

Implementing Universal Design and the ICF in Higher Education: Towards a Model That Achieves Quality Higher Education for All

Giulia M. L. BENCINI^{a,1}, Ilaria GAROFOLO^b, Alberto ARENGHI^c

^a *Ca Foscari University of Venice, Department of Linguistics and Comparative Cultural Studies*

^b *University of Trieste, Department of Engineering and Architecture*

^c *University of Brescia, Department of Civil Engineering, Architecture, Land, Environment and of Mathematics*

Abstract. The landmark UN 2030 Agenda for Sustainable Development Goals (SDGs) for the first time explicitly makes reference to the inclusion of the needs and capacities of all persons, on equal grounds, in the planning of our built environment and services (Goal 11) and in our quality educational systems (Goal 4). Accessibility and inclusion of all people in vulnerable situations, including people with disabilities, provides a strong benchmark for sustainability. Accessibility and Inclusion in higher education are the topic of an increasing number of studies, however, there is no existing common set of multidomain indicators for Inclusion available to the multiple stakeholders involved in higher education. The purpose of this paper is to fill this gap. With a Universal Design approach and the common language of the ICF we aim to provide a multi-dimensional assessment and planning tool to quantitatively and qualitatively measure Inclusion of environments and services in Higher Education.

Keywords. ICF and Universal Design in Higher Education, Inclusion in Higher Education, Inclusion Index.

1. Introduction

Universities world-wide have increasingly embraced the values of Accessibility and Inclusion for diverse student populations. This is in line with several supra-national policies and agendas at the European and global level which recognize that being able to be educated is an essential human function (UN 2030 Sustainable Development Goal Number 4: Access to quality education for all). Choosing to be educated and having access to Higher Education enhances personal freedoms and capabilities, and at a societal

¹ Giulia M. L. Bencini, Corresponding author, Ca Foscari University of Venice; E-mail: giulia.bencini@unive.it.

level, higher education plays a pivotal role in eliminating disparities among citizens based on gender, disability, minority-status, or any other form of socially-based exclusion and inequality [1]. There is, however, still a great need to mainstream disability along the lines advocated by many international organizations [2].

Implementing inclusive higher education requires a number of conceptual and operational shifts on multiple dimensions. First, inclusion requires designing learning environments (in the broadest sense) that take student diversity as a starting point, second it requires embracing inclusion as a dynamic interaction between people (i.e. students) and their physical, social, technological and social environments [3]. Third, for a university system to be inclusive, its governance and policies, its physical, administrative, instructional, technical, and communicative environments and policies need to be systematically described and assessed in order to either plan their initial development or transformation. Interventions to foster Inclusion in higher education are increasing in number in many countries, as is the number of studies that offer detailed analyses of one domain such as: reasonable accommodations and accessibility to higher education; career guidance; universal design for learning; assistive technologies and ICT; job placement services; peer-tutoring (see, for example, the contributions in the edited volume by Pace, Pavone and Petrini, 2018 and references therein [4]. We argue that for inclusion to be effective at a systems level, initiatives in one domain (e.g., accessibility to the built environment) must be linked to inclusion in other domains (e.g., accessible teaching and learning). There is, to our knowledge, no existing set of multidomain indicators to assist the multiple stakeholders involved in higher education.

In this paper we propose that the framework and coding system offered by the International Classification of Functioning Disability and Health or ICF [3] can be combined with a Universal Design approach for the built environment [5][6][7][8] and Universal Design for Learning for the educational environment see [9][10][11][12][13][14] to assist all actors involved in planning for higher education build inclusive learning spaces and services. The goal of the paper is twofold: 1) to increase awareness of the usefulness of the ICF in higher education as conceptual framework and assessment tool to be implemented both at the level of individual learners entering higher education and at the level of the learning environments 2) to provide a multi-domain measurable set of environmental indicators for inclusion in higher education to be shared by local and national educational policy makers, administrators, educators, designers and the entire community of users. It is essential to plan and build for inclusion in higher education with a multidisciplinary approach and domain specific expertise – but all actors must share a common language. For this we propose the use of the common framework of the ICF.

We start with a brief introduction and overview of the ICF framework in section 2 and then present our proposal of a core set of ICF domains specifically relevant to the design process of Higher Education environments, taking a student oriented perspective as our reference point.

2. Introduction to the ICF

The ICF is a classification system that belongs to World Health Organization (WHO) family of international classifications [3]. Whereas the more widely known International Classification of Diseases (ICD) gives users an etiological framework to classify diseases by diagnosis through the use of an alphanumeric coding system (e.g.: F81.0, Specific reading disorder; F81.81, disorder of written expression), the ICF offers a complementary and broader classification system to the ICD. Like the ICD the ICF is grounded in the body with a list of body *functions* and *structures* (e.g., The structures and functions of the nervous system), but, unlike the ICD, the ICF also includes lists of domains of *activity* and domains of *participation*.

In the ICF, the term *functioning* is a neutral term and it refers to all body functions, activities and participation. Similarly, the term *disability* is a neutral cover term that applies to impairments, activity limitations and participation restrictions. Central to the ICF is also the recognition of the role of environmental variables on human functions, activities and participation, so the ICF also includes lists of *environments*. Because the ICF adopts a person-centered view, environments are broadly defined as consisting not just of the physical environment but also including the social, relational and cultural environments.

Like the ICD, the ICF uses an alphanumeric coding system with letter codes to identify the major domains describing human functions (**b** = body functions; **s** = body structures), activities (**d**) and environments (**e**). In addition to the major codes the ICF uses Qualifiers following the codes: numbers 0-4 indicate level of impairment (0=none, 4=complete problem). Further qualifiers have different meanings: In Activity/Participation: there is a distinction between a person's ability to perform a skill in his/her natural environment (performance qualifier) vs. performing the skill in a standard setting, such as a clinic (capacity qualifier). The capacity qualifier in turn consists of 2 digits, indicating capacity without assistance and capacity with assistance.

As an example, consider the case of a person who may, for whatever reason – it could be hearing loss, language deficit or speaking in a non-native language – have severe difficulties in carrying out a conversation in a natural environment. The relevant ICF macro-chapter is d3 (Communication), the subchapter is d3501: “sustaining a conversation” which is defined as “Continuing and shaping a dialogue or interchange by taking turns in vocalizing, speaking or signing, by adding ideas, introducing a new topic or retrieving a topic that has been previously mentioned” [3]. She/he would therefore receive a 3 (indicating severe impairment) on the corresponding activity, followed by a 2 code for the first capacity qualifier without assistance (indicating moderate impairment) in a standardized environment (such as a speech-language therapy clinic) and a 1 score for the capacity qualifier in a standardized environment with assistance. To summarize, the corresponding ICF code would be: d350.3.2.1. The code reads: severe impairment in conducting a conversation in a natural environment, moderate impairment in a standardized setting without assistance, mild impairment in a standardized setting with assistance (Example adapted from [16]).

2.1 The ICF in higher education

We propose that the ICF is a useful common framework to adopt and share across stakeholders in higher education because it offers a person centered classification system which is useful to flexibly describe who the learners entering higher education are, the extent to which they can and cannot perform functions and activities in different contexts through the useful distinction between “performance” and “capacity” illustrated in the example provided in introduction section above and the more fine-grained set of descriptors for learner profiles above and beyond standard ICD diagnostic codes. ICF codes also include useful information relative to the kinds of accommodations needed to support student’s best performance, be it quiet testing environments, smaller class-room settings and flexible seating arrangements, communication support services in the form of translators, captioning, to name a few.

Another strength of the ICF is the importance of the role of the environment. It is within this domain that we focused on in developing our set of indicators, because this where stakeholders can intervene with a systems wide approach in higher education. In choosing the indicators to include in the Environment Chapters relevant for Higher Education in a student-centered approach, we situated our selection of indicators first by narrowing the definition of “environments” to those that are typical of higher education, from the built environment (classrooms, student halls, libraries, labs, facilities) to the online or virtual environment (e.g., website, e-learning or virtual-reality-platforms) to the human environment (teaching staff, administrative staff, peers).

2.2 The ICF, Universal Design and Universal Design for Learning

Common to the ICF, Universal Design and Universal Design for Learning approaches is the focus on the interaction between person and environment – in this extended sense [7][8]. With respect to the built environment in which learning takes place, Universal Design is the highest expression of person-centered planning philosophy. UD is addressed “to the greatest extent possible” of all users (hence introducing a limit) which cannot literally mean each and every single person, otherwise designing ‘for all’ risks hiding behind a single abstract definition losing both sight of the complexity of the real world and giving the illusion that Universally Designed spaces are the final solution. UD is best viewed as an ongoing process, in the awareness that there is no one easy fix. There will always be unique situations which require customized solutions [17].

3. Development of Key Indicators for Inclusion in Higher Education

Universities must be directed to adopt diversity and inclusion as core values within their mission and strategic planning, to be required to provide university-wide inclusion plans that take into account people, environments and their interactions and monitor progress through periodic status reports. All of the stakeholders involved in design for education, be it designers of the built environment (e.g., architects and engineers) or curriculum and learning designers (program or department directors, academic and instructional staff) must be involved in the design and planning stage with a view that takes student diversity into account, in a dynamic transformative process informed by advances in technology and learning science (e.g. Universal Design for Learning).

To plan, develop and monitor inclusion, key indicators must be available and shared across stakeholders. For this we propose using the common language of the ICF to contextualize the domain of the indicator. We find that the ICF offers a person-centered approach that can be useful both as a general framework and a flexible descriptive matrix to encode individual and personal student characteristics. The advantage of the ICF is that it is applicable to ALL students, irrespective of their physical, cognitive, psychological, cultural, or linguistic backgrounds. The ICF also allows us to describe the physical, instructional, social and cultural environments in which learning takes place, highlighting the central role played by contextual variables on learning outcomes. Our multi-domain instrument is aimed at aiding institutions of higher education in systematizing their manyfold actions and approaches to inclusion within a more holistic framework.

3.1. ICF Chapters relevant to describing personal learner characteristics

Inclusive education models require learner-centered approaches to education and environments that maximally support learners with diverse physical, linguistic, cognitive and learning styles, while at the same time meeting national higher education standards. In the current WHO conceptualization, the ICF shifts the emphasis from disease and disability to the broader concept of functioning, activity and participation, which apply to all human beings. As we saw in section 2, the ICF includes both a description of a person's body structures and functions (e.g., motor and sensory functions, special mental functions such as language, activities such as communicating) to the impact that limitation in one domain may have on a person's ability to participate in domains of life such as education and educational related activities (e.g., participating in: an archeological trip, a chemistry lab, a foreign language discussion group, etc.). This is moderated by contextual and personal factors, from individual circumstances and attitudes to larger societal factors (e.g., anything from belief systems about the role of higher education with respect to paid employment, to beliefs about the value of learning foreign languages).

University planners, governance bodies, instructional and technical staff need to be familiar with the conceptual framework and basic coding system of the ICF to consider the design impact of: differing characteristics of students from various backgrounds and ages; students navigating the built environment and the virtual environment without sight or hearing, or even with neither sight nor hearing; varying language backgrounds and competencies in accessing and understanding information presented in print media, audio, video, communication and websites; the consequences of disease or trauma; the challenges for students with limited mobility or agility as they seek to participate in academic life (lectures, events, international mobility and study abroad). Fortunately, the ICF is increasingly being adopted internationally to define functional learner profiles to accompany learners throughout their educational careers from primary to secondary school and in a growing number of cases ICF functional profiles are making their way into higher educational systems – a trend we strongly support, because functional profiles obtained during a student's primary and secondary schooling career offer precious information as to the adaptations required.

3.2. *Chapters relevant to describing the learning environment*

The ICF contains a large number of environmental chapters - physical, social, and relational in nature. When choosing the relevant environmental chapters we deliberately adopted a learner-centered perspective, that is, we placed the learner at the center of the ICF framework and then used the ICF coding system to describe everything in the learning environment from a student's perspective. From a student's perspective *environment* includes everything from the physical and virtual learning environments, to the way learning is facilitated via learning curricula, to the providers of instruction and services, to the individual interactions with different faculty, staff and peers.

In our work we aimed at selecting the most relevant ICF Environmental Chapters drawing on our own perspectives and experiences as researchers, educators and university appointed delegates for disability support services in medium-sized Italian Universities with undergraduate and programs that span across the liberal-arts and humanities, physical, biological and social sciences, medicine, architecture and engineering. We therefore identified the following environmental ICF chapters and situated them in a university context, from a student-centered perspective:

- E1 Chapters covering products and technology
- E3 Chapters covering support and relationships
- E4 Chapters covering attitudes
- E 5 Chapters covering services, systems and policies.

4. **Towards a multidomain set of indicators for inclusion**

Inclusion in higher education requires planning physical, virtual and social environments that maximally support learners with diverse physical, linguistic, cognitive and learning preferences and styles. In order to allow stakeholders in higher education plan and monitor inclusion we provide a multi-domain checklist using the ICF along with quantitatively and qualitatively measurable indicators across different ICF environmental chapters which stakeholders in higher education have agency on. The checklist is summarized in Table 1. The checklist aims at the right balance between qualitative, quantitative indicators or a mixture of the two, following the dictact that indicators should try to be SMART (specific, measurable, attainable, relevant and time bound) and SPICED (subjective, participatory, interpreted, cross-checked, empowering and diverse).

Future work will test the use of these indicators in different universities. This will allow us to select benchmarks with the goal of developing shared best practices at a national and international level.

4.1. *Summary and concluding remarks*

Inclusion in higher education requires planning physical, virtual and social environments that maximally support learners with diverse physical, linguistic, cognitive and learning preferences and styles. In this work we have outlined a multi-domain instrument aimed at aiding institutions of higher education assess, plan and monitor Inclusion practices and actions. We recognize that many institutions may be well along their way in the domains described by the indicators, however, there is no existing instrument that captures the

need for a holistic approach to Inclusion, nor metrics that can help institutions assess or benchmark their actions for inclusion. This instrument can therefore be used by universities in their strategic plans for Inclusion, allowing for a greater synergy across traditionally different actors (e.g., persons in charge of planning the built environment, persons involved in curriculum development, ICT, etc.)

Table 1. Multidomain Instrument for Inclusion in Higher Education using the ICF with Quantitative (SM) and Qualitative (SP) Indicators and related Metrics (N = Number; SM = SMART Indicator; SP = Spiced Indicator).

Chapter		Indicator		Type	Metric
E1 - PRODUCTS AND TECHNOLOGY continue...	E125 Products and technology for communication	1	Fix hardware equipped with dedicated accessibility programs	SM	N devices
		2	Portable hardware equipped with dedicated accessibility programs	SM	N devices
		3	Applications and software (text to speech, captioning..)	SM & SP	N licences
		4	Research and development initiatives with focus on UD, UDL and inclusion	SM & SP	N initiatives
		5	Texts composed following plain and baes language principles and guidelines	SM	existence
	E 130 Products and technology for education	6	Educational technology and software, learning labs and platforms, video and audio hardware and software	SM & SP	N products
		7	Courses providing multiple means of engagement, representation, action and expression	SM & SP	N courses N credits hours
		8	Continuing education and training opportunities on ICF and UDL for administative, technical, instructional and support staff	SM & SP	N participants N hours
		9	Research and development in inclusive education	SM & SP	N projects
	E140 Products and technology for culture, recreation and sport	10	Flexible or specially designed equipment	SM	N products
		11	Applications and software (text to speech, captioning..)	SM	N products
		12	Events providing multiple means of participation, engagement, representation, action and expression	SM & SP	N events

Table 1. Multidomain Instrument for Inclusion in Higher Education using the ICF (continued)

Chapter		Indicator		Type	Metric
continue... E1 - PRODUCTS AND TECHNOLOGY	E150 Design, construction and building products and technology of buildings for public use	13	Accessible locations compliant with current standards	SM & SP	% classrooms % facilities % lecture, meeting and conference halls
		14	Orientation and navigation facilitators (tactile paths and maps, wayfinding)	SM & SP	N devices/facilitators
		15	Proximity and navigation software	SM	N devices
		16	Clear, flexible and multi-media /muti format information and signage	SM & SP	% signage out of total % safety, evacuation, hazards signage
		17	Flexible or specially designed furniture and equipment	SM&SP	% furniture % equipment
		18	Spaces designed for easy and flexible use	SM & SP	% of classrooms with movable seatings and furniture
		19	Domotics	SM	N devices
E3 - SUPPORT AND RELATIONSHIPS	E360 Other professionals	20	Instructional staff compent in UDL	SM & SP	N
		21	Continuing education and training opportunities on ICF and UDL for administative, technical, instructional and support staff	SM & SP	N persons N initiatives
E4 - ATTITUDES	E425 Individual attitudes of peers, colleagues and community members	22	Continuing education and training opportunities on ICF and UDL for administative, technical, instructional and support staff	SM & SP	N initiatives N participants
	E430 Individual attitudes of people in positions of authority	23	Public engagement initiatives respecting UD	SM & SP	N initiatives N participants
	E460 Societal attitudes	24	Public engagement initiatives respecting UD	SM & SP	N initiatives N participants
E5 - SERVICES, SYSTEMS AND POLICIES	E5400 Transportation services	25	Transportation services to and from university facilities and off-site locations	SM & SP	existence of service
	E545 Civil protection services, systems and policies	26	Safety and evacuation plans for persons with disabilities	SM & SP	existence of plans
	E5352 Communication policies	27	Inclusion and UD endorsed by all university statutes, acts and strategic documents	SM & SP	existence of plans
		28	Availability of documents and guidelines, how to's, best practices, checklists	SM	existence
		29	Communication, information and documents comply with accessibilty standards (e.g. W3C), texts are flexible, multimodal and in alternative formats	SM & SP	existence
		30	Texts composed following plain and baes language principles and guidelines	SP	existence

In our selection of the student relevant ICF Environmental Chapters we also draw on our own perspectives and experiences as researchers, educators and university appointed delegates for disability support services in medium-sized Italian Universities with undergraduate and programs that span across the liberal-arts and humanities, physical, biological and social sciences, medicine, architecture and engineering.

Future work will test the use of these indicators in different universities. This will allow us to select benchmarks with the goal of developing shared best practices at a national and international level.

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