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Brian J. Hains
University of Kentucky

Kristina D. Hains
University of Kentucky

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While originally utilized within the natural and agricultural sciences, the diffusion of innovation theory has been applied across numerous contexts. As we continue to apply this model within Extension education, international development, and other community education contexts around the world, it not only becomes pertinent to examine how it applies towards social innovations—innovations that improve the social good—but also to understand how communities react when adopting social innovations. Within this article, researchers propose an Emotional-Behavioral Influence Model to deepen the understanding as to how communities respond, emotionally and behaviorally, towards social innovation throughout the adoption process. They then overlay the model onto two examples, one urban and one rural, showcasing its application to communities worldwide. Finally, researchers discuss implications for extension professionals as they reflect on implementing social innovations in communities globally

Keywords

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Abstract

While originally utilized within the natural and agricultural sciences, the diffusion of innovation theory has been applied across numerous contexts. As we continue to apply this model within Extension education, international development, and other community education contexts around the world, it not only becomes pertinent to examine how it applies towards social innovations – innovations that improve the social good – but also to understand how communities react when adopting social innovations. Within this article, researchers propose an Emotional-Behavioral Influence Model to deepen the understanding as to how communities respond, emotionally and behaviorally, towards social innovations throughout the adoption process. They then overlay the model onto two examples, one urban and one rural, showcasing its application to communities worldwide. Finally, researchers discuss implications for extension professionals as they reflect on implementing social innovations in communities globally.

Keywords: Diffusion of Innovation theory; flow; communities; downshifting; social innovation

Introduction

The concept of *diffusion of innovations* has been around for nearly 70 years. For many individuals, especially those who were a part of a United States-based Agricultural Education higher education program, this theory was considered fundamental to our training. This makes sense, as research on diffusion of innovations began in Iowa in the early 1950's with regards to agricultural innovation. Originally supported by the Iowa Agricultural Experiment Station, this diffusion research focused on developing hybrid seed corn and other agricultural innovations (Rogers, 2003). For Everett Rogers, generally considered the father of this theory, this research developed into his dissertation in 1957 – with an analysis of the diffusion of several agricultural innovations in the rural community of Collins, Iowa. It was during his dissertation when a pivotal moment shifted his paradigm on how individuals think about change, which Rogers shares with us: “I (Rogers) was convinced that the diffusion of innovations was a kind of universal process of social change.” (p. xvi, 2003).

Throughout the years, diffusion of innovations has been applied across a variety of contexts; as aforesaid, originally it was utilized within natural science and agricultural science applications. There are a variety of other contexts in which it has been applied – public health, nursing, technology and education to name a few (Andrews, Tonkin, Lancaster & Kirk, 2014; Beets, Flay, Vuchinich, Acock, Li & Allred, 2008; Frank, Zhao, & Borman, 2004). What's more, it continues to play an important role within Extension education, international development, and other community education contexts around the world (Rodriguez, Roberts & Harder, 2018; Scott, Weeks & Weeks, 2018). As we continue to utilize this model towards the diffusion of

innovations, it becomes important to consider not only how this model is applied towards social innovations, but also how does a group – such as community – react when applied within the model? It begs the question – How do communities respond, emotionally and behaviorally, towards social innovations?

The Basics of Diffusion of Innovation

To apply the theory in a new or novel way, first we must undertake a thorough discussion about the model. However, as this discussion is specifically focused on what occurs during the innovation adoption process, we will limit this discussion to a few basics and the adopter categorizations. As defined by Rogers (2003), *diffusion is the process where an innovation is communicated through specific channels over time, amongst the members of a social system.* Within the diffusion of innovations process, there are four primary elements that can be identified in any diffusion campaign or program. These elements are:

1. *An innovation* – a idea, practice or object that is perceived as new or novel by an individual or other unit of adoption (i.e. organizations, communities, etc.);
2. *Communication channels* – the means by which messages get from one individual to another. This includes both mass media and interpersonal channels;
3. *Over time*;
4. *Among members of a social system* – a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members of a social system may be individuals, organizations or communities. (Rogers, 2003)

Throughout the diffusion process, communication is utilized by community

members within the social system to create and share information, in order to reach a collective understanding. Specifically, the communication occurring is about a new or novel idea (innovation); this impacts the overall process, because as with anything that is new, with novelty comes uncertainty, which adds complexity. Finally, some individuals claim that diffusion can include the unplanned, spontaneous spread of novel

ideas; Rogers accepts this perspective, and thus includes both planned and spontaneous spread of new ideas within the overall idea of diffusing innovations.

It is throughout the diffusion process that community members determine if they will or won't adopt the innovation; for those who decide to adopt, there is a relative timeline of adoption (see Figure 1 below).

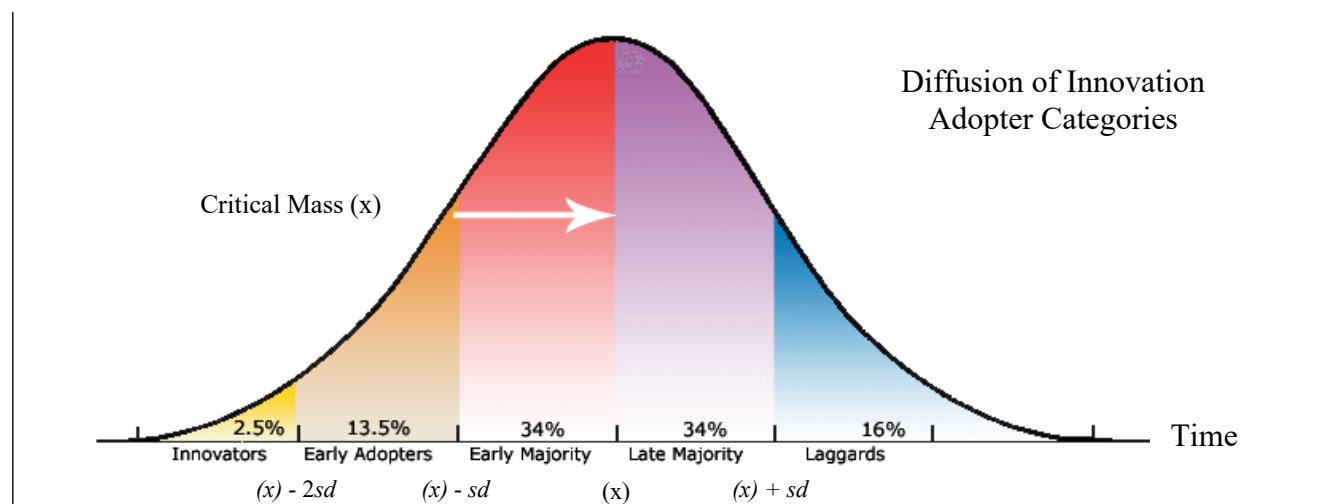


Figure 1. Adopter Categories in Regard to Innovativeness (Rogers, 2003). Online figure modified by authors. NOTE: (x) = mean; sd = standard deviation

In order to standardize and clarify the different patterns or trends within adoption of innovations, Rogers (2003) separated adopters into five different categories, based upon *innovativeness* of the entity, or the degree to which an individual or group is relatively earlier in adopting a novel idea than other members within the social system. The resulting categories are based upon a normal frequency distribution and are outlined below:

1. **Innovators** – area lying to the left of the mean time of adoption (critical mass) minus two standard deviations; *is the first 2.5% of the individuals in a system to adopt an innovation.*

2. **Early Adopters** – are included in the area between the mean minus one standard deviation and the mean minus two standard deviations; *these are the next 13.5% of individuals in a system to adopt an innovation.*

3. **Early Majority** – make up the area between the mean time of adoption and the mean minus one standard deviation; *are the next 34% of individuals in a system to adopt an innovation.*

4. **Late Majority**- are included in the area between the mean and the mean plus one standard deviation; *are the next 34% of individuals in a system to adopt an innovation.*

5. **Laggards** - area lying to the right of the mean plus one standard deviation; *are the last 16% to adopt the innovation.*

Adopters within each of the five adopter classifications share general characteristics associated with innovation adoption; and even though these categories are considered ideal types, there are exceptions. Finally, the adopter categories are exhaustive, except for nonadopters.

Traditionally, individuals are the units of analysis when determining an innovation's adoption timeline; however, this proves to be problematic when considering innovation adoption in the organization or community setting. Thus, researchers began basing the group's (organization or community) innovative adopter category on who makes the innovation-decisions in that system. For an organization, it might be the CEO or Executive Board; within a community, this could be the Mayor, Judge Executive or community governing body. Whatever the group, it is important to realize who is making the innovation-decisions for the organization or community.

Social Innovation

According to Phillips, Jr., Deiglmeier, and Miller (2008) *social innovation is a new solution to a social issue that is more effective, efficient or fair than current solutions and for which the value created benefits society as whole rather than specific individuals.* Innovation, within a general context, is a novel idea or solution that creates value for others. The computer has dramatically enhanced individual productivity and creativity. Pharmaceutical drugs save lives. High speed trains connect families and communities, while also enhancing individual freedom. So, while it could be argued that most innovations have social benefits, they wouldn't necessarily be

considered a social innovation. An innovation is truly a social innovation only if the balance is shifted toward the social good – which benefits society as a whole. Social innovation becomes particularly salient when markets fail and is utilized to create value that would not otherwise be created. Phillips, Jr., Deiglmeier, and Miller (2008) go on to argue that social innovation itself is the best construct for understanding, and ultimately producing, long-term social change.

Social innovations can provide particular benefit within today's communities. Many important social issues can't be solved without collaboration between the nonprofit, public and private sectors (Phillips, Jr., Deiglmeier, & Miller, 2008). In addition, communities provide a venue for individuals to learn and adapt in, as well work collaboratively towards improving the social good. Thus, it is not only critical to think of who is making the innovation-decision, but also how the community will ultimately respond to the adoption of the innovation. This provides the platform for our discussion and begs the question - "How do communities respond, emotionally and behaviorally, towards social innovations?"

Conceptual Framework

As individuals interact with the world, they assess life events and situations based on their significance to the individual's provoked emotional valence (positive or negative emotions) and well-being (Lazarus, 1991; Scherer & Moors, 2019). This primal, cognitive assessment is the precursor for behaviors related to Rogers' (2003) early and late innovation adoption. Those who perceive the event as a threat tend to experience negative emotions, often rejecting the innovation. Contrarily, people who perceive the event as a benefit often embrace the innovation and become

early adopters. It is with this understanding that we argue, communities, in addition to individuals, respond similarly when faced with social innovative events/situations. Throughout our article we focus specifically on social innovations as they are considered pertinent to international extension and global communities (Adam & Westlund, 2013). However, to fully examine this concept, we must first examine the underlying theories supporting our assertion. Thus, we examine three theories: *appraisal theory*, *downshifting*, and *flow theory*.

Appraisal Theory

An individual's cognitive evaluation of a life event and its correlating emotion are frequently identified as an “appraisal.” Appraisal theory is founded on the assumption that when faced with a novel event/situation (stimulus) emotions are provoked and differentiated based on individual evaluation (Scherer, 1999; Scherer & Moors, 2019; Smith & Kirby, 2009). One’s appraisal is inclusive of a number of criteria categorized into four classes:

1. Intrinsic characteristics of objects, such as novelty or agreeableness.
2. Significance of the event for the individual’s needs or goals.
3. Individual’s ability to influence or cope with the consequences of the event, including the evaluation of “agency.”
4. Compatibility of the event with social or personal standards, norms, or values (Scherer, 1999, p. 638).

While appraisal theory focuses on one’s initial evaluation, there are more complex cognitive processes that lead to correlating behaviors. To further understand these processes, we pose the question, “What cognitive processes are initiated

when the stimuli are perceived as either threatening or non-threatening?”

Downshifting – Negative Appraisal

Once a person perceives an event/situation as being threatening, they experience a phenomenon known as “downshifting.” Hart (1983) identified downshifting as a behavioral outcome from biological coping processes. For example, when an individual detects a threatening situation, “full use of their brain is suspended and faster-acting, simpler brain resources take larger roles” (Hart, 1983, p. 108). Hart’s theory is associated with MacLean’s Triune-Brain theory. MacLean (1990) theorized that human brains have evolved into three interrelated yet separate components, the R-complex, the limbic system, and the neocortex.

Hart (1983) suggested that when events or situations evoke intense negative emotions, the brain defaults to the R-complex or reptilian complex. As a result, individuals often freeze up, are unable to speak or communicate as they would normally and may become nauseous, physically ill, or shake profusely when asked to perform a task. Additional behaviors can include evasive or aggressive responses toward a perceived threat, or primal behaviors such as territoriality, ritualistic display, “nesting”, and “flocking” (Caine & Caine, 1993; Hart, 1983; MacLean, 1990).

Appraised events provoking emotional intensity strong enough to trigger the limbic system also impact a person’s ability to process information. Behaviors triggering the limbic system can include stuttering, short-term loss of vocabulary, and evasive play behaviors or behaviors initiated to avoid the perceived threat (Hart, 1983).

The neocortex is the largest of the three evolved brains and is responsible for language communication and writing as well

as logical and operational thinking (Caine & Caine, 1993). The neocortex is able to assess scenarios of threat more accurately than the quick responses of the R-complex and limbic system, often suppressing primal responses according to the appraisal (Hart, 1983). In the absence of threat, full use of the cerebral brain is enacted, increasing the potential for learning and engagement (Hains, 2007; Hart, 1983). We discuss this scenario further in the following section.

While Hart (1983) and Hains (2007) examined this theory on an individual level, we argue that these behaviors are also often seen within communities. For example, community members may exhibit R-complex or limbic behaviors during an election or local governance results, if they perceive the results are negatively impacting them or the communities in which they live. This type of behavior is also common in communities of practice such as during a professional strike or union conflict. While downshifting provides insight on negatively appraised events, we will now explore the cognitive processes associated with positive appraisals.

Flow - Positive Appraisal

Whereas the theory of downshifting assists in understanding behaviors resulting from negative appraisals, it does not fully explain behaviors associated with positive appraisals. To do this, we examine flow theory. Csikszentmihalyi (1975) introduced the concept of *flow* as the phenomenon of being in an optimal cognitive state within a social context for a period of time. More specifically, Nakamura and Csikszentmihalyi (2001) identified six characteristics of flow:

1. Intense and focused concentration on what one is doing in the present moment;
2. Merging of action and awareness;

3. Loss of reflective self-consciousness (i.e., loss of awareness of oneself as a social actor);
4. A sense that one can control one's actions; that is, the sense that one can deal with the situation because they know how to respond to whatever happens next;
5. Distortion of temporal experience (typically, a sense that time has passed faster than normal); and
6. Experience of the activity as intrinsically rewarding. (p. 90)

So, what happens when members of a community appraise a social innovation as being favorable? If it aligns with their social norms and values and they have the resources to implement the innovation, is it possible for them to enter a state of *community flow*? Could this lead to early adoption? It is questions such as these that need to be answered within a community context. To fully showcase the interface of these theories the following conceptual model was developed (see Figure 2 below).

Summary

Appraisal of a new event or situation happens instantaneously, provoking positive or negative emotions. Depending on the appraised emotional valence, positive or negative, it can initiate a series of behaviors that influence innovation adoption. This is especially true with social innovations in communities of place (geographic locale) or practice (professional community). If a majority of community members perceive the innovation as negatively influencing them and their community (place or practice), it can lead to negative behaviors resulting in late adoption or no adoption at all. However, if the majority of the community perceive the innovation as being

positive to them and their community, it could potentially lead to early adoption. In either case, community members who have appraised a social innovation with minimal

threat or benefit, may be persuaded by other community members whose appraisal evoked a stronger emotional intensity.

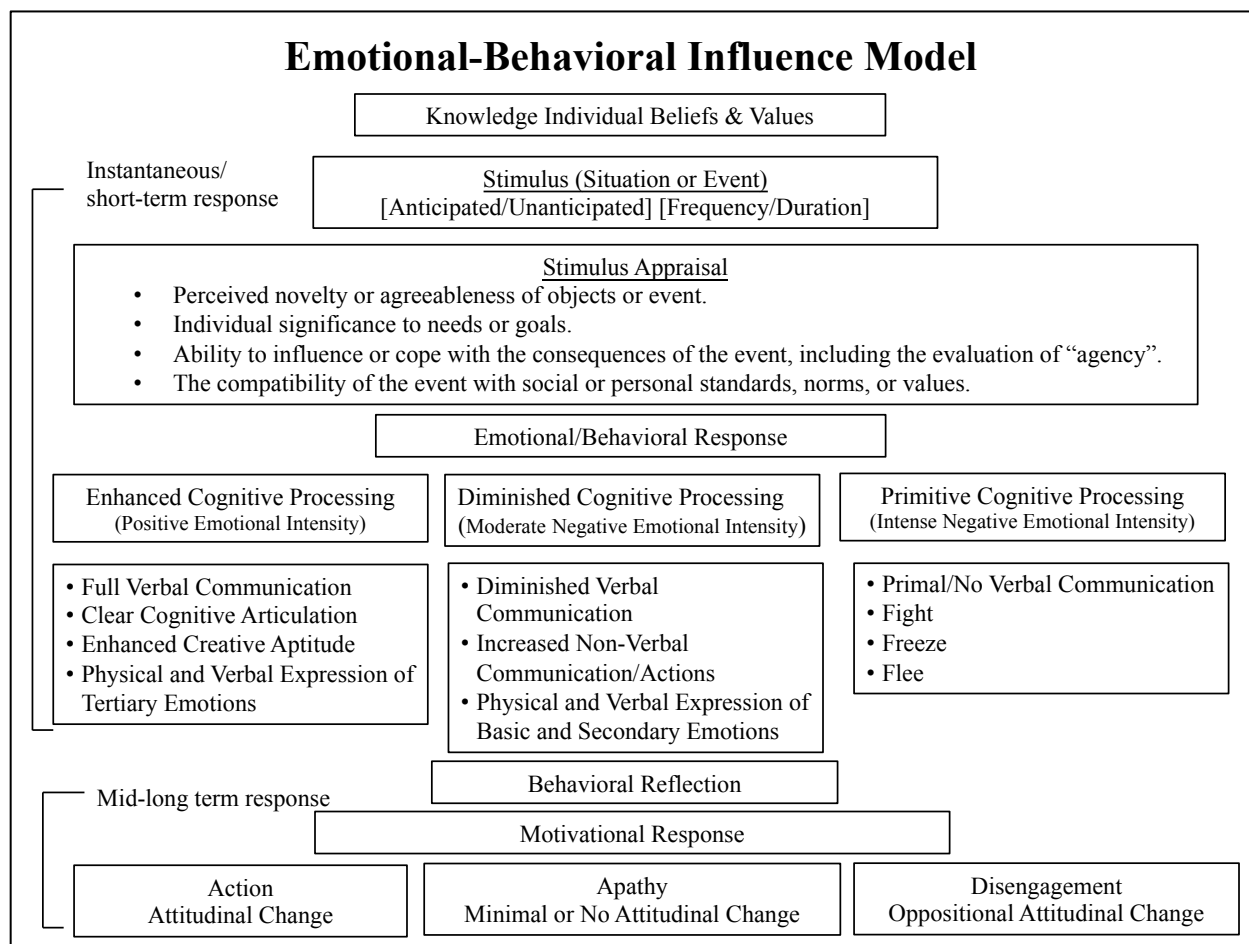


Figure 2. Emotional/Behavioral Model of Influence (Adapted from the Model of Emotional Influence, Hains & Knobloch, 2013).

Social Innovation: A Conceptual Application

To better answer our initial question, “How do communities respond, emotionally and behaviorally, to social innovations?” we overlay our conceptual model on two examples. The first highlights opportunities for extension professionals working in urban communities to apply the conceptual model utilizing a pertinent and controversial illustration. The second highlights a unique

model of rural development for our international extension colleagues.

Example One –The American Civil War & Contemporary Role of Urban Extension

Background & setting. The setting for our first example is a southern city within the United States during the Civil War. Within the South, the city is

considered to be a “transitional city”. A transitional city is one where men fought for both sides of the U.S. Civil War (1861), the Union and the Confederacy. The war literally tore the city, and many of its families apart resulting in social and political torment. While the war ended in 1865, it would have substantial impact on the cultural and political development of the city and its citizens for generations to come.

Fast forward one hundred years later, Confederate officers have been honored for by the raising of permanent statues within the city’s center, causing generational unrest for community members who were descendants of slaves and those whose ancestors fought for the Union. In 2018, the generational turmoil came to a head with a social movement. There were two distinct sides to this social movement - those influenced by slavery and the fight to end slavery, and those whose ancestors fought for the Confederacy and who were southern sympathizers.

Social innovation. The movement to remove the Confederate statues, in front of a prominent building and center of the city, began as a flashmob. As the movement gained momentum protestors began demonstrations, eventually they established an informative booth at local events assisting them in collecting supporter signatures (Musgrave, 2017). All this took place on the grounds of the former slave auctions where the statues also stood.

Even through community criticism, leaders of the movement continued to educate the general public, met with local leaders, participated in several public events and attended numerous civic meetings. After two years, their persistence paid off with the removal of the Confederate statues in the middle of the night.

Community emotional/behavioral responses.

Innovators/Early Adopters – Flow.

There were a large number of community members in support of the movement to remove the Confederate statues. Early adopters within the community viewed the innovation as highly relevant to contemporary society, their initial appraisal aligned with their personal norms and values and they were in favor of the cultural change (Scherer, 1999). They supported the leaders of the movement instantaneously and worked to convince community members who were unsure to support the movement. These individuals attended community functions, civic meetings and signed petitions to sustain the movement. They also provided the verbal and moral support to keep the leaders, who were unsure of their progress, going during the process. These individuals were passionate and felt that the presence of Confederate statues in a prominent area of the city that was a place for slave auctions was ludicrous and did not represent the 21st century community in which they lived.

Early adopters in this situation exhibited a form of communal “flow.” In other words, they went above and beyond their normal civic behavior as a result of their commitment and passion toward the movement. They exhibited several factors associated with flow theory as proposed by Nakamura and Csikszentmihalyi (2001): intense and focused concentration on what one is doing in the present moment; experience of the activity as intrinsically rewarding, such that often the end goal is just an excuse for the process; a sense that one can control one’s actions; that is, a sense that one can in principle deal with the situation because one knows how to respond to whatever happens next; and merging of action and awareness

Early Majority Adopters.

Community members who were minimally or unaffected by the movement were indifferent or moderately aware of the situation. These individuals were most at risk to be swayed by passionate individuals on both sides of the issue. As such, several of the early adopters worked to appeal to the moral and ethical fibers of the majority. This, in fact, did sway those who were undecided on the issue and influenced several to be in support of the removal.

Late Adopters/Laggards/Opposers.

As often exists with social innovations or movements, there are sectors of the community who are reluctant to the innovation or even in direct opposition. Many in the late adopters/laggards/opposer group viewed the removal of the statues as a threat to their culture and ancestry. As such, they also attended public functions, civic meetings, posted on social media and signed petitions in opposition of the movement. They too appealed to the late majority adopters using cultural heritage as a context to sway their perspective. In fact, some extreme opposers used violent threats and intimidation tactics to inhibit the movement and sway opinions (Musgrave, 2017).

This negative appraisal of community members provides a great example of downshifting behaviors (Hains, 2007). Protestors exhibited behaviors such as territoriality, ritualistic display, “nesting”, and “flocking” (Caine & Caine, 1993; Hart, 1983; MacLean, 1990). Additionally, extremists in the community used aggressive fight or flight behaviors to intimidate leaders of the movement and thwart its momentum. However, even the late adopters and laggards had to begrudgingly, succeed to the social innovation over time.

Example Two – Isle of Gigha: A Scottish Social Innovation

Background. Just off of the west coast of Scotland, you will find a small island known as Gigha. Marked by a beautiful landscape, Gigha can most certainly be characterized as the islanders’ “little piece of paradise.” The peace and beauty of the Isle, however, belies much of the struggle this small island had seen over the last decades.

Gigha, like several island on the Inner and Outer Hebrides, exhibited remanence of the feudal system until rather recently. For instance, Gigha was owned and managed by one landowner or laird, who oversaw the island’s development. Under this system, the villagers paid rent to the landowner to stay and work on the laird’s property (Isle of Gigha, 2019). However, in return, the laird was obligated to maintain the island and the village.

Social innovation. In 2002, after centuries of sole ownership, the small island was offered the opportunity to become a “community-owned” island, rather than operating under a laird, or other absentee landowner. The community took this opportunity and became one of the first community-owned islands in Scotland. Gigha residents raised \$2,000,000 (as a community) to purchase the island from the laird. What followed was a mixture of success, failure and a variety of social innovations in the discovery of who it is as its own, self-governed community.

Community emotional/behavioral responses.

Innovators/Early Adopters – Flow. There was great solidarity in the Gigha community as they worked diligently to raise funds and finally purchase their island. People worked with other agencies and put in countless hours to make the vision become a reality as it would provide more

leadership stability, ability to control its own decisions (and ultimately its destiny), the opportunity to bring new businesses to the island that would help to grow the community – becoming community owned would bring with it much more responsibility and work for its community members.

It is evident that a vast majority of the community appraised the event, purchasing their island, as being quite positive. As a result, the residents entered a state of communal flow (Nakamura & Csikszentmihalyi, 2001), working meticulously to create the resources needed to accomplish their goal. Furthermore, their relationships only strengthened as they were focused on a common vision.

Early Majority Adopters. Those who had been conditioned by centuries of laird ownership exhibited signs of hesitation, not knowing the community's future as this was quite innovative for the time. However, over time they too began to embrace the idea of community ownership and began to join the innovators and early adopters in their initiative.

Late Adopters/Laggards/Opposers. While the majority of the Gigha community were in full support of the island's purchase, there were a few in opposition and negatively appraised the situation. These individuals understood the benefits of having a laird (family or person) who owns the island. If something went wrong with the islands' infrastructure or community it was the laird's responsibility to fix it. Additionally, there was always the laird to blame if the community did not like decisions that directly impacted their community.

However, when the community assumed responsibility for the island, they became responsible for the community's infrastructure and future. The immediate responsibility initially caused frustration

among the community and many residents exhibited behaviors associated with downshifting such as nesting and flocking as social cliques, short-term loss of vocabulary in public conflict, and evasive play behaviors or behaviors initiated to avoid the perceived threat (Hart, 1983). These behaviors reinforced the laggards and opposers position on the social innovation initially. However, over time, the community worked through the initial shock of community ownership and the laggards and opposers embraced the innovation.

Many years later, Isle of Gigha is still going strong. Many aspects have changed; the Housing Improvement Project has improved a majority of the houses on the island, bringing them up to standard while also adding several new homes. Eleven new businesses have been introduced onto the island since 2002, adding more jobs and encouraging the economic sustainability of the island; and the schoolhouse is fuller than it's been in recent history, with 22 students on its rolls. Yet while not all the decisions that have been made over the last eight years may have been perfect, developing into a strong, viable community owned island is an accomplishment in and of itself.

Summary

Within both of these examples – domestic and international – clearly the emotional and behavioral responses impacted the experience of the overall community. Emotions (and resulting behaviors) of community members impacted how the community dealt with the change, communicated, developed shared values and ultimately made the final decision to innovate. Regardless of whether the community was an Early Adopter (Isle of Gigha) or a Late Adopter (Southern city), social innovation was felt by the community and its members.

Conclusions & Implications

Diffusion of innovations is a concept that continues to be utilized today in a variety of contexts; not the least of which is the context of Extension and community education. The application of this model isn't necessarily unique or novel – however, utilizing it when addressing social innovations and considering the emotional or behavioral reactions to the innovation from a community standpoint is novel. As defined previously, social innovation's unique "value added" is its impact upon the social good – as community educators around the world, we are continuously involved in projects and programs designed to provide positive impact to the communities we serve. In many cases we could be considered the designers of social innovations. Extension should be at the forefront of leading more social innovation; as such, there will be behavioral and emotional reactions to be expected from the communities they serve.

Rogers' (2003) diffusion of innovations model can assist us in understanding how individuals may react in the adoption process. Rogers' adopter categories give us a baseline from which to operate – Innovators all the way to Laggards. However, these categories illustrate innovation from an individual perspective; they don't address innovativeness of a group. Understanding that a community is a group of individuals, and within the group there will be times where you experience early, mid and late adopters all at one time is particularly salient. As more recent diffusion research shares, it is important to realize who is the community decision maker, and base the group's innovative adopter category on who makes the innovation-decisions in that system.

What's more, is within the community setting there can be a variety of

group emotional and behavioral responses occurring in reference to various social changes. Community members could experience positive communal "flow", negative collective "downshifting" or potentially even group think. All of these collective emotional reactions not only affect the decision to adopt or reject a social innovation, but they can also have an impact on the community in general. This is why it is critical to not only understand the emotional/behavioral process, but also basic tenets of group facilitation and community development.

It could be argued that in traditional Extension circles, there tend to be more Late Adopters than Innovators or Early Adopters. This is not unusual in more traditional fields. Within today's society, it is especially important to remain relevant. This perspective becomes the stimulus for Extension to downshift or adopt; innovate or not. In a world where community education can do so much good, there is a need for more social innovations. By considering these various examples and thinking through the types of potential community responses prior to introducing the innovation (*preflection*), considering the Emotional-Behavioral Influence Model may help in establishing more early adopters. This, in turn, could lead to a more successful adoption process and community transition. As we introduce more social innovations, we need to be cognizant of the behavioral and emotional impacts it will have on our communities. This would improve our overall relevance and help move us into the future.

Rogers (2003) concludes the introduction to his book with this insight:

Throughout this book I seek to represent a healthily critical stance. We do not need more-of-the-same diffusion research. The challenge for

diffusion scholars of the future is to move beyond the proven methods and models of the past, to recognize their shortcomings and limitations, and to broaden their conceptions of the diffusions of innovations. (p. xxi)

Even revisiting this work over 15 years later, this statement still proves to be particularly poignant. The purpose behind all of this wasn't to reach an endpoint – it was instead to continue pushing the envelope and expanding how to apply model itself. And it is in this spirit that we forge ahead and encourage pushing the creatives juices of future diffusion of innovation practitioners and scholars.

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