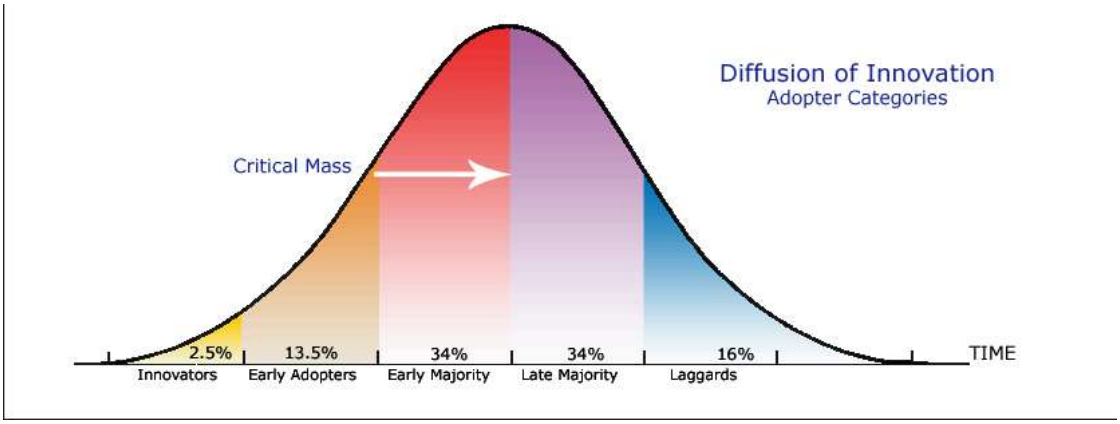

Figure 1: Diffusion of Innovation Adopter Categories

The five categories of adopters can be described in the context of technological innovation adoption and their influence on the innovative and adoption processes.

Innovators (2.5%) - Technology enthusiasts

- Require the shortest adoption period of all of the categories
- **Venturesome, risk takers**
- Understand and apply complex technical knowledge to cope with a high degree of uncertainty
- Appreciate technology for its own sake
- Motivated by idea of being a **change agent**
- **Gatekeepers** for the next group of adopters
- Recruit to be **peer educators**

Early adopters (13.5%) - Visionaries

- Serve as the **opinion leaders**
- Have a natural desire to be **trend setters**
- Serve as **role models** within their social system, respected by peers, successful
- Want to revolutionize competitive rules in their industry (want to be first)
- Attracted by high-risk/high-reward projects (**adventurous**)
- Not necessarily cost sensitive (often think "spend big")
- Provide **excellent tester subjects** to trial the innovation

Early Majority (34%) - Pragmatists

- Interact frequently with peers, **deliberate contact**
- Also serve as **opinion leaders,** but later in the process
- Comfortable with only evolutionary changes in practices, in order to gain productivity enhancements
- Want proven applications, reliable service
- Do not like complexity
- Buy only with a reference from trusted colleague in same industry
- Want to pick the same proven technology solution as others (**avoid risk)**
- **Prudent**; want to stay within budget
- Make slow, steady progress, need simple user friendly training

Late Majority (34%) - Conservatives

- Respond to **peer pressure**
- Respond to economic necessity
- **Skeptical, cautious**
- Often **technologically shy**
- Very cost sensitive
- **Require bullet-proof solutions**
- Motivated only by need to keep up with competitors or proven trends in their industry
- Rely on single, trusted advisor
- Easily influenced by laggards

Laggards (16%) - Skeptics

- **Isolated** from opinion leaders
- Point of reference is in the past (the way we have always done things)
- **Suspicious of innovations**, innovation-decision process is lengthy, resource limited, traditional
- Want to **maintain status quo**
- Think technology is a hindrance to operations
- Usually invest in technology only if all other alternatives worse

Within this theory, the goal is not to move people within the five adopter categories into another category, but to streamline the innovation to meet the needs of all five categories.

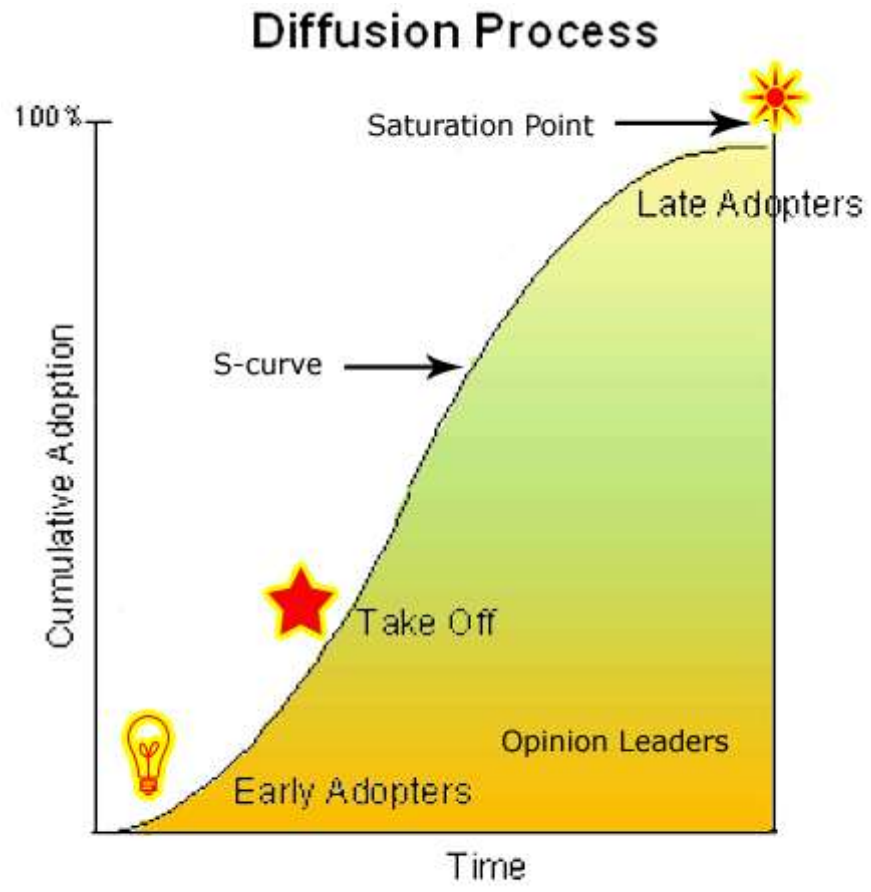

Figure 2: Diffusion Process

Peer Networks

The concept of peer networks is important in the Diffusion of Innovation theory. It is the critical mass achieved through the influence of innovators and early adopters who serve as opinion leaders that sparks the initial “take off” point in the innovation adoption process. These opinion leaders serve as valuable integral change agents who influence their peers through peer to peer communication, role modeling, and networking. This process works well within an organization or in society at large. A prime example is the use of social media networking to influence people through opinion leader tactics.

Five Stage Adoption Process

Knowledge or Awareness Stage

Individual is exposed to innovation but lacks complete information

Persuasion or Interest Stage

Individual becomes interested in the new idea and seeks additional information

Decision or Evaluation Stage

Individual mentally applies innovation to his present and anticipated future situation, and then decides whether or not to try it

Implementation or Trial Stage

Individual makes full use of innovation

Confirmation or Adoption Stage

Individual decides to continue the full use of innovation

Rogers (2003) explained that diffusion of innovation was the process by which an innovation is communicated through certain channels over time among members of a social system.

It is important to examine why some innovations are successful, while others never become widely accepted. Five distinct innovation characteristics have been identified by Rogers to explain this mystery. These characteristics include observability, relative advantage, compatibility, trialability, and complexity and according to Rogers, account for 49 to 87 per cent of the adoption variation seen across all categories of adopters. These characteristics also provide a valuable evaluation list for technology project leaders to apply when first considering innovative changes.

Innovation Characteristics

Observability

The degree to which the results of an innovation are visible to potential adopters

Relative Advantage

The degree to which the innovation is perceived to be superior to current practice

Compatibility

The degree to which the innovation is perceived to be consistent with socio-cultural values,
previous ideas, and/or perceived needs

Trialability

The degree to which the innovation can be experienced on a limited basis

Complexity

The degree to which an innovation is difficult to use or understand, its simplicity.

Re-invention

Re-invention is another important consideration. This is basically referring to the degree that an innovation is changed or modified as the adoption and implementation process is enacted. If an innovation is amenable to re-invention as dictated by the needs of the five adopter categories, , the more versatile and adaptable it is seen to be, and the more likely it will be fully adopted to a healthy saturation point.

Communication Channels

Communication Channels refers to the rate and degree that people talk about and spread the news about the innovations. Two major communication channels were described by Rogers:

Mass Media Channels

These are effective in creating knowledge about the innovation, for instance system related videos or DVDs, or television commercials within the mainstream media

Interpersonal Channels

Person to person communication is very effective in changing people's attitudes about the innovation which ultimately influences their decision to accept or reject the innovation. Peer subjective evaluations of an innovation are very influential.

Time

Time is involved in three distinct dimensions of the innovation process

Innovation Adoption Process

– including first knowledge of the innovation through to final acceptance or rejection of its utility and ultimate implementation, as discussed earlier.

Innovation Adopter Categories

– time is also critical within the five adopter categories and how they influence one another to support full saturation of the innovation.

Rate of Adoption

– time is also involved when looking at the ultimate rate of adoption, say within an organization, from start to finish, and how many people of the total population have adopted the innovation. This rate of adoption is influenced by the innovation characteristics introduced above.

Social System

The fourth and final dimension refers to the groups of people involved in the innovation adoption process. This could be employees at an institution, a neighborhood or a whole nation.

Conclusion

The Diffusion of Innovation theory is a very important theory that can serve administrators, information technologists, nursing informatics experts, and change agents well. The theory also benefits the targets of change, since respect and consideration for all involved stakeholders is intertwined with robust strategies for implementing innovative change. The theory fits nursing informatics well, and provides a scaffold for planning informatics related innovations.

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