A conceptual model for interprofessional education: The International Classification of Functioning, Disability and Health (ICF)


Doctoral Program in Rehabilitation Sciences, The University of Western Ontario, London, Ontario, Canada

Abstract
A shared language and conceptual framework is essential to successful interprofessional collaboration. The World Health Organization’s International Classification of Functioning, Disability and Health (ICF) provides a shared language and conceptual framework that transcends traditional disciplinary boundaries. This paper will familiarize readers with the ICF and describe the biopsychosocial perspective that is adopted in its conceptual framework and language. The presentation of a case study will illustrate how the ICF can enhance interprofessional learning by promoting a multidimensional perspective of an individual's health concerns. The case study will also highlight the value of the shared language and conceptual framework of the ICF for interprofessional collaboration. It is argued that a strong foundation in the principles exemplified by the ICF may serve to enhance interprofessional communication, and in so doing, encourage involvement in interprofessional collaboration and healthcare.

Keywords: ICF, conceptual framework, language, biopsychosocial, interprofessional, education

Introduction
A recent review sponsored by Health Canada indicated that current conceptual frameworks do not adequately describe the foundation underlying interprofessional collaboration (D’Amour et al., 2005). Additionally, “establishing common ground between disciplines foremost requires speaking a common language” (Giacomini, 2004, p. 179). In 2001, the World Health Organization (WHO) introduced “a unified and standard language and framework for the description of health and health-related states” entitled the International Classification of Functioning, Disability and Health (ICF, p. 3). The ICF framework expresses health and functioning as complex and multidimensional. Moreover, its conceptual framework is translated into a visual representation, a feature that is of benefit in educational contexts. The ICF also adopts a unified terminology that serves as an
“interprofessional” language with which to communicate health information across disciplinary and geographic boundaries. The provision of a shared framework and language are fundamental steps in achieving the goal of interprofessional collaboration (Giacomini, 2004). As such, education about the ICF and its relevance to interprofessional education is an important step in the achievement of this goal.

Through experience, the authors can attest to the value of the ICF for cross-discipline communication and collaboration. As students in the Doctoral Program in Rehabilitation Sciences at the University of Western Ontario in Canada, the authors formed an interprofessional “team” within the context of a course designed to promote interdisciplinary thinking. The team includes professionals from the disciplines of audiology, kinesiology, nursing, occupational therapy, and speech-language pathology. Their research interests encompass the lifespan and address many areas of healthcare, including gait, developmental language disorders, auditory perception and learning, wound healing, and musicians’ injuries. During their coursework, the team studied the history and development of the ICF and explored its value as a conceptual framework for healthcare education. Reflection upon the team’s collective educational and clinical experience indicated that there was a need for a conceptual framework and language such as the ICF in healthcare education. In the context of an assignment for their course, the authors developed a workshop on the application of the ICF in medical education that was subsequently presented at a medical education conference in Ontario, Canada (Allan et al., 2005). When the authors viewed the Call for Papers for a student competition, they immediately agreed that it was an ideal opportunity to introduce the ICF to a broader audience and to demonstrate its relevance to interprofessional healthcare.

This paper will familiarize readers with the ICF and describe the biopsychosocial perspective that it has adopted in its conceptual framework and language. The presentation of a case will illustrate how the ICF promotes a multidimensional perspective in understanding an individual’s complex health concerns. This multidimensional perspective, we believe, is fundamental to establishing a foundation for educating future and current professionals in interprofessional healthcare.

The development of the biopsychosocial model of health

In 1977, physician and psychiatrist George L. Engel wrote a seminal paper published in the journal Science entitled “The need for a new model: A challenge for biomedicine”. In this paper, Engel argued that the dominant biomedical model of disease was insufficient for a complete understanding of health. Specifically, he stated that this model “assumes disease to be fully accounted for by deviations from the norm of measurable, biological variables. It leaves no room within its framework for the social, psychological and behavioural dimensions of illness” (p. 130). Engel’s paper gave a six-point critique of the biomedical viewpoint. This critique focused on the inadequacies of a biomedical model in determining the outcomes of treatments and in fully explaining the impact of illness or disease on the experiences of individuals. In order to rectify these inadequacies, Engel advocated that healthcare needed to join the biomedical and psychosocial viewpoints in what he termed a biopsychosocial model. This model would consider not only the body-focused biological components of health, but also the individual and societal contexts of the individual’s experience of health.

Since 1977, nearly 1500 papers in Medline, and over 1600 in Web of Science, have referenced Engel’s paper. The authors conducted a brief review of the medical and allied health literature in these indices, focusing on articles published in the areas of healthcare
practice and education. This literature review revealed that some consensus has evolved. It is acknowledged that a biopsychosocial approach is essential to best practice, particularly in the case of complex health issues such as stroke, low back pain, brain injury, and substance abuse (Allen et al., 2002; Fritz, 1998; Martelli et al., 1998; Pringle et al., 2002). Waldstein et al. (2001) reported that administrators and faculty perceived the biopsychosocial approach to be an important aspect of medical education, and that medical students respond positively to this model of care. Indeed, many medical schools now offer lectures and courses in holistic medicine that “recognize that the biomedical model is only one of a number of ways of looking at health and disease” (Maizes et al., 2002, p. 852).

Although Engel’s biopsychosocial model was proposed 29 years ago and, as demonstrated in the literature, is well accepted in medical educational programs, our review indicates that its implementation in medical practice is still limited. A comparison of concepts of health in The Lancet from 1978 to 1982 and 1996 to 2000 found no difference in the expression of health concepts from these two time periods (Alonso, 2004). Alonso indicated that this revealed a deep-rooted dominance of the biomedical model of health. Clinical implementation of the biopsychosocial model in medicine can be improved, however, particularly through the use of clinical cases and role models in clinical care (Benbassat et al., 2003; McClain et al., 2004; Satterfield et al., 2004). Teacher training was also highlighted as an important factor in translating theory into practice (Margalit et al., 2004).

The field of nursing appears to have adopted the term biopsychosocial into its professional language to the degree that it is no longer referenced or explained. For example, in describing intervention provided to participants in a study on stroke outcomes, Allen et al. refer to the provision of “a standardized biopsychosocial assessment,” without referencing or defining this assessment (2002, p. 89). Xu et al. (2002) note that Engel’s paper “generated significant derivative effects on . . . nursing education,” and that “the U.S. curriculum has mirrored such influences since the 1970s” (p. 313). Physiotherapy also appears to have adopted this model in some of its clinical research (Bartlett & Palisano, 2000; Scholten-Peeters et al., 2003).

Much of the allied health literature appears to use the term biopsychosocial interchangeably with concepts such as holistic health care and the social model of health care. Utz (2003) described the assisted living philosophy as having goals that reflect the social model of health care, and explained that this model emphasized “a holistic model of service provision . . . to meet individualized needs and preferences” (p. 381). She referred to Engel’s paper as an example of research demonstrating that a “contemporary approach to health care is the optimal and preferred model of health care delivery” (p. 381). Occupational therapy cited Engel’s article as early as 1989 (Peloquin), and incorporates this model into the profession’s view of “the human being as a complex mix of internal physical, psychologic, social, and cultural variables living within an equally dynamic environmental mixture of social, cultural, interpersonal, economic, and political variables” (Kielhofner, 1985 as cited in Peloquin, 1997, p. 167).

References to Engel’s article were not located within Medline and Web of Science for all allied health professions. However, audiology and speech-language pathology, along with other disciplines, have advanced the literature by providing clinical examples of the use of the biopsychosocial approach as adopted in the ICF framework. The following provide a sampling of recent publications in this area. Baylor et al. (2005) explored the “biopsychosocial consequences of spasmodic dystonia (SD)” in a qualitative study (p. 395). They concluded that “understanding the nature of communication-related [quality of life] for each individual requires . . . recognition of the multidimensional factors that shape the experience of SD” (p. 395). Eadie (2003) presented the ICF as a “framework to make
meaningful differences in the lives of the individuals [speech-language pathologists] serve,” and stated that “the ICF’s biopsychosocial model…represents a more encompassing conceptual model of health and disablement [than the biomedical model]” (p. 191). Reed et al. (2005) published a paper about the efforts of the American Psychological Association to develop a manual on the application of the ICF in clinical practice. In this paper, they stated that “the ICF is based on a biopsychosocial approach that allows users to document the impact of health conditions on human functioning from biological, individual, and societal perspectives” (p. 122).

A further reflection of the move from a biomedical to a biopsychosocial view of health is the development of documents by the World Health Organization. The WHO is an international authority on health governed by 192 Member States through the World Health Assembly. The WHO defines health as “a state of complete physical, mental and social well-being” (WHO, 2006, About WHO, ¶ 1). In its most recent iteration, the ICF is explicit in its adoption of a biopsychosocial approach:

In order to capture the integration of the various perspectives of functioning, a ‘biopsychosocial’ approach is used. Thus, ICF attempts to achieve a synthesis, in order to provide a coherent view of different perspectives of health from a biological, individual and social perspective (WHO, 2001, p. 20).

The International Classification of Functioning, Disability and Health

The ICF contains six components of health linked by multidirectional arrows to indicate that the relationship between these components is interactive and dynamic. Therefore, the ICF acknowledges that the presence of disease or disorder is not causally linked to an individual’s functional outcome in a linear fashion. In other words, it is recognized that two individuals may have the same diagnosis but differ in their level of functioning, or in contrast, two individuals may have the same level of functioning but differ in their diagnosis. To better understand this complex connection between disease and functional outcome, the WHO endorses utilizing the ICF with its companion classification, the International Classification of Diseases, Tenth Revision (ICD-10).

ICD-10 provides a ‘diagnosis’ of diseases, disorders or other health conditions, and this information is enriched by the additional information given by the ICF on functioning. Together, information on diagnosis plus functioning provides a broader and more meaningful picture of the health of people or populations… (WHO, 2001, p. 4)

Thus, the WHO encourages an inclusive approach to understanding health and functioning.

Figure 1 shows the graphic representation of the six interactive components of the ICF. Body structures refer to anatomical parts of the body, such as the hands or feet, and organs, such as the brain or lungs. Body functions are physiological functions, such as voluntary hand movement, or psychological functions, such as cognition. Activities are the execution of tasks or actions, and activity limitations are difficulties an individual encounters while performing tasks or actions. For example, activities can vary from typing on a computer to making complex decisions. Participation is involvement in life situations, and participation restrictions are problems an individual faces when participating in life situations. Keeping in touch with friends through e-mail, managing household finances, or attending a local book club meeting are examples of participation.
In addition, the ICF also identifies contextual factors as components of a person’s health. These contextual factors include environmental factors and personal factors. Environmental factors include the physical, social, and attitudinal environment in which an individual lives and conducts his or her life. They comprise a wide range of domains, from medications and assistive devices to family, friends, and social policies. Environmental factors have an impact upon an individual’s functioning. For example, modified eating utensils enable people with decreased hand coordination to eat independently. Personal factors include an individual’s age, gender, coping style, education, and work experience. Personal factors influence how an individual experiences a health condition. For example, a person who independently managed his/her household finances may have more difficulty adjusting to a loss of this ability than someone who previously did not perform this role. Both environmental and personal factors can be either barriers or facilitators to participation in daily life.

Using the ICF in Interprofessional Education

Experienced health professionals will likely recognize the value of adopting a biopsychosocial approach, such as the ICF, into their practice. However, they may be unfamiliar with the ICF as a specific conceptual framework that can facilitate collaboration. Students, because of their limited experience, may be less familiar with the benefits afforded by a biopsychosocial approach. Therefore, it is important that both current and future health professionals receive instruction in the conceptual framework and language of the ICF. Complex case studies are particularly effective in illustrating the utility of a biopsychosocial approach, such as the ICF (Allen et al., 2002; Fritz, 1998; Pringle et al., 2002). To demonstrate the merits of a biopsychosocial approach, and specifically the ICF framework, the case of Mr Smith (a pseudonym) is presented here.

Mr Smith is 84 years old and has experienced a major stroke. His inpatient rehabilitation is coming to completion and he is being discharged from the hospital to his home and into the care of his primary care physician and the community-based healthcare team. He will be returning to his two-storey home where he has lived with his wife for the last 54 years. In addition to the stroke, Mr Smith has also had three prior heart attacks. He has uncontrolled hypertension and controlled Type 2 Diabetes. Mr Smith is taking a number of medications that relate to his present medical condition. These include medications for his cholesterol, blood pressure, diabetes, and pain.
An assessment of Mr Smith revealed that the stroke has had a negative impact on his cognitive status. He has difficulty reading and sequencing numbers and letters. Mr Smith also demonstrates a decreased ability to initiate activities. He requires repeated questioning and prompting to engage in conversation and does not provide adequate responses to questions and comments from others. He also uses very little facial expression during conversations. Mr Smith was diagnosed with a bilateral moderate hearing loss with poor word discrimination abilities. Although Mr Smith had been fit with bilateral hearing aids, his hand coordination difficulties have a negative impact on his ability to use the aids.

Physically, Mr Smith has bilateral weakness in his upper and lower limbs and his hand coordination is considered to be fair. He uses a 4-wheeled walker but needs cueing to use the walker’s brakes. He is experiencing a generalized decrease in his physical condition and endurance. He also has significant problems with balance. Mr Smith has experienced multiple falls and has painful compression fractures in his lower back. Although he is able to eat a regular diet, Mr Smith’s appetite has decreased since the stroke. He reports feeling depressed and has a significant amount of difficulty sleeping.

Mr Smith has completed a high school education and is a veteran of World War II. Following the war, he managed a hardware store and is now retired. Prior to the stroke, he managed all household finances and shared responsibility for household tasks such as cooking and shopping. He has been the sole driver in the family. Before his stroke, Mr Smith enjoyed going out for a daily coffee at the local diner, attending the seniors swimming hour at the community centre, and using his home computer.

Mr and Mrs Smith have no children and no extended family living in the area. Most of their friends have died. They no longer attend church and have very few social contacts, other than their long-time neighbours. Presently, Mr Smith does not receive assistance from community agencies. Mrs Smith appears to be distressed by the changes in her husband’s functional abilities.

Figure 2 illustrates how a complex health condition, such as Mr Smith’s stroke, can be visually “mapped” onto the ICF framework. For example, damage in the brain is reflected in numerous changes to body functions, including cognition, language, and control of movement. The impact of the stroke is particularly apparent when one considers the limitations that now exist in Mr Smith’s ability to perform and participate in activities of daily living. For instance, he is no longer able to assist his wife in many household tasks and can no longer fulfill his role as the sole driver in the family. Moreover, Mr and Mrs Smith have been forced to adopt new roles in their relationship, with her becoming the primary caretaker and decision-maker of the household. The stress associated with these changes may be mediated by both environmental and personal factors. On the one hand, Mrs Smith’s difficulty coping with the demands of her new role may be a barrier to her husband’s well being, especially if her own health deteriorates and she is unable to care for him. On the other hand, the healthcare team may serve as a facilitator by providing medical and rehabilitative services to Mr Smith, as well as by facilitating access to any community support for which he may be eligible. One must also recognize that Mr Smith’s response to intervention and assistance will be influenced by his own response to his health condition, as well as by the unique set of life experiences that shape his attitudes and behaviour.

As this case study demonstrates, a multitude of factors may influence Mr Smith’s ultimate functional outcome. For instance, it is important that Mr Smith continue to receive medical and pharmacological treatment from his primary care physician to address the body structure and function problems created by his diabetes, hypertension, pain, and depression. It is also important that he continue to receive rehabilitative services to address
Figure 2. Visual depiction of how Mr Smith's health and functional status can be related to the ICF conceptual framework. From the International Classification of Functioning, Disability and Health (World Health Organization, 2001, p. 18). Copyright by the World Health Organization. Adapted with permission.
concerns with his activity and participation in the areas of intellectual functioning, communication, self-care, and mobility. Yet there are environmental and personal factors that are unique to Mr Smith that may significantly influence his outcome, but would not be identified by considering his medical conditions and symptoms alone. For example, as discussed previously, Mrs Smith’s ability to assume new household responsibilities may impact on Mr Smith’s experience of his health condition. It is for this reason that Mr Smith’s case serves to highlight the value of the ICF framework in healthcare. Specifically, by adopting a broad approach one is better able to anticipate the full extent of Mr Smith’s healthcare needs.

The ICF framework is a potentially valuable tool that health professionals can use to integrate biomedical and psychosocial factors. As Shaw and MacKinnon (2004) assert:

[The ICF] offers a...comprehensive understanding of the contextual nature of health concerns and expands the breadth of issues that contribute to health problems. For instance, it opens the door for health professionals to consider how the interplay of personal and contextual factors, such as lack of involvement in a societal role or lack of access to basic resources for living may impede the potential of improving health outcomes for clients if issues remain unaddressed (pp. 220 – 221).

By providing a conceptual framework that is holistic and inclusive, the ICF can create opportunities for health professionals to learn about one another’s disciplines. For example, following a discussion of the diverse needs of a particular client such as Mr Smith, it may be more meaningful to then identify the potential members of a healthcare team and discuss their respective roles. Furthermore, the universal language of the ICF promotes communication and collaboration both within and across disciplines (Stucki & Grimby, 2004; Kearney & Pryor, 2004; Shaw & MacKinnon, 2004).

Particularly in complex cases, it is evident that a number of health professionals are needed to address all aspects of diagnosis, health, and functioning within the conceptual framework of the ICF and its complementary classification, the ICD-10. Focusing on the health and functioning implications of Mr Smith’s case, the authors discussed the utility of the ICF as a conceptual framework and language for communication across our own disciplines. Even when considering a single goal related to participation for Mr Smith – going out for coffee – we identified seven specific areas that could be rehabilitation goals, and would reasonably require significant contributions from each of our disciplines. Table I provides an illustration of how these seven rehabilitation objectives can be described using the ICF’s terminology (i.e., body structures and functions, activities, participation, and contextual factors).

Although the example in Table I utilizes the authors’ professions, it is recognized that in actual practice the healthcare team would include representation from additional disciplines, such as medicine, social work, or physiotherapy (among others). The intent is simply to provide the reader with an idea of how the ICF language can be used to transcend disciplinary boundaries and permit discussion of rehabilitation objectives using a shared terminology. This may bridge boundaries that can arise between professionals when they use terminology specific to their respective disciplines. Further, the ICF framework may assist professionals in recognizing the contributions of each member to an overall goal by crystallizing the relationship between the individual objectives and the broader participation goal. Sharing common goals is an essential element of interprofessional collaboration (Giacomini, 2004). The utility of the ICF in team-based care is further supported by Rentsch et al.’s (2003) study showing that the adoption of the ICF into the daily practice of a
neurorehabilitation team\textsuperscript{2} “resulted in the use of a common language and common terms by all specialists” (p. 420) and “improved considerably the quality of interdisciplinary work processes and contributed to a more systematic approach to rehabilitation tasks” (p. 411).

Introducing the ICF to health professionals may have additional benefits. For instance, it validates the provision and reimbursement of services that do not directly focus on the individual with a health condition, but nevertheless are of benefit to him or her (e.g., modifying the environment, counselling family and friends, or advocating for resources; Simmons-Mackie, 2004). Additionally, the framework can encourage collaboration between professionals as a means to address the multidimensional aspects of an individual’s health concerns. This may lead to a reduction in competition for limited resources between professionals. Rehabilitation in the home and community may also be legitimized because the ICF directs attention to the functioning of the individual in his or her everyday environment. This focus on functioning may also encourage health professionals to document meaningful change in behaviour rather than score change, which is likely to be of relevance to consumers and policy makers (Simmons-Mackie, 2004).

The utility of the ICF to the education of health professionals is already evident in its application in several colleges and universities across Canada and the United States (Mulhorn, 2003). The Doctoral Program in Rehabilitation Sciences at the University of Western Ontario is a particularly unique example of a program that is based upon the conceptual framework of the ICF. The program is designed to ensure that students not only acquire expertise in their own area, but also learn skills that allow for cross-discipline communication and collaboration. For example, one of the requirements of the program is the presentation to peers and faculty of a comprehensive paper that explores how the student’s area of specialization can be interpreted within the broader ICF model.

\textbf{Conclusion}

Given the long-standing call to increase the presence of a biopsychosocial perspective in healthcare (e.g., Engel, 1977), the conceptual framework of the ICF makes a valuable contribution to education in healthcare. Exposing health professionals to a multidimensional perspective of health through the use of the ICF conceptual framework will better

\begin{table}[h]
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\hline
Participation goal & Rehabilitation objectives & ICF components & Professionals \\
\hline
Going out for coffee & Ambulation & Activities & Kinesiologist \\
& Fine motor coordination & Body functions & Occupational Therapist/Kinesiologist \\
& Communication (e.g., ordering coffee, socializing) & Participation & Speech-Language Pathologist \\
& Listening in a noisy environment & Activities and environmental factors & Audiologist \\
Preparing medically for the event (e.g., taking insulin) & Activities & Nursing \\
Maintaining personal hygiene & Activities & Nursing/Occupational Therapist \\
Dressing & Activities & Occupational Therapist \\
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\caption{An example of interprofessional collaboration at the Participation level of the ICF.}
\end{table}
prepare them to address the breadth of factors that influence health. The graphic representation of the ICF framework can serve as an entry point for such exploration and learning, especially when utilized with complex cases. Additionally, the language of the ICF provides a common ground for interprofessional and international communication. Ultimately, a strong foundation in the principles exemplified by the ICF may serve to enhance interprofessional communication and learning, and in so doing, encourage involvement in interprofessional care.

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Notes

1. A health professional is defined broadly and inclusively as “any person who has completed a course of study in a field of health, such as a registered nurse, physical therapist, or physician. The person is usually licensed by a government agency or certified by a professional organization” (Mosby’s Medical, Nursing, & Allied Health Dictionary: Anderson et al., 1994, p. 712).

2. The team included professionals from medicine, neuropsychology, nursing, physiotherapy, occupational therapy, speech-language pathology, and social work.

References


