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# An ICF-based assessment tool: the ICF-Application

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**Abstract:** This paper presents a trial aimed at developing an assessment tool based on the International Classification of Functioning (ICF) framework, designed to define the Biopsychosocial Functional Profile of persons with disabilities, including the elderly and those with mental health disorders. This tool comprises an open-access online platform designed to disseminate an evidence-based approach in social, educational, and rehabilitation contexts through the use of the ICF. Aligned with the conceptual framework of Universal Design (UD) and the UN STGs 3 and 4, the ICF Application platform offers targeted guidance for identifying and analysing barriers, environmental and personal factors that impact human functioning and necessitate intervention to support individuals' empowerment within their living contexts. With the information collected through the ICF questionnaire, the platform allows the development of functional profiles that serve as comprehensive assessment tools, facilitating the generation of indicators for the planning, evaluation, and implementation of interventions tailored to specific population targets. The trial demonstrated that employing the biopsychosocial assessment provides evidence regarding individual support needs and the design of accessible environments from the UD perspective. Furthermore, the platform offers tools for education, rehabilitation, and social-care professionals to apply the principles of the ICF for designing person-centred interventions.

**Keywords:**
International Classification of Functioning, Assessment Tool, Application Platform, Participatory Action Research

## 1. Introduction

The International Classification of Functioning, Disability and Health (ICF), promoted and disseminated by the World Health Organization (WHO) since 2001, serves as a tool for describing an individual's overall health status and the impact of various pathologies on their quality of life. It is a matter of fact that the analysis of functioning allows highlighting that it is not the health conditions themselves that cause disabilities, but rather the way in which they impact the life context, from which the person can receive support and/or encounter barriers.

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The ICF was originally elaborated as a classification tool for descriptive purposes. However, the WHO has also promoted its use for assessment purposes, as demonstrated by the implementation of WHODAS 2.0 – Disability Assessment Schedule [1]. This assessment's purpose is further emphasised in the ICF-CY, which clearly specifies that the ICF classification unit is not intended for diagnosis, but rather for the development of Functioning Profiles [2, p. 23].

A systematic literature review by Cerniauskaite et al. [3] identified over one hundred studies presenting insights and applications of the ICF to specific categories of individuals. All these experiences have in common the fact that they were developed starting from a selection of codes, from among the over 1,400 items that make the ICF capable of describing the prototypical spectrum of functioning of persons with specific clinical and social conditions.

Based on these premises, this paper reports one component of a broader participatory research programme: the co-design and initial field testing of an ICF-based assessment tool for defining Biopsychosocial Functional Profiles of persons with disabilities, older people, and persons with mental health conditions [4, 5]. The specific aims were to develop a shared question-based instrument, make its data-processing workflow explicit, and examine whether its outputs could support educational, social-care, and rehabilitation planning.

The ICF Application platform[2] is aligned with the conceptual framework of Universal Design (UD), which provides guidance for designing accessible environments, and for identifying and analysing the barriers and factors (environmental and personal) that impact human functioning and necessitate intervention to support individuals' empowerment within their living contexts.

## 2. Methodology

The study used Participatory Action Research [6]. Three multidisciplinary expert groups participated: 14 Local Health Unit professionals (a neuropsychiatrist, physiatrist, psychologist, rehabilitation therapist, educator, and social worker), 20 teachers specialising in disability support and inclusion, and 4 paediatricians. Their complementary expertise informed the co-design, field testing, analysis, and revision of the assessment tool.

The groups worked as co-generative learning communities [7, p. 141]. In successive sessions, participants reviewed the ICF framework, compared professional perspectives, selected items relevant to the intended educational and care contexts, reformulated them as observable questions, and discussed their practical clarity and relevance. Field use feedback was subsequently utilized to refine the questions and the resulting graphical outputs.

The first design objective was to identify a shared Core Set of ICF codes for Functioning Profiles (FPs) and Individualised Education Plans (IEPs), with particular attention to Activity and Participation and to recurrent Environmental Factors [8-11]. Selection was based on relevance to the target contexts and usability across professional perspectives; the study did not apply a psychometric item-reduction procedure.

[2] Available at: https://www.icfapplicazioni.it/eng/

The second objective was to define an organisationally sustainable workflow through which different stakeholders could contribute to the FP and IEP. The expert groups therefore assessed the criteria primarily through structured discussion and iterative field feedback on comprehensibility, professional relevance, and usability.
The principal input-stage result was a shared question-based instrument derived from the selected ICF items. Each question records information needed to assign the applicable ICF qualifier or contextual category. This question-based operationalisation follows an approach previously documented and tested in the literature [12, 13].
The workflow is as follows: a professional completes the online ICF questionnaire; each response is linked to its ICF code and qualifier; the platform applies predefined rule-based transformations; and the coded values are displayed in functional profiles and graphs. The analysis is descriptive rather than inferential: qualifier values and contextual categories are retained and visualised through severity levels, colours, and domain-based profiles. No predictive modelling or statistical hypothesis testing was used in this development trial.

## 3. Results

The co-design phase produced two connected outputs: (1) the shared question-based ICF instrument described above and (2) an online processing and visualisation workflow. This addresses the input and output stages as parts of a single assessment process. The trial established content and practical usability through multidisciplinary review and iterative field feedback; formal reliability, validity, and between-group comparisons remain objectives for subsequent phases of the broader study.
When questionnaire responses are submitted, the platform maps them to the corresponding ICF codes and qualifiers and generates descriptive indicators for planning, monitoring, and evaluating interventions [14, 15]. The rule-based output includes the following six profiles:

- A Performance and Capacity profile on the Activities and Participation dimension (Fig. 1).
- A Context analysis of barriers and facilitators (Fig. 2).
- A Health profile (Fig. 3).
- An Analysis of the strengths and weaknesses of the support network (Fig. 4).
- A Skills profile (Fig. 5).
- A Job potential profile (Fig. 6).

Figure 1 presents a graphical representation of the performance and capacity profile associated with the activities and participation dimension:

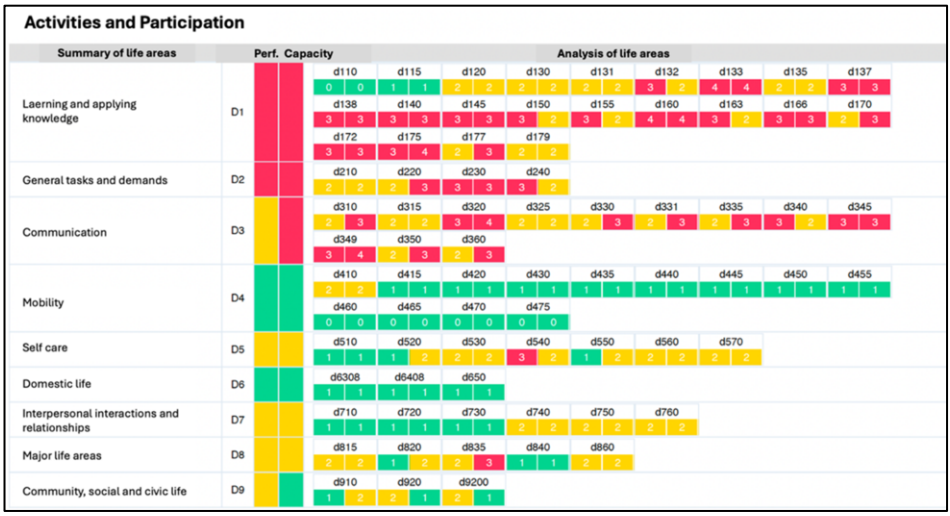



**Figure 1.** Example of the chart of Performance and Capacity profile concerning the activities and participation dimensions[3]

This figure displays Activity and Participation items using the ICF performance and capacity qualifiers. Values represent problem severity on the ICF 0-4 scale: 0 denotes no problem, 1 mild, 2 moderate, 3 severe, and 4 complete. Green indicates no or mild problems, yellow moderate problems, and red severe or complete problems. In this example, difficulties are concentrated in learning and applying knowledge and in communication, identifying priorities for targeted intervention.
The comparison between capacity and performance also indicates whether functioning changes in the person's current environment, thereby linking individual support needs with possible environmental adaptations.

Figure 2 illustrates the contextual analysis. Environmental factors are coded according to their observed role in the person's functioning: green indicates a facilitator and red a barrier:

3 The numbers reported in the figure correspond to the ICF codes (for example: code d110 stands for "Watching" or observing/intentionally using the sense of sight).

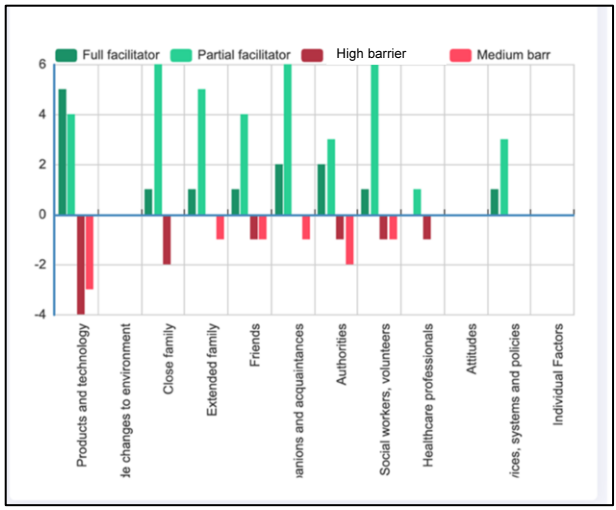



**Figure 2.** Example of the graph concerning the Contextual Factors

In this example, close family, friends, and social workers act as facilitators, whereas features of the living environment constitute barriers when appropriate adaptations are absent.
The profile therefore documents both resources that can be mobilised and environmental conditions that should be addressed through Universal Design or individualised adjustments.

Figure 3 presents Body Functions and Structures affected by impairment:

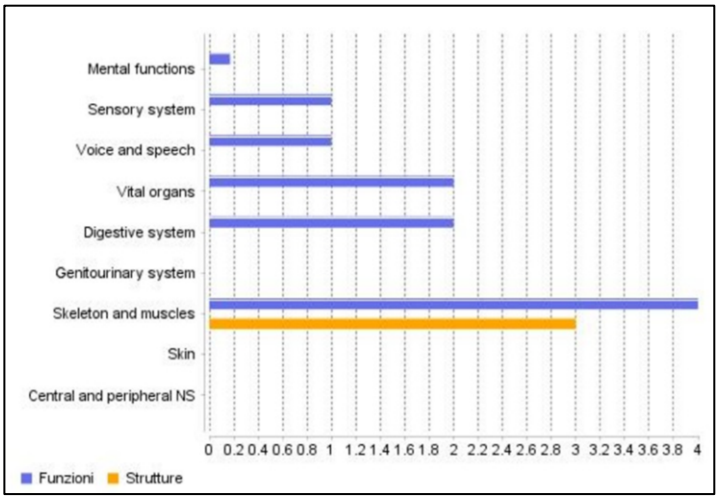



**Figure 3.** Example of the graph concerning Functions and Body Structures

The horizontal bars retain the ICF qualifier values from 0 (no impairment) to 4 (complete impairment), enabling both the affected domains and their severity to be read directly.

In this example, the profile identifies impairments across several domains of Body Functions and Structures. Its purpose is descriptive and decision-supporting: it helps professionals connect physical characteristics with participation needs and contextual intervention, rather than provide a diagnosis. This use responds to the WHO recommendation to plan interventions by considering the interaction between a person's characteristics and life contexts.

Figure 4 shifts the analysis from individual functioning to the support network:

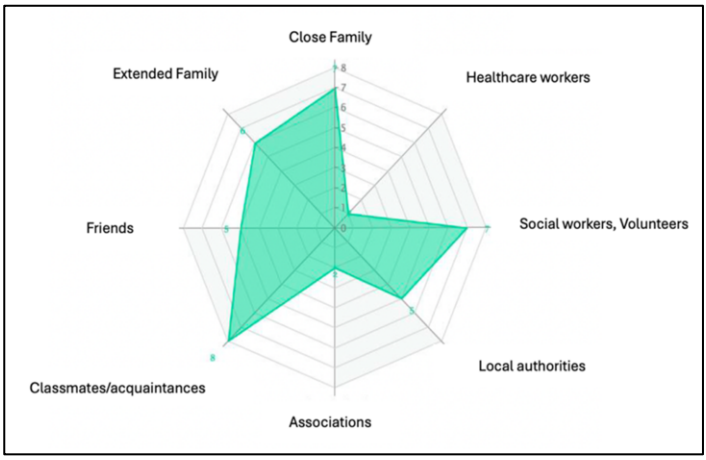



**Figure 4.** Example of the graph concerning the strengths and weaknesses of the Support Network

It distinguishes relationships and services that currently provide support from those that are absent or insufficient.
In this example, associations and healthcare workers are not yet acting as effective supports. The representation helps professionals identify service gaps and community resources that could be engaged more effectively in inclusion processes.

Figure 5 summarises competencies relevant to autonomy, education, and transition planning:

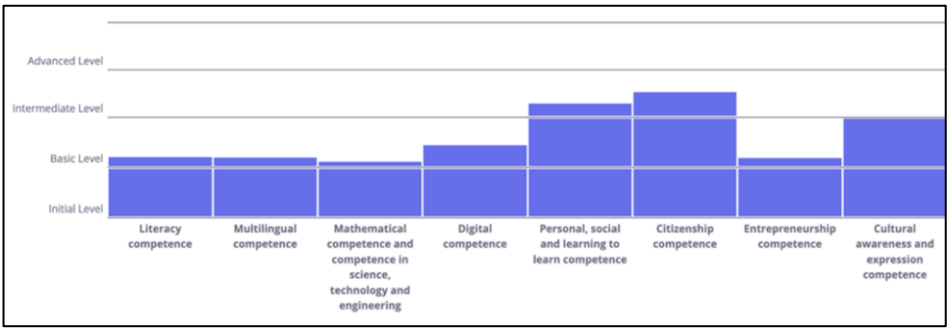



**Figure 5.** Example of the chart concerning the Skills Profile

It can inform an IEP or a school-to-work programme by distinguishing acquired competencies from those requiring further intervention.
In this example, basic literacy and mathematical competencies are present, while social and citizenship competencies show a good level of acquisition.
The profile supports realistic personal and educational objectives aligned with the individual's characteristics and potential.

Figure 6 presents the job-potential profile as decision support for job seeking and placement:

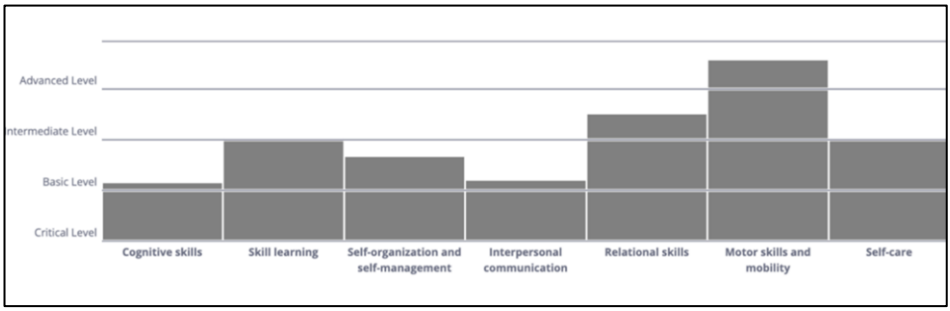



**Figure 6.** Example of the chart concerning the Job Potential Profile

It combines functioning-related resources and support needs without treating the output as a deterministic vocational prescription.
In this example, relational and interpersonal skills suggest that customer-facing work, such as a shop-assistant role, may be compatible with the person's profile.
The chart is intended to guide exploration of compatible work contexts and to identify reasonable support and adjustments where autonomy is insufficient.

Taken together, the six outputs are intended to support a common language across education, health, rehabilitation, and social care. Their contribution is not the production of a single global score, but the coordinated display of complementary information: what a person can do, what the person does in the current context, which environmental factors facilitate or hinder participation, which body functions and structures are affected, and which personal and network resources can be mobilised. This distinction is important for Universal Design because it directs attention away from impairment alone and towards the interaction between human variability and environmental demands. The profiles can therefore be used to formulate hypotheses for intervention, document priorities, and monitor whether planned supports or environmental changes correspond to the needs recorded in the assessment. Interpretation nevertheless remains a professional and participatory task. The graphs should be discussed with the person concerned and, where appropriate, with family members and the multidisciplinary team; they do not replace clinical diagnosis, educational observation, or shared decision-making.

## 4. Conclusions

At the time of writing, the portal was used by 17,551 people, primarily teachers preparing ICF-based IEPs [16], as well as social-care and rehabilitation professionals developing personalised life plans for persons with disabilities, older people, and persons with mental health conditions.

This development trial indicates that a shared ICF questionnaire and transparent, rule-based data visualisation can support the identification of individual needs and person-centred planning for accessible living environments in line with Universal Design. The findings concern content development and practical usability; further research should test reliability, validity, outcome sensitivity, and transferability across settings and populations.

The present paper reports the developmental stage of a broader research programme. Its strengths are the multidisciplinary co-design process, the explicit connection between questionnaire inputs and graphical outputs, and its implementation in ordinary educational and care settings. At the same time, the trial does not provide psychometric validation, inter-rater reliability estimates, inferential comparisons between professional groups, or evidence that use of the platform improves individual outcomes. The reported number of users indicates dissemination rather than effectiveness. Subsequent phases should therefore document the final item set and decision rules in greater detail; test content validity, construct validity, reliability, and sensitivity to change; examine accessibility and usability with different user groups; and evaluate whether platform-supported planning produces measurable improvements in participation and environmental accessibility. Particular attention should also be paid to co-evaluation with persons with disabilities, so that the interpretation of barriers, facilitators, and personal priorities is not limited to professional perspectives. Within these boundaries, an open-access ICF-based tool can foster shared assessment practices across education, social care, and healthcare and strengthen collaboration between academic research, community services, and the people whose life contexts are being assessed.

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