

Handbooks in Health, Work, and Disability

Reuben Escorpizo

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Gerold Stucki *Editors*

Handbook of Vocational Rehabilitation and Disability Evaluation

Application and
Implementation of the ICF

 Springer

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Editors

Handbook of Vocational Rehabilitation and Disability Evaluation

Application and Implementation of the ICF

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Foreword

Promoting the right of persons with disabilities and their full inclusion in all sectors of society on an equal basis with others is a policy goal in many countries around the world, following the entry into force of the UN Convention on the Rights of Persons with Disabilities (UNCRPD) in May 2008. The UNCRPD highlights the right of persons with disabilities to access general health, education, habilitation and rehabilitation, and vocational and training services and their right to decent and productive work and employment in the open labour market, on an equal basis with others. Whether their disability dates from birth or an early age, or whether they acquired their disability in the course of their working lives, States that have ratified UNCRPD are required to promote and protect these rights, among others, through a range of measures, including prohibition of discrimination on the basis of disability and ensuring reasonable accommodation is made. It is not immediately clear to States what measures will be effective in transforming the vision the UNCRPD represents into a reality for persons with disabilities around the world. It is thus important to draw attention to those that have been tried and tested, examining their impact on health, education, training, and employment outcomes.

For a long time, it was assumed that exclusion or marginalization of persons with disabilities was closely interrelated to, and in fact the unavoidable consequence of, the physical and mental impairments of the persons concerned. It is now increasingly recognized that many of the disadvantages they face leading to their exclusion from employment and other sectors of society are not due to individual impairments but rather a result of how society reacts and caters to those impairments. The WHO's International Classification of Functioning, Disability and Health (ICF) is key in promoting this understanding of disability, which underlies the provisions of the UNCRPD.

Taking the right to work and employment as an example, countries are seeking to tackle the low employment rates and low rates of participation in the labour market, which is the situation of persons with disabilities of working-age everywhere, and to address the pattern that, when in employment, workers with disability are more likely to be in low-paid jobs with poor career prospects and working conditions than workers without disability. This situation has negative impacts at

many levels for the estimated 780 million persons with disabilities of working age. Many are counted among the working poor, and many more rely on social security benefits or charity, trapping them in a vicious cycle associated with widespread poverty for both themselves and their households. As a consequence, employers do not fully benefit from the unique and substantial contribution persons with disabilities can make in the workplace. From a national and global perspective, there are significant economic losses arising from high unemployment and lost productivity of women and men with disabilities – estimated at between 3 % and 7 % of Gross Domestic Product in a pilot study conducted by the International Labour Organization (ILO) of ten low and middle-income developing countries. Thus, effectively implementing the right to work and employment will have benefits across the board, and the ICF can be used to promote this right more effectively, through possible and innovative new approaches to vocational assessment, workplace disability evaluation and disability management.

This publication, *Handbook of Vocational Rehabilitation and Disability Evaluation – Application and Implementation of the ICF*, is timely in that it addresses pressing issues and themes of relevance to enabling persons with disabilities to work effectively and to reaching their full potential and participate in all sectors of society. Apart from the immediate audience of researchers, academicians and students in the field of work and employment, it is of broader relevance to policy-makers and service providers, as they move to implement the provisions of the UNCRPD. By highlighting good and emerging practice in these areas and more broadly, through the use of the ICF as a conceptual model and classification system, it will make an important contribution to improving the quality of life of persons with disabilities worldwide, and enabling societies to benefit from the valuable contribution that persons with disabilities can make in their communities.

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Barbara Murray

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Finally, our endless gratitude goes to all our stakeholders in the realm of vocational rehabilitation and disability evaluation for making us understand that they matter, and writing a book about them is the least we can do to advocate for their cause. Nothing can summarize it better than the words of Professor Stephen Hawking, . . . *it is very clear that the majority of people with disabilities in the world have an extremely difficult time with everyday survival, let alone productive employment and personal fulfillment. . . this century will mark a turning point for the inclusion of people with disabilities in the lives of their societies. . .*

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Part I
Introduction

Chapter 1

Conceptual Framework: Disability Evaluation and Vocational Rehabilitation

Gerold Stucki, Soren Brage, Debra Homa, and Reuben Escorpizo

1.1 Introduction

Disability represents a major challenge that societies worldwide have to address [1, 2]. First, from an individual perspective, persons with disabilities have the right to “full and effective participation and inclusion in the society.” Second, from a societal perspective, the society has the ethical and legal obligation to include them in all aspects of life. Third, from an economic perspective, the society is interested that persons with disabilities contribute to the community either in the form of tangible or intangible productivity [3].

For most people, work is a major aspect of life. When any type of disability affects a person, work disability may occur and contribute to negative consequences not just on the individual but for the society as well. If all attempts for remedying

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work disability still result in a persons' inability to work in full or optimal capacity, then income replacement in the form of disability benefits is an alternative to help ensure that persons with disabilities have the economic means for "attaining and maintaining maximum independence" and participation in other major aspects of life [1].

When any type of disability affects a person, work disability may occur and contribute to negative consequences not just on the individual but for the society as well.

1.2 Disability Evaluation

The assessment of a person's work disability is among the key features of *disability evaluation* (DE). Disability evaluation is instrumental in assigning persons with disabilities (henceforth *claimants*) to appropriate *return-to-work* (RTW) programs, medical rehabilitation, and provision of assistive devices or medical devices. Providing the appropriate intervention for a particular person at the right time increases the cost-effectiveness of selected interventions, or, in other words, the chances for a successful outcome, namely, RTW [4]. *RTW programs* can be understood interchangeably with the term *vocational rehabilitation* (VR), which will be presented later in this chapter. An RTW program is in principle a process of VR for those who have previously worked with the ultimate goal of undertaking work duties in the long term. In the context of RTW, work disability can be understood as the inability to work due to an illness or injury in light of influencing contextual factors.

Disability evaluation is also crucial to determine a claimant's eligibility for disability benefits as well as to establish appropriate levels of benefits. In addition, DE provides the necessary information to determine if the claimant should participate in an RTW program before receiving disability benefits. While there are differing definitions of disability evaluation toward eligibility determination for benefits [5–7], we refer to the "Medical Subject Headings" (MeSh) definition of DE: DE is the "determination of the degree of a person's physical, mental, or emotional [disability]. The diagnosis is applied to legal qualification for benefits and income under disability insurance and to eligibility for Social Security and workers' compensation benefits" [8]. In the context of eligibility determination for benefits, work disability is a legal concept with varying definitions among social security laws of different countries [9]. However, work disability usually refers to a person's inability to work due to an illness or injury without considering the influence of contextual factors.

1.3 Requirements for Disability Evaluation

Disability evaluations should fulfill fundamental requirements to provide a just assignment to RTW programs as well as fair eligibility determination for disability benefits. The evaluations should be comparable in terms of content validity and inter-rater reliability between the medical experts who perform the assessments [10, 11]. This could be achieved with the introduction of standards in the disability evaluation process [12].

It is also essential that disability evaluation be documented in a transparent way [13, 14] and address how functional limitations at work are affected by the claimant's health condition or by contextual factors. Moreover, the documentation should be plausible and comprehensible for all those involved in the disability evaluation process, including the medical experts, the claimants themselves, the legal system, and the disability insurance systems. To provide transparency, professional guidance on disability evaluation advises medical experts to capture a comprehensive picture of the claimants in their medical reports [15]. Such transparent documentations provide claimants with a basis for formally appealing eligibility decisions they deem as unwarranted.

Disability evaluations should fulfill fundamental requirements to provide a just assignment to RTW programs as well as fair eligibility determination for disability benefits.

1.4 Functioning Assessment in Disability Evaluation

Although different countries organize disability evaluation in varying ways, the key information in the evaluation usually refers to functioning and disability. Therefore, *functioning assessments* are a core element of disability evaluation [9] and provide important information for evaluating work disability. Functioning assessment in the context of disability evaluation address the claimant's ability to perform activities relevant for executing physical or cognitive work tasks such as lifting or focusing attention. There are differences in functioning assessments depending on whether the sole purpose for the disability evaluation is determining eligibility for benefits, considering RTW, or both. Toward facilitating RTW, functioning assessments in disability evaluation focus on the appraisal of the *performance* of the claimant. The assessment of functional limitations or abilities and influencing contextual factors, such as the claimant's living conditions or the job market situation, is the basis for selecting appropriate RTW programs to enhance the claimant's potential to perform work tasks and subsequent work participation. Functioning assessment in the context of determining eligibility for benefits is geared toward an objective

statement about the claimant's functional *capacity* in a standardized environment without considering the influence of contextual factors. The functioning assessment provides key information on the relationship between impairments and functional limitations and thus ascertains a claimant's work disability.

The functioning assessment provides key information on the relationship between impairments and functional limitations and thus ascertains a claimant's work disability.

1.5 Work Disability and Vocational Rehabilitation

When a worker becomes ill or develops a health condition or disease, work disability may result which can prevent the individual from continuing to work. Work disability may be associated with personal suffering, limitations in functioning, loss of income, high medical costs, and strained relationships of the individual with others. In addition, work disability may lead to diminished productivity for the individual as a member of society.

Work disability poses a great burden and challenge to both developing [16] and developed nations [17, 18], with indirect cost making up the bulk of the burden in industrialized countries (approximately 80 %) [19]. The challenge is to find ways to mitigate work disability-related burden and how to sustain optimal work participation.

Vocational rehabilitation is defined as “*a multi-professional evidence-based approach that is provided in different settings, services, and activities to working age individuals with health-related impairments, limitations, or restrictions with work functioning, and whose primary aim is to optimize work participation*” [20]. This general definition is based on the International Classification of Functioning, Disability, and Health (ICF) [21] to indicate the breadth and complexity of factors that are relevant to vocational rehabilitation. This conceptual definition considers the aspects of vocational rehabilitation based on the components of the ICF: *Body Functions* and *Body Structure, Activities And Participation*, and the contextual factors [21].

The primary goal of vocational rehabilitation is both RTW and sustained RTW. In some cases, it may be that an individual did not work before (i.e., does not have any work history). Rather than returning to work, the individual in this situation wants to engage in work, which still falls within the context of vocational rehabilitation (e.g., a person who just graduated from high school and had an accident resulting in spinal cord injury, who now wants to work). In this case, vocational

rehabilitation is designed to ensure that the person is able to participate in employment despite the disability.

1.6 The ICF: A Standard for Disability Evaluation and Vocational Rehabilitation

Because the key information in disability evaluation refers to functioning and disability, standards for functioning assessment are instrumental in ensuring comparability, transparency, and fairness in disability evaluation, and the ICF can help facilitate this process. The framework of the ICF conceptualizes human functioning as a dynamic interplay between *body functions* and *body structures*, *activities and participation*, as well as contextual factors, i.e., *environmental factors* and *personal factors*. In disability evaluation, the ICF allows for a comprehensive description of a claimant's functioning and can facilitate a standardized and comprehensible documentation [22]. Thus, it could ensure comparability of functioning assessment in terms of inter-rater reliability. Moreover, the ICF could contribute to a transparent illustration of how impairments affect a claimant's work activities, work participation, and work disability [23] and point to the role of contextual factors in the process [24]. Finally, the ICF can be used to standardize reporting of work disability, which in turn could facilitate comparison of functioning assessment across countries [25].

Study Questions

1. What is disability evaluation and how is it related to work disability?

Answer: Disability evaluation is the determination of the degree of a person's physical, mental, or emotional [disability]. The diagnosis is applied to legal qualification for benefits and income under disability insurance and to eligibility for Social Security and workers' compensation benefits. In the context of eligibility determination for benefits, work disability is a legal concept with varying definitions among social security laws of different countries. However, work disability usually refers to a person's inability to work due to an illness or injury without considering the influence of contextual factors.

2. What is functioning assessment?

Answer: Functioning assessment is a core element of disability evaluation and provides important information for evaluating work disability. Functioning assessment in the context of disability evaluation address the claimant's ability to perform activities relevant for executing physical or cognitive work tasks such as lifting or focusing attention. There are differences in functioning assessments depending on whether the sole purpose for the

disability evaluation is determining eligibility for benefits, or considering RTW, or both.

3. What is vocational rehabilitation?

Answer: Vocational rehabilitation is a multi-professional evidence-based approach that is provided in different settings, services, and activities to working age individuals with health-related impairments, limitations, or restrictions with work functioning and whose primary aim is to optimize work participation.

Glossary

Disability Evaluation The assessment of the extent of a person's work disability is among the key features of *disability evaluation* (DE). DE is instrumental to assign persons with disabilities (i.e., claimants) to the most appropriate *return-to-work* (RTW) programs, medical rehabilitation, and/or provision of assistive devices. DE is also crucial to determine claimants' eligibility for disability benefits, to establish appropriate levels of benefits, and provides the necessary information whether assignment to an RTW program is required before receiving disability benefits.

Eligibility Determination for Benefits *DE in the context of eligibility determination for benefits* is the "determination of the degree of a person's physical, mental, or emotional [disability]. The diagnosis is applied to legal qualification for benefits and income under disability insurance and to eligibility for Social Security and workers' compensation benefits."

Functioning Assessments *Functioning assessments* (FA) are core elements of DE across countries [2] and provide useful information for evaluating work disability. FA in the context of DE address the claimant's ability to perform activities relevant for executing physical or cognitive work tasks such as lifting or focusing attention. There are differences in FA depending on whether the sole purpose for the DE is determining eligibility for benefits or also, respectively, exclusively considering RTW. Toward facilitating RTW, FA in DE focuses on the appraisal of the claimant's *functional performance*. Assessments of functional limitations or abilities and influencing contextual factors such as the claimant's living conditions or the situation on the job market are the basis for selecting appropriate RTW programs to enhance the claimant's functioning at work and, finally, work participation. FA in DE toward eligibility determination for disability benefits are geared toward an objective statement on the claimant's *functional capacity* in a standardized environment without considering the influence of contextual factors. The assessments provide key information for the determination of the relationship between impairments and functional limitations and, thus, for establishing a claimant's work disability.

Return-to-Work Programs and Vocational Rehabilitation *Return-to-work (RTW) programs* can be understood interchangeably with the term *vocational rehabilitation (VR)*. Escorpizo et al. [19] defined VR as “a multi-professional evidence-based approach that is provided in different settings, services, and activities to working age individuals with health-related impairments, limitations, or restrictions with work functioning, and whose primary aim is to optimize work participation.” An RTW program is in principle VR of those who have previously worked with the ultimate goal of undertaking work duties long term. RTW programs encompass services such as job counseling, job placement, job matching, job coaching, skills development and retraining, provision of products and technology, work conditioning, or workplace modification.

Work Disability In the context of RTW, work disability is defined as a claimant’s inability to work due to an illness or injury in the light of influencing contextual factors. In the context of eligibility determination for disability benefits, work disability is seen as a legal concept with varying definitions among social security laws of different countries. However, work disability usually refers to a person’s inability to work due to an illness or injury without considering the influence of contextual factors.

References

1. United Nations. Convention on the rights of persons with disabilities. Geneva: United Nations; 2006.
2. World Health Organization, World Bank. World report on disability. Geneva: WHO Press; 2011.
3. Community Support Network Inc. Employment. Available from: www.csni.org/fpg/Volume%201%20Employment.pdf (2013). Accessed 18 Jun 2013.
4. Eisenberg JM, Power EJ. Transforming insurance coverage into quality health care: voltage drops from potential to delivered quality. *JAMA*. 2000;284(16):2100–7.
5. de Boer W, Besseling J, Willems J. Organisation of disability evaluation in 15 countries. *Pratiques et organisation des soins*. 2007;38:205–17.
6. Slebus FG, Sluiter JK, Kuijer PP, Willems JH, Frings-Dresen MH. Work-ability evaluation: a piece of cake or a hard nut to crack? *Disabil Rehabil*. 2007;29(16):1295–300.
7. Waddell G, Aylward M. The scientific and conceptual basis of incapacity benefits. Norwich: TSO; 2005.
8. National Library of Medicine. Medical Subject Headings (MeSH). http://www.nlm.nih.gov/cgi/mesh/2013/MB_cgi (2013). Accessed 18 Jun 2013.
9. Anner J, Schwegler U, Kunz R, Trezzini B, de Boer W. Evaluation of work disability and the international classification of functioning, disability and health: what to expect and what not. *BMC Public Health*. 2012;12:470.
10. Demeter SL, Andersson GBJ, Smith GM, editors. Disability evaluation. St. Louis: Mosby and the American Medical Association; 1996.
11. Rudbeck M, Fonager K. Agreement between medical expert assessments in social medicine. *Scand J Public Health*. 2011;39(7):766–72.
12. Matheson LN, Kane M, Rodbard D. Development of new methods to determine work disability in the United States. *J Occup Rehabil*. 2001;11(3):143–54.

13. Meershoek A, Krumeich A, Vos R. Judging without criteria? Sickness certification in Dutch disability schemes. *Sociol Health Illn.* 2007;29(4):497–514.
14. Stöhr S, Bollag Y, Auerbach H, Eichler K, Imhof D, Fabbro T, et al. Quality assessment of a randomly selected sample of Swiss medical expertises – a pilot study. *Swiss Med Wkly.* 2011;141:w13173.
15. Hesse B, Gebauer E. Disability assessment for the statutory benefits insurance: significance, need for research, and opportunities. *Rehabilitation (Stuttg).* 2011;50(1):17–24.
16. Chan CC, Zhuo DH. Occupational rehabilitation in twenty-first century Asia Pacific: facilitating health and work: an introduction. *J Occup Rehabil.* 2011;21 Suppl 1:S1–4.
17. Stubbs J, Deaner G. When considering vocational rehabilitation: describing and comparing the Swedish and American systems and professions. *Work.* 2005;24(3):239–49.
18. Organisation for Economic Co-operation and Development Directorate for Employment, Labour and Social Affairs. Sickness, disability and work: keeping on track in the economic downturn (background paper). May 2009. Report No.: High-Level Forum, Stockholm.
19. Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. *Spine J.* 2008;8(1):8–20.
20. Escorpizo R, Reneman MF, Ekholm J, Fritz J, Krupa T, Marnetoft SU, et al. A conceptual definition of vocational rehabilitation based on the ICF: building a shared global model. *J Occup Rehabil.* 2011;21(2):126–33.
21. World Health Organization. International classification of functioning, disability and health (ICF). Geneva: World Health Organization; 2001.
22. Schwegler U, Anner J, Boldt C, Glässel A, Lay V, De Boer WEL, et al. Aspects of functioning and environmental factors in medical work capacity evaluations of persons with chronic widespread pain and low back pain can be represented by a combination of applicable ICF Core Sets. *BMC Public Health.* 2012;12(1):1088.
23. Baron S, Linden M. The role of the “International Classification of Functioning, Disability and Health, ICF” in the description and classification of mental disorders. *Eur Arch Psychiatry Clin Neurosci.* 2008;258 Suppl 5:81–5.
24. Sanderson K, Nicholson J, Graves N, Tilse E, Oldenburg B. Mental health in the workplace: using the ICF to model the prospective associations between symptoms, activities, participation and environmental factors. *Disabil Rehabil.* 2008;30(17):1289–97.
25. Brage S, Donceel P, Falez F. Development of ICF core set for disability evaluation in social security. *Disabil Rehabil.* 2008;30(18):1392–6.

Chapter 2

Conceptual Framework: Functioning and Disability

Reuben Escorpizo

Abbreviations

DOT	Dictionary of Occupational Titles
FCE	Functional capacity evaluation
ICF	International Classification of Functioning, Disability and Health
MGS	Minimal generic set
RTW	Return to work
VR	Vocational rehabilitation
WHO	World Health Organization
WHO DAS	World Health Organization-Disability Assessment Schedule
2.0	version 2.0
WHS	World Health Survey
WORQ	Work Rehabilitation Questionnaire

2.1 Introduction

In 1916, John Collie in his seminal paper presented the challenging issue of return to work for those individuals who have had injuries (or health conditions) that prevent them from working. His paper provided what could be one of the early publications on the challenges and difficulties encountered by the worker, one of

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which being the worker not only *recovering* from the ill effects of injury or a health condition which prevents engaging with work but also being able to sustain that recovery [1]. About a century later, return to work as a process has greatly evolved and has become what we now understand as a multifactorial process with outcomes that are complex and often interrelated. This increasing complexity is coupled with the need for fair and true disability or work disability evaluation so as to inform effective vocational rehabilitation or other appropriate programmes.

This chapter will introduce the readers to the International Classification of Functioning, Disability and Health (ICF) [2] model of the World Health Organization (WHO) and discuss how the ICF model can help us to understand and examine the broader context of work disability in an effort to evaluate disability. This chapter will also provide the readers with an overview of the role of the ICF in vocational rehabilitation and disability evaluation.

2.2 ICF

2.2.1 *The ICF as a Conceptual Model*

In 2001, the World Health Assembly endorsed the ICF [2] as a common framework and language to describe the different aspects of human functioning and disability (disability denotes a negative state, while “functioning” a positive state).¹ The ICF is a conceptual model and also a classification system with applications for providing clinical care and conducting research, developing health and social policy, and conducting population surveys for various reasons. The ICF can be used to understand health and health-related domains and can serve as a common language of disability, in effect serving as a basis to compare disability data across different countries [2]. Hence, the ICF can be used independent of the setting, culture, and context.

As a conceptual model, the ICF illustrates the interrelationship and association between a health condition (disease or injury) and its impact on the individual’s body (as depicted by body functions component and body structure component), and its impact on the individual’s participation in the society (as depicted by activities and participation component). These different components represent the “functioning” aspect of the ICF with the notion that functioning may be influenced by contextual factors (environmental factors and personal factors), which can worsen, improve, or maintain the level of disability of an individual (see Fig. 2.1).

¹ Portions of this section of the chapter has been excerpted and used with some modification from Escorpizo et al. [21] (including Supplement Material), with kind permission of the American Physical Therapy Association (APTA).

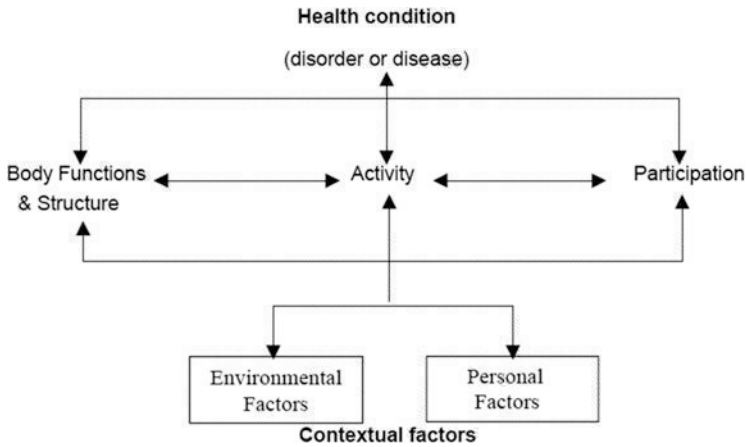


Fig. 2.1 The International Classification of Functioning, Disability and Health (ICF) model of the WHO

Disability refers to either impairment of the body structure and function, limitation of activities, or restriction in participation. Hence, functioning and disability can be illustrated using a sliding scale depending on the positive or negative direction that functioning and disability may take in light of a health condition (Fig. 2.2).

The ICF illustrates the interrelationship and association between a health condition (disease or injury) and its impact on the individual's body (as depicted by body functions component and body structure component) and its impact on the individual's participation in the society (as depicted by activities and participation component).

2.2.2 The ICF as a Classification System

In the ICF, there are different components of human functioning (and disability): *body functions* and *body structures* classify functions and structures at the organ system level respectively. An example of *body function* would be “muscle power function” and “structure of the shoulder region” would be *body structure*. *Activities* and *participation* classify the full range of actions, tasks, and social or life roles such as reading, carrying out daily routine, walking, and remunerative employment. *Body function*, *body structure*, and *activities and participation* can be influenced by characteristics of the person (*personal factors*) such as coping and his or her physical, social, and attitudinal environment (*environmental factors*) such as physical accessibility of a building, attitude of family members, and support from health

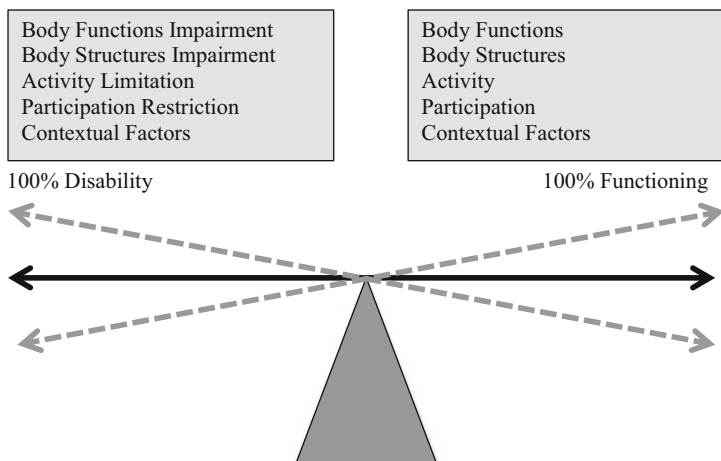


Fig. 2.2 Functioning and disability as depicted in a scale. Impairment, limitation, and restriction in any of the ICF components weigh the scale towards disability; the level of disability is influenced by contextual factors (environment and personal factors)

professionals. Each ICF component, except for *personal factors*, is assigned a letter code: “b” for *body functions*, “s” for *body structures*, “d” for *activities and participation*, and “e” for *environmental factors*. *Personal factors* while defined as the “... background of an individual’s life and living, and comprise features of the individual that are not part of a health condition or health states” [2] are not classified (which means no codes) at this time.

Each ICF component consists of different chapters or domains (e.g. in *body functions* the chapters include mental functioning, sensory functions, functions of the cardiovascular, haematological, immunological, and respiratory system, etc.), and each chapter is made up of several alphanumerically coded *ICF categories* which are the specific units of a domain. Each ICF category is given a distinct alphanumeric code that identifies the component (b, s, d, or e), chapter (number), and level (specific domains) in the hierarchical structure. The classification and coding structure is presented in Fig. 2.3.

As previously said, each ICF category is assigned a component letter and numerical code which makes each category unique. The hierarchical arrangement is illustrated below under *body functions* within the domain “pain”:

ICF component	b	Body function
Chapter/first level	b2	Sensory functions and pain
2nd level category	b280	Sensation of pain
3rd level category	b2801	Pain in body part
4th level category	b28010	Pain in head and neck

Below is an example of the hierarchy of codes under *body structure* within the domain “structure of lower extremity”:

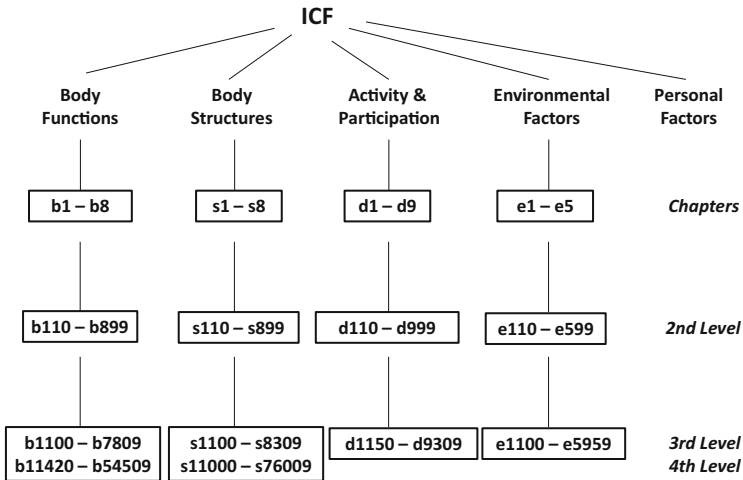


Fig. 2.3 The hierarchical structure of the ICF: from chapter level down to 4th level ICF category specification. For example, “b1–b8” means that there are eight chapters to *body functions*, i.e. chapter b1, b2, b3, etc., “b110–b899” is a collection of codes from b110 to b899

ICF component	s	Body structure
Chapter/first level	s7	Structures related to movement
2nd level category	s750	Structure of lower extremity
3rd level category	s7500	Structure of thigh
4th level category	s75001	Hip joint

In some cases, 4th level categories are not available for some domains. Here is an example for *activities and participation*:

ICF component	d	Activities and participation
Chapter/first level	d8	Major life areas
2nd level category	d850	Remunerative employment
3rd level category	d8500	Self-employment
4th level category	<i>no code</i>	

In the case of d850, other 3rd level ICF categories include d8501 part-time employment and d8502 full-time employment.

Below is an example of the hierarchy of codes under *environmental factors* within the domain “products and technology”:

ICF component	e	Environmental factors
Chapter/first level	e1	Products and technology
2nd level category	e135	Products and technology for employment
3rd level category	e1351	Assistive products and technology for employment

As illustrated above, 3rd and 4th level categories are specifications of the more general and higher levels, namely, the 2nd and 1st levels. In the entire ICF, there are 30 chapters in total and 1,424 separate categories distributed across the four ICF components (*body function*, *body structure*, *activities and participation*, and *environmental factors*).

2.2.3 ICF Contents in Detail

Table 2.1 illustrates the depth and breadth of coverage of the ICF at the chapter level. There are eight chapters for *body functions* ranging from mental functions to integumentary functions and also eight chapters for *body structures* (covering all body organ systems). *Activities and participation* has nine chapters ranging from the simple, person level (learning and applying knowledge) to the more complex, societal level (community, social, and civic life) of interaction. Finally, *environmental factors* cover the entire physical, human-built, technological, attitudinal, and social and political world which are divided into five chapters (Table 2.1).

Table 2.2 illustrates the specification of a chapter, e.g. on mental functions under the *body functions* component, where the two parts of the chapter relate to global mental functions, e.g. consciousness and intellectual function, and to specific mental functions, e.g. perceptual and higher-level cognitive functions.

Table 2.3 illustrates the specification of a chapter, Chap. 4 Mobility of the *Activities and Participation* component in this case. From this table, mobility is categorized into several mobility-relevant descriptions such as those of body position, handling objects, walking, and using transportation. Each category is defined in the ICF handbook, and inclusion and exclusion criteria for each are also provided to make the distinction between and among seemingly similar ICF categories. Readers are referred to the ICF handbook for the detailed description of ICF categories [2].

2.2.4 The ICF Qualifier

The previous section of this chapter provided what domains of functioning and disability are to be assessed in light of health condition. In this section, a way of assessing the problem in a given ICF category will be discussed using “ICF qualifiers” (rating scale). The ICF *qualifiers* can be used to rate the severity or magnitude of the impairment of *body functions* or *body structures*, limitation in *activity*, and restrictions in *participation*. The ICF also provides qualifiers to indicate the extent of an *environmental factor* being a barrier or a facilitator of functioning. Without these qualifiers, an ICF code would not be meaningful in terms of the information that it conveys.

Table 2.1 Components and chapters of the ICF

Body functions (Chapters b1–b8)	
Chapter 1 Mental functions	Chapter 5 Functions of the digestive, metabolic, and endocrine systems
Chapter 2 Sensory functions and pain	Chapter 6 Genitourinary and reproductive systems
Chapter 3 Voice and speech functions	Chapter 7 Neuromusculoskeletal and movement-related functions
Chapter 4 Functions of the cardiovascular, haematological, immunological, and respiratory systems	Chapter 8 Functions of the skin and related structures
Body structures (Chapters s1–s8)	
Chapter 1 Structures of the nervous system	Chapter 5 Structures related to the digestive, metabolic, and endocrine systems
Chapter 2 The eye, ear, and related structures	Chapter 6 Structures related to genitourinary and reproductive systems
Chapter 3 Structures involved in voice and speech	Chapter 7 Structures related to movement
Chapter 4 Structures of the cardiovascular, immunological, and respiratory systems	Chapter 8 Skin and related structures
Activities and participation (Chapters d1–d9)	
Chapter 1 Learning and applying knowledge	Chapter 6 Domestic life
Chapter 2 General tasks and demands	Chapter 7 Interpersonal interactions and relationships
Chapter 3 Communication	Chapter 8 Major life areas
Chapter 4 Mobility	Chapter 9 Community, social, and civic life
Chapter 5 Self-care	
Environmental factors (Chapters e1–e5)	
Chapter 1 Products and technology	Chapter 4 Attitudes
Chapter 2 Natural environment and human-made changes to environment	Chapter 5 Services, systems, and policies
Chapter 3 Support and relationships	

There are different levels of the ICF qualifier. In this chapter, we will simplify and focus on the first-level qualifier and, as for the other levels, see the ICF handbook for details. The first-level qualifier is a generic rating scale from 0 to 4, with 0 = no problem, 1 = mild problem, 2 = moderate problem, 3 = severe problem, and 4 = complete problem. Two additional options can be used: 8 (not specified)² and 9 (not applicable).³ On the other hand, the ICF qualifier for the *environmental factors* has nine response options ranging from 4 (complete barrier) to +4 (complete facilitator), with a zero value indicating neither a facilitator nor a barrier. Three additional options for environmental factors can be used: 8 (barrier,

² When there is not enough or insufficient information to rate an ICF category.

³ When rating an ICF category is not applicable, e.g. assessing d830 higher education in an individual who is still in high school.

Table 2.2 Chapter on “mental functions” and its 2nd-level categories

Global mental functions	b110 Consciousness functions
	b114 Orientation functions
	b117 Intellectual functions
	b122 Global psychosocial functions
	b126 Temperament and personality functions
	b130 Energy and drive functions
	b134 Sleep functions
	b139 Global mental functions, other specified and unspecified
Specific mental functions	b140 Attention functions
	b144 Memory functions
	b147 Psychomotor functions
	b152 Emotional functions
	b156 Perceptual functions
	b160 Thought functions
	b164 Higher-level cognitive functions
	b167 Mental functions of language
	b172 Calculation functions
	b176 Mental function of sequencing complex movements
	b180 Experience of self and time functions
	b189 Specific mental functions, other specified and unspecified
	b198 Mental functions, other specified
b199 Mental functions, unspecified	

not specified), +8 (facilitator, not specified), and 9 (not applicable) using the same principles of definition stated earlier [2]. For each ICF qualifier, the WHO also provides a corresponding range of percentage. See Table 2.4 for a summary of the ICF qualifiers.

So, for example, an ICF code with qualifier of “b134.1” means that there is a mild (or between 5 % and 24 % level of) impairment of sleep functions. The “b134” refers to the ICF code on sleep functions and the “1” refers to the ICF qualifier for mild impairment. ICF categories belonging to *activities and participation* require a performance and capacity qualifier which means at least two first qualifiers. An example is “d4300.32” which means that there is a severe (50–95 %) difficulty with performance in lifting (d4300) and moderate (25–49 %) difficulty with capacity in lifting. The first of the two qualifiers refers to performance and the second to capacity. The concept of performance refers to what an individual does in his or her *current environment or actual context* in which they live; performance involves the influence of environmental factors. Capacity qualifier refers to an individual’s ability tested in a standard or uniform environment (i.e. adjusted for environment) [2].

For *environmental factors*, a plus sign is used to denote that that environmental factor is a facilitator and no sign to denote a barrier. So, for example, a code of e330.+4 means that support and relationship with “people in positions of

Table 2.3 Chapter on “mobility” and its 2nd-level categories

Changing and maintaining body position	d410 Changing basic body position
	d415 Maintaining a body position
	d420 Transferring oneself
	d429 Changing and maintaining body position, other specified and unspecified
Carrying, moving, and handling objects	d430 Lifting and carrying objects
	d435 Moving objects with lower extremities
	d440 Fine hand use
	d445 Hand and arm use
	d449 Carrying, moving, and handling objects, other specified and unspecified
Walking and moving	d450 Walking
	d455 Moving around
	d460 Moving around in different locations
	d465 Moving around using equipment
	d469 Walking and moving, other specified and unspecified
Moving around using transportation	d470 Using transportation
	d475 Driving
	d480 Riding animals for transportation
	d489 Moving around using transportation, other specified and unspecified
	d498 Mobility, other specified
	d499 Mobility, unspecified

authority” (i.e. e330) is a complete (96–100 %) facilitator, while a code of e330.4 means that the support is a complete barrier.

Readers are advised to consult the ICF handbook for more details on the ICF qualifiers.

2.3 Work Disability

2.3.1 Work Disability

Work or employment is a major area in people’s lives. You or somebody you know has worked at some point in their lives. Work contributes to a person’s well-being and health; hence, it is a significant aspect of daily activities. However, when a worker suffers from the effects of a health condition, illness, or disease, work disability may result which can prevent that individual from working (hence, work disability). Other additional health conditions or comorbidities can occur as a result of work disability. Work disability may be associated with personal suffering, limitations in functioning, loss of income, high medical costs, and