Diffusion of Innovations

- Everett Rogers, 1995
- Change is like a wave passing through society
- Intellectual roots: Anthropology, Sociology
- Purpose: Explain how new ideas and activities are understood and adopted by populations
  - Explain the process of social change

Diffusion of Innovations: Scurvy

- The major health threat to crews on sailing ships
- Dietary factor suspected, but it took hundreds of years to prove it
- Captain James Lancaster, 1601
  - Gave lemon juice to all the sailors on one boat of a fleet of 4; none of them died
  - 40% of the sailors on the other ships died

Diffusion of Innovations: Scurvy

- Despite Lancaster’s success, British Navy didn’t adopt the innovation
- It took 264 years and two more experimental trials to get citrus added to the Navy’s diet

Diffusion of Innovations: Scurvy

- Meanwhile, Captain James Cook (1760s) adopted citrus
  - He was an innovator
  - Once flogged a sailor for failing to eat his sauerkraut

Diffusion of Innovations: Constructs

- Innovation: An idea, practice, or object that is perceived as new by an individual or other unit of adoption
  - The perceived newness of the idea influences the reaction to it
Diffusion of Innovations: Constructs
• Diffusion: the process by which an innovation is communicated through certain channels over time among the members of a social system

![Roger's Innovation Adoption Curve]

- How innovation moves through a societal group
- Slowly at first, as innovators adopt the innovation
- Faster, as influence moves through the population
- Peaks
- Declines as pool of innovators and early adopters shrinks

Diffusion of Innovations
• What determines the extent & rate of diffusion?
  – Adopter Categories
  – Characteristics of the Innovation
  – Stages of Adoption

Adopter Categories
• Innovators:
  – Venturesome and Imaginative
  – Risk-taking
  – Fascination with novelty
  – Higher SES
  – Adopting the innovation requires effort and involves risk for them
  – May be considered weird or incautious (mavericks)
  – Occur in all types of societies

Adopter Categories
• Early Adopters
  – Respected by other members of social group
  – Experimental
  – Quick to make connections between clever innovations and their personal needs
  – Trend-Setters
  – They like the phrase “State of the art”
Adopter Categories

• Early Adopters: Educational Strategies
  – Face to face methods like information nights and peer education
  – Demonstration events
  – Reward their egos - such as media coverage
  – Offer regular feedback

• Early Majority: Educational Strategies
  – Offer free give-aways & trial runs
  – Use mainstream advertising & publicity featuring endorsements from credible, respected sources
  – Guarantee performance
  – Provide strong customer service and support

• Late Majority:
  – Skeptical
  – Adopt new ideas after the average members of a social system
  – Peer pressure is often necessary for adoption
  – Need to overcome barriers
  – Risk-averse but don’t like to be left behind

• Laggards
  – Traditional
  – Pay little attention to the opinions of others
  – They may make good arguments and direct further innovation
  – Educational Strategies
    • Regulated compliance
Innovation Characteristics

• “Perceptions of an innovation predict between 47% and 87% of the variance in the rate of spread”
  • Berwick, 2003, page 1971

Innovation Characteristics

• Relative Advantage (Perceived Benefit)
  – The degree to which the innovation is perceived as better than the idea it replaces
  – Is this better than what we had before?
  – Measured In:
    • Economic Terms
    • Social Prestige
    • Convenience
    • Satisfaction

Innovation Characteristics

• Compatibility
  – The degree to which an innovation is perceived as being consistent with values, beliefs, past history, and current needs of potential adopters
  – Does it fit with the intended audience?

Innovation Characteristics

• Complexity
  – The degree to which an innovation is perceived as difficult to understand and use
  – Is it easy to use
  – Modification, often in the form of simplification, is a nearly universal property of successful dissemination
  – Innovations always change as they spread

Innovation Characteristics

• Trialability: The degree to which an innovation may be experimented with on a limited basis
• Can it be tried before I commit to it?
• Can I start with just a little before doing it all?
• Trialability reduces uncertainty and anxiety about adoption
Innovation Characteristics

- **Observability**
  - Are the results of the innovation observable and directly measurable?
  - Visibility stimulates spread of the idea as well
  - Can I observe other people enjoying the benefits before I commit?
  - Sounds like vicarious self-efficacy...

Innovation Characteristics

- What makes an innovation quickly adopted?
  - High relative advantage
  - High compatibility
  - High trialability
  - High observability
  - Less complexity

The Tipping Point

- At some point, it becomes difficult to stop a change from spreading further
- At 15% to 20%, great momentum is gained
- This represents the early majority beginning to follow the lead of the innovators and early adopters
- Interface between innovators/early adopters and early majority is critical!

The Tipping Point

- The jump from Innovator/EA to Early Majority is the key
  - Communication is not always smooth between these groups
  - Big difference in risk-tolerance & desire for change
  - The idea has to transform from one that appeals to the first group to one that appeals to the majority
  - Gladwell, 2002

The iPod

- Introduced by Apple on October 23, 2001
  - Integrated hard disk
  - Small size
  - Ease of Use
  - Large Storage Capacity
  - Easy interface with iTunes
- 125,000 sold in first two months

The iPod & Oprah

- Spring 2003: Oprah names iPod one of her favorite things on her show
- Gives one to every member of the audience
- She didn’t know how to use it...
The iPod

- Relative Advantage
- Compatibility
- Trialability
- Observability
- Complexity

Stages of Diffusion

1. Innovation Development
2. Dissemination
3. Adoption
4. Implementation
5. Maintenance

Stages of Diffusion

- Innovation Development
  - Decisions and activities that occur from an idea’s conception through to its development and production
  - Can be guided by several models/frameworks
    - Social Marketing
    - PRECEDE/PROCEDE
    - Intervention Mapping
- Dissemination
  - An active approach for transferring knowledge from the resource system to the user system
  - Channels can be formal or informal
Stages of Diffusion

- **Adoption**
  - Uptake of the program by the target audience
  - This occurs in stages
    - Persuasion
    - Decision
    - Implementation
    - Confirmation

- **Influenced by 3 types of knowledge**
  - Awareness knowledge
    - What is it
  - Procedural knowledge
    - How to do it
  - Principles knowledge
    - How it works

- **Implementation**
  - Initial use of the program in practice
  - Involves improving the self-efficacy and skills of adopters

- **Maintenance**
  - Ongoing implementation or continued use of the intervention in practice
  - Two types
    - Maintenance: continued use
    - Institutionalization: Incorporation of the program into the SOP of an organization

Research Application

- Physicians’ use of the Internet as a source of up-to-date medical information
- Mail survey of 58 family physicians
- Innovation attributes constructs predicted physician use of the Internet
- Gender & recency of training were not predictive
  - Chew, Grant, & Tote, 2004

- Survey measured innovation attributes:
  - Relative advantage
  - Compatibility
  - Observability
  - Trialability
  - Complexity
- Items were scored with a Likert scale
### Table 1

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<th>Predictor</th>
<th>Male Physicians</th>
<th>Female Physicians</th>
<th>Male N=280</th>
<th>Female N=282</th>
<th>Male Mean</th>
<th>Female Mean</th>
<th>Male SD</th>
<th>Female SD</th>
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<tr>
<td>Relative Advantage (n=15)</td>
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<td>0.56</td>
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</table>

- **Predictors of Internet Usage, Relative Advantage, Trialability, Observability, and Compatibility**
- Chew, Grant, & Tote, 2004
- **Solid line**: Pathway begins with reduced patient load & observation of colleagues benefiting from Internet use
- **Dotted line**: Pathway begins with skill acquisition