

# **Sensemaking in Disability Management**

Katherine D. Lippa  
Wright State University  
Dayton, Ohio

Valerie L. Shalin  
Wright State University  
Dayton, Ohio

## **ABSTRACT**

Sensemaking is the process people use to take information from the environment and use it to create meaningful models of the world around them. Sensemaking is particularly significant for disability management, because individuals with disabilities live in environments that are often not suited for their capabilities. Understanding how people make sense of disability management has the potential to increase our understanding of personal adaptation, stakeholder communication, and assistive technology utilization. In this paper sensemaking is introduced as a construct and its implications for disability management are described. A hypothetical model of how individuals with disabilities make sense of their condition, with respect to both personal and abstract issues, is presented. Preliminary evidence for the model is provided from two previous studies on disability management.

## **INTRODUCTION**

Individuals with disabilities live in a world that is designed for people with different capacities. They must adapt to living in an ill-suited environment. This is a difficult task, requiring complex, critical and constant problem solving for each new circumstance and challenge. Assistive technology provides an excellent resource for bridging the gap between the environment and the individual's abilities. However, many assistive devices are tried and abandoned or are used in only limited ways so that the individual does not utilize the full functionality of the device (Cook & Hussey, 2002).

For those with acquired disabilities, psychological adaptation compounds physical adaptation. The sudden and often drastic change in functioning associated with acquiring a disability may shock the individual's sense of self. Our sense of control and our belief in our ability to accomplish things are core parts of personality (Judge, Bono, Erez & Locke, 2005). Acquiring a disability can change how much control individuals feel they have over their lives from both a physical and psychological perspective. This in turn influences their understanding of their ability to perform certain tasks. As such, a major part of disability management is integrating these new self-evaluations into the individual's identity (Cook & Hussey, 2002).

The difficult task of adaptation is complicated by the distributed nature of the disability management system. The intricacy and coordination required for disability management to be effective are truly astounding. The individual must collaborate with multiple practitioners, government agents, the rehabilitation system, and vocational organizations, all competing to demonstrate effective outcomes. Understandably, communication amongst these various stakeholders is often difficult and may become acrimonious as each individual or organization has a different view of and is committed to different goals for the management process (Cook & Hussey, 2002).

Human factor psychology has begun to study complex real world tasks, like disability management, under a rubric called macro-cognition (Klein, et al., 2003). Macro-cognition examines how people solve problems in the real world outside control laboratory settings and focuses on higher order processes that are meaningful in such contexts. Sensemaking is one such macro-cognitive process that has great potential for helping to understand and facilitate the disability management process and which may be especially useful in ameliorating problems of identity reformulation, use of assistive technology, and inter-stakeholder communication. In this paper a number of theories of sensemaking will be described in relation to disability management and then an integrated model will be proposed specifically for sensemaking in disability management.

## **SENSEMAKING**

To interact effectively with the environment, individuals must organize the vast array of available information into a manageable and meaningful format. The process by which people parse and organize information in order to create meaning is referred to as sensemaking. Broadly speaking, studies of sensemaking can be placed into two categories: data framing approaches (e.g, Battles, Dixon, Borotkanics, Rabin-Fastmen, & Kaplan, 2006) and identity construction approaches (e.g, Bean & Eisenberg, 2006). Though not mutually exclusive, each of these approaches focuses on a different aspect of meaning construction. Data framing approaches concentrate on how people assemble disparate environmental cues into holistic models. Data framing approaches can be used to understand communication and miscommunication among actors with different basic frameworks for making sense of an issue. Lee and McCormick (2002), in one of the only studies on sensemaking and disabilities, highlight the difficulties people with disabilities have in confronting and integrating the multiple frame works to which they are exposed. Identity construction approaches focus on the individual's attempts to construct believable meaningful models of their significance and role within the environment. One way to think about the difference between data based and identity based approaches to sensemaking is in terms of the kind of models that result from sensemaking. Data-based approaches focus on how individuals construct models of various aspects of the environment. Whereas, identity-based approaches focus on how individuals construct models of themselves within the environment. But, both identity centered theories and data centered theories of sensemaking are likely to be relevant to many problems in disability management.

One of the most widely used identity-based approaches to sensemaking is the model proposed by Karl Weick (1995). Weick has suggested that there are seven characteristics of sensemaking. Namely that sensemaking is grounded in identity construction, retrospective, environmentally enactive, social, ongoing, focused on and by environmental cues, and plausible. These seven component properties are particularly relevant to understanding issues of identity construction in people with disabilities. Since people associate so much of their understanding of meaning in the world with their personal situation, Weick argues that all sensemaking involves identity construction. This is particularly true for individuals with a disability who in many situations must explicitly take their abilities and limitations into account in making sense of the environment. For those with an acquired disability making sense of the world with respect to their new identity is a significant part of the adjustment process (Shaw, Segal, Polatajkos & Harburn, 2002). In adjusting to inaccessible environments, individuals with disabilities must retrospectively consider past situations and strategies. In addition, retrospection is salient for people with acquired disabilities who need to constantly integrate past experiences with new capacities. The last five characteristics of Weick's construct largely function together for individuals with disabilities in that these constructs represent the ongoing feedback, social and physical, from the environment that people with disabilities receive regarding their capacities and the relative success of various actions. For example, one study found that feedback, both in terms of social responses and task performance, was a major contributing factor to identity adjustment and return to work behaviors in individuals with traumatic brain injuries (Power & Hershenson, 2003).

Sensemaking within disability management is dynamic, involving multiple interactions between the environment, person with the disability, and associated professionals all varying across time and space. Klein, et al.'s (2004) Data/Frame theory of sensemaking is well suited to understanding these interactions. Data framing approaches focus on development of a model of the situation and its application to individual and group decision processes. Data framing approaches follow a particular logical argument. The world is assumed to be composed of complex data which exceeds human processing capacity. To simplify processing, people use various sensemaking techniques that emphasize underlying similarities. Therefore, in order to make sense of a particular environment or situation, people fit specific environmental stimuli into pre-existing cognitive frameworks (see Figure 1). These frames are then modified and improved as more information becomes available. The frames referred to in data/frame theory have not been discussed much or well defined. For the purposes of this paper, frames will be considered as an alternative term for the construct of mental models, which has received a great deal of attention (Johnson-Laird, 2004; Wilson & Rutheford, 1989; Nersessian, 2002)

Figure 1. Data/Frame Concept

Sensemaking is a major determinant of the effectiveness of communication, especially when the people involved come from different backgrounds. Each individual conceives of an issue or situation in a unique way and when these frameworks are incompatible

communication and collaboration are often impaired. This is a common problem in disability management where multiple stakeholders each have a unique framework for understanding the situation. Figure 2 illustrates some of the communication patterns among stakeholders and the disparate models of each. Such incompatibility can hamper efforts to help increase independence and return to work people with disabilities

Figure 2. Sensemaking in communication

(Franche, Baril, Shaw, Nicholas, & Loisel, 2005). For example, the medical model suggests that disabilities are defects to be

minimized or eliminated. This perspective often conflicts with disability model used by rehabilitation professionals that stresses person-environment adaptation and functional capacities. In one instance, a woman who had a back injury was initially cared for by doctors. After multiple surgeries she was returned to her work with an extensive list of restrictions. From the doctors, perspective the damage had been minimized and the disability managed as much as possible. Unfortunately, the woman's physical restrictions led to difficulties performing her job and conflict with her employer. Only after months of frustration, did the woman and her employer realize the need for on going disability management and bring in a vocational rehabilitation specialist to help with adaptation to the remaining disability (Smith & Ellington, 1998).

The data/frame theory is also a helpful for understanding how people with disabilities develop and improve models of their disability and how these models can be exploited to facilitate interaction with the environment. While relatively little work has been done on specific theories regarding the interaction between sensemaking and the environmental conditions, these interactions are likely to be significant for disability management. In one of the few studies addressing this issue, Rudolph proposes two modes of interaction between sensemaking and the environment: exploitation and exploration (2006). Exploitation occurs when people make use of what they know perhaps with slight modifications. Exploitation is a common strategy in many areas of disability management. In assistive technology, many devices are simple alterations of ordinary design ideas (e.g. an enlarged keyboard). Similarly, most individuals with disabilities have developed strategies for repetitive events. For example, a person using an

augmented or alternative communication device may frequently encounter problems with engaging in social interactions fast enough to be effective. So, s/he may pre-program common phrases that are easily accessible into his/her device. Exploration, on the other hand, occurs when the situation is novel requiring experimentation, rethinking problems, and improvisation. Exploration is common in disability management since each individual's situation is a little unique. In particular, many ergonomic work stations and assistive technology system are custom designed and rely entirely on exploratory sensemaking, some of which is codified in standard procedures for workplace accommodation (Langton & Ramseur, 2001).

Sensemaking clearly is a useful construct for understanding disability management, but the unique nature of each individual's experiences of disability make it difficult for highly general models to be applied to specific problems in the field. Consequently the rest of this paper represents a model of the specific sensemaking processes involved in disability management.

### **MODELLING SENSEMAKING IN DISABILITY MANAGEMENT**

The following model (Figure 3) draws upon a variety of sensemaking and other macrocognitive areas (Klein, et al., 2003; Nersessian, 2002). It was developed, during two projects working with individuals with disabilities, in response to the question of why participants of similar physiological status varied so greatly in their ability to manage a disability (Lippa, Klein, & Shalin, in review; Lippa, unpublished manuscript). The first project examined how people with diabetes made sense of and managed their glucose levels and the second examined how seniors with low vision made adjustments to compensate for decreasing vision. Observations from both studies will be used to lend support to the model.

Figure 3. Sensemaking in individual disability management

The model contains two sub-model each of which involves a different type of sense that people make in response to a disabling condition. The personal model involves their understanding of what the disability means for them and how it is/will affect them personally. This model includes the person with a disability beliefs about his/her own capacities and how these beliefs relative to his/her sense of self and personal narrative. The personal model involves the individual's identity based sensemaking regarding his/her disability. The conceptual model involves the person's abstract understanding of the condition as a physiological disorder or impairment. This model represents the cognitive, conscious understanding of his/her condition and represents how the individual with a disability understands and integrates the information s/he is receiving from disability professionals. The conceptual model represents the person's data based sensemaking processes. Both models interact with one another and receive various inputs from other people and the environment. Two models are necessary since a person's conceptual model of his/her disability may not match his/her personal model. For example, many people with diabetes theoretically know how to control their glucose levels, but cannot integrate this knowledge into their daily lives and so fail to achieve adequate self-management.

The personal model, encompassing identity based sensemaking processes, forms the core of the person's experience of disability. This model is descriptive in that it does not contain any understanding of the mechanics of the disability, but only describes how it is perceived. This model contains two key elements a personal narrative regarding the disability and sensations associated with the condition itself. Narrative in general is a core part of how people understand the world (de Fina, Schiffrin, & Bamberg, 2006). In working with people with diabetes and low vision, I have found that almost everyone has a story they tell about their disorder. For example, a woman with deteriorating vision whom I spoke with always spoke of her disorder in terms of what she had lost and how these losses were exacerbated by unaccommodating children and poor social services. The story of her victimization limited her efforts to actively accommodate to her disability and led her to lack the motivation and persistence necessary to use the assistive devices which had been provided to her. The sensation component of the personal model is largely related to an individual's sense of well being, his/her physical self-care, and environmental feedback. For example, in working with individuals with diabetes some participants frequently experienced unpleasant symptoms associated with the disorder and were therefore more inclined to actively engage in self-care activities than those with few symptoms. The personal model is deeply affected by the person's identity prior to and/ or in conjunction with the disability and his/her functional goals. For example, one man with diabetes was an active professional with two young children. He believed in his ability to control his life, including his diabetes. Moreover, he was strongly motivated to take care of himself so that he could remain an active father. These attributes led him to proactively compensate for his condition to the greatest degree possible and made him one of the best controlled participants in the study.

The conceptual model, which captures data-based sensemaking processes, is the person with a disability's abstract understanding of his/her condition. This model is both descriptive in that it contains information about the person's technical condition and

explanatory in that it is used to interpret experiences associated with the disabling condition. For example, a man who had been completely blind for several years explained his high level of functioning by saying his cane had become his eyes. He explained his own capability in terms of an assistive device replacing an impaired sensory system. The conceptual model also includes how the individual understands the information provided to him/her by practitioners. This understanding may or may not be accurate. For example, a woman with macular degeneration reported being in a drug trial that her doctor said 'might improve the course of her disease.' She interpreted this to mean that the trial medication would improve her vision and was disappointed when this improvement did not occur even though the drug had, as intended, halted her visual deterioration. Finally, the conceptual model includes knowledge of routine strategies exploited by individuals with disabilities to deal with common problems. For example, several participants in the diabetes study routinely used a strategy of drinking orange juice to compensate for low blood glucose.

The models individuals construct of their disabilities and the sensemaking processes they go through in constructing them are fundamental to the experience of a disability and to determining level of functioning. Sensemaking and the resulting models impact how individuals interact with disability professionals, how individuals understand themselves in terms of their disabilities, and the strategies, including assistive technology, that they use to mediate between their abilities and inaccessible environments.

## CONCLUSION

Sensemaking refers to the meaning people make of their environments and the models they build of specific situations and issues. Very little has been done to understand the sensemaking processes impacting disability management. This paper has presented a model of how an individual with a disability makes sense of their disability along with supporting examples, making a distinction between personal models that inform identity formation and daily disability management and conceptual models that inform communication and explanation of disability related issues. Further research is needed to test this model and explore how sensemaking impacts other elements in the disability management system. Improving our understanding of sensemaking in disability management has great potential for improving, personal adaptation, stakeholder communication, and intervention efficacy.

## REFERENCES

- Battles, J.B., Dixon, N.M., Borotkanics, R.J., Rabin-Fastman, B., and Kaplan, H.S. (2006). Sensemaking of patient safety risks and hazards. *Health Services Research, 41*, 1555-1575.
- Bean, C.J. and Eisenberg, E.M. (2006). Employee sensemaking in the transition to nomadic work. *Journal of Organizational Change Management, 19*, 210-222.
- Cook, A.M. & Hussey, S.M. (2002). *Assistive technologies: Principles and practice*. St. Louis: Mosby.
- de Fina, A., Schiffrin, D., and Bamberg, M. (Eds.). (2006). *Discourse and identity*. New York: Cambridge University Press.

- Franché, R.L., Cullen, K., Clarke, J., Irvin, E., Sinclair, S., and Frank, J. (2005). Workplace-based return-to-work, intervention: A systematic review of the quantitative literature. *Journal of Occupational Rehabilitation, 15*, 607-631.
- Johnson-Laird, P.N. (2004). Mental models and reasoning. In J.P. Leighton and R.J. Sternberg (Eds.), *The nature of reasoning*, (pp. 169-204). New York: Cambridge University Press.
- Judge, T.A., Bono, J.E., Erez, A., and Locke, E.A. (2005). Core self-evaluations and job and life satisfaction: The role of self-concordance and goal attainment. *Journal of Applied Psychology, 90*, 257-268.
- Klein, G., Karol, R.G., Moon, B.M., Klein, D.E., Hoffman, R.R., and Hollnagel, E. (2003). Macrocognition. *IEEE: Intelligent Systems, 18*, 81-85.
- Klein, G., Phillips, J.K., Rall, E.L., and Peluso, D.A. (2004). A Data/Frame Theory of Sensemaking. In R. Hoffman (Ed.), *Expertise Out of Context*. Submitted.
- Langton, A.J. & Ramseur, H. (2001). Enhancing employment outcomes through job accommodation and assistive technology resources and services. *Journal of Vocational Rehabilitation, 16*, 2001.
- Lee, Y. and McCormick, B.P. (2002). Sense Making Process in Defining Health for People with Chronic Illnesses and Disabilities. *Therapeutic Recreation Journal, 36*, 235-246.
- Lynch, M., Estes, C.L., and Hernandez, M. (2005). Chronic care initiatives for the elderly: Can they bridge the gerontology-medicines gap? *Journal of Applied Gerontology, 24*, 108-124.
- Nersessian, N.J. (2002). The cognitive basis of model-based reasoning in science. In P. Carruthers, S. Stich, and M. Siegal (Eds.), *The cognitive basis of science* (pp. 133-153). New York: Cambridge University Press.
- Power, P.W. & Hershenson, D.B. (2003). Work adjustment and readjustment of persons with mid-career onset traumatic brain injury. *Brain Injury, 17*, 1021-1034.
- Rudolph, J. W., & Raemer, D. B. 2004. Diagnostic problem solving during simulated crises in the OR. *Anesthesia and Analgesia, 98(5S)*: S34.
- Shaw, L., Segal, R., Polatajko, H., and Harburn, K. (2002). Understanding return to work behaviours: Promoting the importance of individual perceptions in the study of return to work. *Disability and Rehabilitation: An International Multidisciplinary Journal, 24*, 2002.
- Smith, R.O. and Ellington, E.F. (1998). Job modification/ accommodation and assistive technology. In P.M. King (Ed.), *Sourcebook of Occupational Rehabilitation* (pp. 287-323). New York: Plenum Press.
- Weick, K.E. (1995). Sensemaking in organizations. London: Sage.
- Wilson, J.R. and Rutherford, A. (1989). Mental models: Theory and application in human factors. *Human Factors, 31*, 617-634.