

Chapter #7

DESIGN BASED ON ICF

The training courses for in-service teachers

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ABSTRACT

The International Classification of Functioning, Disability and Health (ICF) allowed to adopt that new of 'functioning', which refers to bodily structures and functions, activity and participation and interaction between these and personal and environmental factors.

The model is increasingly becoming the reference for the planning/organization of inclusive interventions, in Europe and in the Italian schools: it has been one of the main topics (l. 107/2015) in the last three-year Italian teacher training plan.

The work presents procedures the early results of three professional training courses evaluation (2017-2019). The courses involved 73 in-service teachers and aimed to enhance the design skills of Individualized Education Plan (IEP) on ICF model. According to the Kirkpatrick Model, the evaluation has been conducted on the teachers' 'learnings' and 'transfer' detected through pre-post test and a document analysis of the IEP.

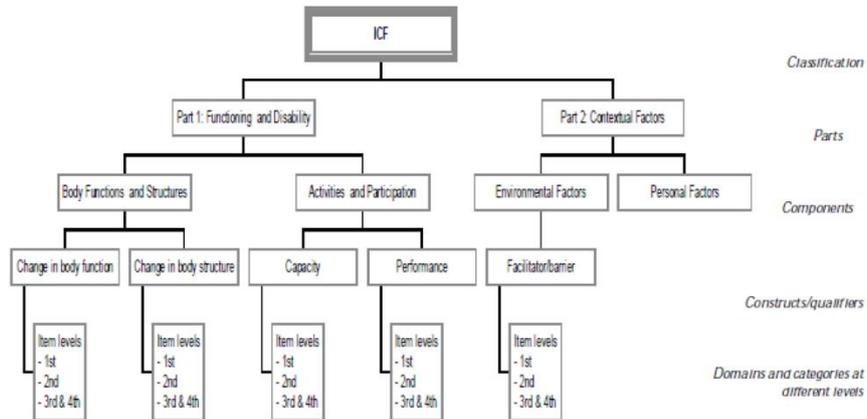
The study highlighted few linguistic and semantic difficulties and a better teachers' sensitivity to the environmental component of the functioning. It offers some useful hints for the construction of a possible trans-national platform (as sharing of practices, data-base) about the training of school teachers on ICF bio-psychosocial model, as well as arguments regarding the tools for verifying the effectiveness of teachers training interventions.

Keywords: international classification of functioning disability and health, special education, individual educational plan, in-service teachers' training.

1. INTRODUCTION – ICF: SEMANTIC NOVELTIES AND TRAINING NEEDS FOR TEACHERS

The 'International Classification of Functioning, Disability and Health' (ICF) is a framework for describing the people health. Exceeding the traditional concept of 'disability' as 'deficit', the framework applies a bio-psychosocial model (WHO, 2001), also for children and youth (WHO, 2007). The used term 'functioning' refers to the *neutral* interaction between individual (with a given health condition) and contextual factors (environmental and personal). Thanks to a dynamic relation between four components - Body Functions (BF) and Structures (BS), Activities and Participation (A&P), Environmental and Personal factors (EF)ⁱ (v. Figure 1, UNESCO, 1994) the framework offers a 'new paradigm and taxonomy of human functioning and disability, which can be used to guide holistic and interdisciplinary approaches to assessment and intervention' (Simeonsson, 2009, p. 70). The ICF introduces a series of lexical and semantic novelties: 4 levels for qualifying each component; alphanumeric codes for summarizing dimensions, chapters, qualifiersⁱⁱ; two important distinctions - between *performance* (in the current environment) and *capacity* (in a standard environment) into 'Activity and Participation' and between *barriers* and *facilitators* into 'Environmental factors' component (WHO, 2013; Chiappetta Cajola, Chiaro, & Rizzo, 2016).

Figure 1.
Structure of ICF (WHO, 2013, p. 18).



Given the complexity of the model and the need for disambiguate the terms, the WHO has elaborated numerous explanatory tools useful for creating a common knowledge base for professionals in the medical, psycho-social and educational area involved as trainers and users (Tokunaga, 2008) - checklist, short list, e-learning platform with tools and quizzes for verify (WHO, 2018). Despite the ICF bio-psychosocial model is increasingly becoming the reference for the planning/organization of inclusive interventions, its implementation differs in Europe (Sanches-Ferreira, Silveira-Maia, Alves, & Simeonsson, 2018; Moretti, Alves, and Maxwell, 2012). Regards educational settings, England and Switzerland are implementing procedures and materials also for decision-making (Hollenweger, 2014; Norwich, 2016), Portugal and Italy are struggling to spread it (Norwich, 2016, p. 10) – also due to the difficulty of connecting Functioning profile and individualized plans (Pasqualotto & Lascioli, 2020; Ianes, Cramerotti, & Scapin, 2019).

Researches show the ICF usefulness for in-depth description of individual (Riva & Antonietti, 2010) and student's needs, the development of individualized programs (Sanches-Ferreira, Simeonsson, Silveira-Maia, & Alves, 2015), the wide decision-making (Fulcher, Purcell, Baker, & Munro, 2015), a better comparison of specific cases (Gray, Msall, & Msal, 2008) but also the need to better train teachers on specific skills such as a. to read the objectives from a more global perspective and on multiple domains (Sanches-Ferreira, Lopes-dos-Santos, Alves, Santos, & Silveira-Maia, 2013); b. to assume environment as an indispensable aspect of intervention (Castro, Pinto, & Simeonsson, 2014). One of the early experiences of professional development in Italy, aimed at design the IEP through the services, parents and school collaboration (De Polo, Pradal, Bortolot, Buffoni, & Martinuzzi, 2009; Francescutti et al., 2009), found a satisfactory adherence to the new ICF-based protocols but also difficulties in distinguish roles and responsibilities as well as in assume 'environment' as a category for procedures and materials. Some recent researches on the elaboration of IEP reported teachers' difficulties in using constructs as 'bodily impairments', *capacity* and *participation* and in full understanding distinction between *barriers* and *facilitators*. The Italian study by Raggi et al. (2013), in particular, made use of a questionnaire based on ICF-CY for teachers engaged in the elaboration of Individual Educational Plans; it highlighted the difficulty in using the capacity qualifier for the description of activities and participation items.

As noted by Norwich (2016, p. 10; Ibragimova, Granlund, & Bjorck-Akesson, 2009) ‘these results suggest (...) that there is a gap between the ICF theory and IEP development practice that raises questions about how the ICF policy innovation has been implemented and adopted’ (p. 8) and how teacher training should be enhanced.

2. DESIGN AND OBJECTIVES – TRAINING ON ICF KNOWLEDGE AND SKILLS

2.1. Context

In Italy ICF was introduced as descriptive model and inclusive procedure in 2012 (Minister Decree December 27th 2012; European Commission, 2013) and officially adopted for the development of IEPs in 2017 (D.Lgs. n. 66). After that, Ministry of Education started a sweeping three-year in-service training (l. 107/2015 – 2016-2019) for teachers and support teachers, which integrates contextual and systemic skills - as well as that of the design (Agrati, 2017) - within the whole competence framework.

Design competence could be considered a 'hybrid' (Davey, 2013) - ability to effectively connect learning objectives and outcomes and to adapt these to specific needs and context resources - and a 'peculiar' feature (Laurillard, 2012) of teaching as profession. Educational research aimed at the paradigm of complexity (Gero, & Kannengiesser, 2002) provides explanatory frameworks ('Conversational Framework', Laurillard, 2012) which offer solutions for teacher training: *situated* and *collaborative* context, through production, elaboration and transformation of mental ('habits') and material ('tools') modelsⁱⁱⁱ.

Three training courses were held for in-service teachers - two 'training units' organized by an institutional Training Centers in the Bari district (years 2017/2018, 2018/19; a training course, organized by a professional association (ANGSA Puglia) in the Brindisi district (year 2019/20). They aimed at enhance the teachers' design skill of IEP-ICF and profiles on specific contents and skills (Tab. 1) in four phases of development (Table 2):

Table 1.
Main contents and learning objectives of IEP-ICF training courses.

Contents:	Learning objectives:
Legislation on inclusion, up to the news of Legislative Decree n. 66/2017	Use technical language and procedures of ICF model
Language and articulation of the ICF bio-psychosocial model (WHO, 2007)	Read a Functional Profile and a IEP-ICF as documents for school inclusion
Procedures to elaborate Functional Profile and IEP-ICF	Develop a IEP-ICF in a group based on Functional Profiles and <i>case studies</i> provided

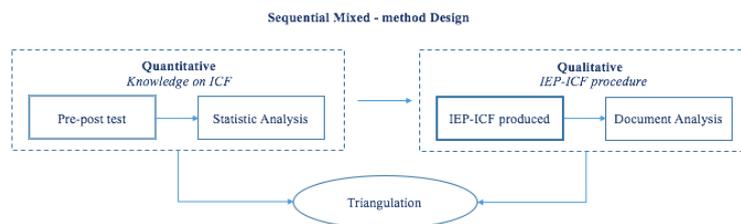
Table 2.
Phases of IEP-ICF training courses.

Learning objectives	Training tool	Focus
<i>Phase I - Information</i>		
Knowledge of the ICF model and language (alphanumeric codes, technical terms)	Official documents (WHO, 2007; 2018) Case-studies	4-domain model: body functions / structures; activity and participation; environmental factors; personal factors
<i>Phase II - Deconstruction</i>		
Analysis of traditional IEP models/document 'by axes' (ICD-10)	Traditional IEP document Functional diagnosis and dynamic profile	Difference between IEP by 'axes' and by 'function'
<i>Phase III - Reconstruction</i>		
In a group elaboration of IEP-ICF, based on <i>case studies</i> and document example	Document example of IEP-ICF, Functional Profile, Class programs	Integration between Functional profile, Individual project, IEP-ICF, Class programs
<i>Phase IV - Construction</i>		
Individual elaboration of IEP-ICF, based on personal experience and teaching practice		Document's adaptation to specific cases

2.2. Design and objectives

A more extensive exploratory survey was carried out, based on a sequential mixed-method design (Creswell, & Plano Clark, 2007; Cameron, 2009) (Figure 2), embedded the training course. This paper presents the outcome of the qualitative analysis regarding the knowledge on the ICF.

Figure 2.
Sequential mixed-method design.



The study aimed to infer the effectiveness of the training intervention carried out on *learnings*, which according to the model of Kirkpatrick (1994, 1996) correspond to the increase in knowledge, skills, attitudes in participants. Specifically, the objective of survey was to find out on which ICF topics there was greater / lesser effectiveness of intervention. This work focuses attention on the relationship between *performance*, environmental factors and *capacity*.

3. METHODS – *LEARNINGS* THROUGH PRE-POST TEST

According to the Kirkpatrick Model, the results of training intervention has been focused on the teachers’:

- *learnings* - increase in knowledge, skills, attitudes in participants - detected through an *ad-hoc* pre-post test on content and knowledge;

- *transfer* - if participants utilize learnings at work, every-day live etc.^{iv} – document-comparative analysis (Bowen, 2009) of the IEP-ICF produced during training and adopted at school.

For learnings, it has resorted to an 'ad hoc' questionnaire, articulated in n. 10 questions - four closed ended item; it is the adaptation of a validated tool (Francescutti et al., 2009) which detects knowledge on the general function of the ICF (Q.1, Q.2), on qualifiers in alphanumeric codes (Q.3, Q.9, Q.10), on performance and capacity in 'Activities and participation' (Q.5, Q.6, Q.8), on 'Environmental factors' (Q.4, Q.7). The questionnaire was administered on the occasion of three training courses on the same topic, at the end of Information (*pre*) and Reconstruction (*post*) phases (see Table 2). The participating teachers, not statistically representative (n. 73), worked mainly in primary school, had an average of 4.7 years of service, was mainly made up of support teachers (n. 60 – 82,2%) - see Table 3.

Table 3.
Characteristics of participants.

<i>Course</i>	ICF1	ICF2	ICF3	Tot.
<i>n. participant</i>	17	14	42	73
<i>School grade*</i>	I/P	I/P	I/P/M	P
<i>Seniority average</i>	3	3,5	7,5	4,7
<i>n. support teachers</i>	13	10	37	60
<i>(%)</i>	(76,50%)	(71,4%)	(88,1%)	(82,2%)

*I = Infant school; P = Primary school; M = Middle school

3.1. Analysis - quantitative and semantic analysis of questions

The quantitative-semantic procedure conducted for the analysis of the answers to questions n. 5 and n. 6 is presented below.

Q.5. Text – ‘*If a pupil has slight difficulties in reading and is supported by the teacher who merely provides simple help in keeping the attention alive, the qualifiers to be used should be*’:

Q.6. Text - *It is known that a child has severe difficulty walking, but he uses a walker*’.

The interest in these questions lies in their typology (multiple-choice questions, MCQ) and in the formulation of the alternative answers: four non-defining alternatives for Q.5 and three non-excluding alternatives for Q.6. Question nn. 5 and 6 are both focused on relation between *performance*, environmental factors (as *facilitator*) and *capacity*.

For the quantitative analysis of both questions, we proceeded by obtaining the absolute pre-post data of the types of response and inferring their redistribution - see Figures 3 and 4.

Two methods were followed for the semantic analysis: analysis of the terms for Q. 5 and analysis of the structure for Q. 6.

Q. 5 describes a hypothetical situation and focuses interest on the linguistic aspect of the qualifier. The alternatives for answering question Q.5 allow to identify at least three possible misunderstandings by the teachers involved in the training: related to the *meaning* of the terms (exchanging performance with skills), regarding the *levels* of severity ('slight difficulties' not identifiable with 0 *capacity*), referring to the general *logic* (criterion that links *capacity* / *facilitators* / *performance*) – see Table 4.

*Table 4.
Alternative answers and types of misunderstandings – Q. 5.*

<i>Answer</i>	<i>Texts of alternative answers</i>	<i>Types of misunderstandings</i>
1	'1 in <i>performance</i> and 2 in <i>capacity</i> ; support is to be scored as a mild facilitator (+1)'	<i>R = right answer</i>
2	'1 in <i>capacity</i> and 2 in <i>performance</i> ; support is to be scored as a mild facilitator (+1)'	<i>Meanings</i> – inversion of meaning between 'performance' and 'capacity' <i>WM = wrong answer for meanings</i>
3	'0 in <i>capacity</i> and 1 in <i>performance</i> ; support is to be scored as a mild facilitator (+1)'	<i>Levels</i> – failure in recognizing qualifier levels <i>WQ = wrong answer for qualifiers</i>
4	'no support can be scored'	<i>Logic</i> – failure in recognizing link between 'performance' / <i>facilitators</i> / 'capacity' <i>WL = wrong answer for general logic</i>

Question n. 6 is also on relation between *performance*, environmental factors (as *facilitator*) and *capacity* but focuses attention on the deductive reasoning that leads a teacher to express a conclusion starting from known facts. Q. 6 presents for this a structured syllogistic with three propositions: major premise, minor premise and conclusion (if A, B, then C) – Table 5. This question is not directly focused on the topic and must be completed with an answer.

*Table 5.
Logical structure of Q. 6.*

<i>Syllogistic arguments forms</i>	<i>Text of Q. 6</i>	<i>Logical value</i>
major premise	'child has severe difficulty walking'	known fact
minor premise	'(same child) uses a walker'	known fact
conclusion	answer to choose	logical consequence to be inferred

Table 6 illustrates the three alternative answers to Q 6 with the respective types of misunderstandings.

Table 6.
Alternative answers and types of misunderstandings – Q6.

Answer	Texts of alternative answers	Types of misunderstandings
1	'It is possible to obtain the information that is missing (<i>capacity</i>) by evaluating how the environmental factor is useful for the child and observing how difficulty he has in carrying out the activity in his daily life at school (<i>performance</i>)'	<i>R</i> = right answer
2	'It is not possible to give any indication of the <i>capacity</i> , but only of the <i>performance</i> '	<i>Meanings</i> – inversion of meaning between 'performance' and 'capacity' <i>WM</i> = wrong answer for meanings
3	'It is only possible to indicate the presence of the environmental factor'	<i>Logic</i> – failure in recognizing link between 'performance' / facilitators / 'capacity' <i>WL</i> = wrong answer for general logic

Alternative n. 1, corresponding to the correct answer - tab. 6 - deserves a specific focus. It illustrates, indeed, the correct reasoning procedure that should be done since, on the one hand, it expresses aspects not directly evident to an in-training teacher ('information that is missing' is in fact the *capacity*), on the other, it describes how to operationally relate information relating to *capacity*, environmental factor and *performance* - note the reference to the observation of an action within a specific context (i.e., school).

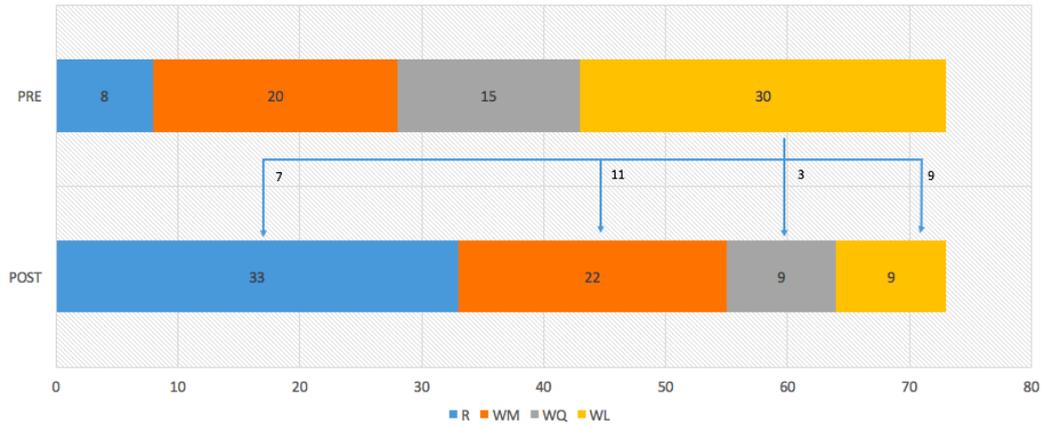
4. RESULTS - INCREASED AND CLEARER KNOWLEDGE

As for the answers to Q. 5, Table 7 shows the absolute references; Figure 3 specifically describes the redistribution of wrong answers at a logical level (WL).

Table 7.
Distribution of answers Q. 5, absolute references.

	<i>R</i> = right answer	<i>WM</i> = wrong answer 'meanings'	<i>WQ</i> = wrong answer 'qualifiers'	<i>WL</i> = wrong answer 'logic'
PRE	8	20	15	30
POST	33	22	9	9
POST-PRE	+25	+2	-6	-21

Figure 3.
Redistribution of WL answers Q. 5, pre-post.



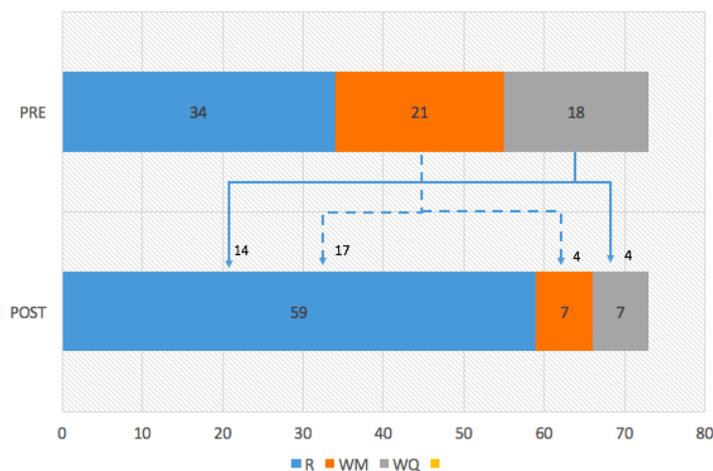
It is found that training had a general positive impact on *learning* (Kirkpatrick, 1996), understood as increased knowledge. It is possible to discover, however, specific difficulties in refers the qualifiers to use – see Q. 5. The pre-post comparison shows that right answers increase ($R_{post} - R_{pre} = +25$), wrong answers on the *meaning* level increase, even if slightly ($WM_{post} - WM_{pre} = +2$), wrong answers on *qualifiers* level decrease ($WQ_{post} - WQ_{pre} = -6$), wrong answers about *logic* decreases ($WL_{post} - WL_{pre} = -21$). With regard to this last aspect, it is noted that after the intervention 7 wrong-logical answers became correct, 11 wrong-meanings, 3 wrong-qualifiers, 9 remained so (Figure 3).

As for the answers to Q. 6, Table 8 shows the absolute references, while Figure 4 specifically describes the redistribution of wrong answers at logical and meaning level (WL, ML).

Table 8.
Distribution of answers Q. 6, absolute references.

	R = right answer	WM = wrong answer 'meanings'	WL = wrong answer 'logic'
PRE	34	21	18
POST	59	7	7
POST-PRE	+25	-14	-11

Figure 4.
Redistribution of WM and WL answers Q. 6, pre-post.



Also for Q. 6, it is possible to discover specific difficulties and misunderstandings. Although the impact was generally positive, given the increase in the number of correct answers ($R_{post} - R_{pre} = +25$), the pre-post comparison (Fig. 4) notes that the right answers increase ($R_{post} - R_{pre} = +25$), wrong answers on the *meaning* level decrease ($WM_{post} - WM_{pre} = -14$), wrong answers about *logic* also decreases ($WL_{post} - WL_{pre} = -11$). As regards the redistributions of the two types of wrong answers: after the intervention, only 4 wrong-meaning and 4 wrong-logical answers remained (Figure 4).

The results of the answers to question 5 were related to the characteristics of seniority, the most divergent within the target group.

Table 9.
Increase of right answers Q.5, absolute and % references.

Seniority years	N.	R (post-pre)	% R (post-pre)
1-3	23	+9	+39,1
4-7	27	+10	+37,0
8+	23	+6	+26,1

Table 9 shows that the greatest increase in right answers, as pre-post difference, concerns the class with the fewest years of service, while the smallest increase concerns the class with the most years of service.

5. DISCUSSION - EFFECTIVE INTERVENTION AND INFLUENTIAL QUESTIONING

From a descriptive point of view, the participants understand the difference between *barrier* and *facilitator*, starting from the case provided, however at the operational level they expressed two types of difficulties: a. *logical-semantic* - the difference between *capacity*

(‘standard’ environment) and *performance* (‘current’ environment) and the function performed by environmental factors within this relationship are difficult to grasp; b. *graphic-linguistic* - in coding the environmental factors, participants easily distinguish facilitators (with graphic notation '+') not barriers (graphic notation '-'), confused with the *performance* and *capacity* qualifiers.

It is appropriate to highlight also the aspect related the structure of the course. In phase I ‘Information’ (Tab. 2), environmental factors were presented as ‘attitudes or physical-social environment in which people live and lead their existence’ (WHO, 2007) that influence the functioning and disabilities from the outside and in the form of facilitating (+) or impeding (-) impact on *performance* and *capacity*. Given that clarity, compared to Q.5 and Q.6, a high number of correct answers in the pre-test would have been expected in both, at the end of phase I; instead this only happened for Q. 6 ($R_{pre} = 34$) not for Q. 5 ($R_{pre} = 8$). In addition, for both the increase ($R = +25$) occurred in the post-test, at the end of phase III.

It would be worth asking what caused this difference already in the pre-test. In refers to the questionnaire used as tool, data highlight a peculiar aspect. The clear difference between Q. 5 and Q. 6 was found in the number of correct answers within the same first administration (Q. 6. $R_{pre} = 34$; Q. 5, $R_{pre} = 8$). It has been clarified that both Q. 5 and Q. 6 focused on relation between *performance*, environmental factors (as facilitator) and *capacity* but that they differed in structure (Q. 5 describes a ‘case’; Q. 6 is a syllogism) and formulation of the alternative answers (4 non-defining alternatives for Q. 5, 3 non-excluding alternatives for Q. 6).

As suggested by research (Haladyna & Downing, 1989; Marsh & Canton, 2014), in a well-designed MCQ a. stems needs to express full problem, to contain all the information and to avoid too specialized language, b. alternatives contain distractors appealing and plausible and needs to be logically and grammatically consistent with the stem. According to the criteria, the formulation of Q. 5 would be formally appropriate as the case is described within the stem, while Q. 6 would be adequate since the alternatives logically correspond to the stem. It would then be appropriate to ask whether the form in which the question is formulated – the short description of a ‘case’ (Q. 5), the formalization of a thought procedure (Q. 6) - affects the ability of teachers to retrieve information in memory concerning the same theme and the possibility of managing and overcoming possible misunderstandings on their own.

6. FUTURE PERSPECTIVES – COMMON DIFFICULTIES AND SOLUTIONS

The sharing of a common language between professionals from different areas is key aspect related to the application of the ICF model (WHO, 2007), both in the health and pedagogical-didactic fields; which however also represents a limitation in the absence of adequate training (Norwich, 2016; Moretti et al., 2012). However, in addition to special teachers, every school operator should also be trained in the bio-psychosocial model that underlies the ICF, since this would favor the analysis of context needs and decision making, more generally (Norwich, 2016). Implementation of ICF model, especially in the related ability to grasp the environmental factors affecting on learning processes of students with and without special needs - such as *barriers* and/or *facilitators* -, would indeed act as a lever for the development of inclusive schools, globally (Castro et al., 2014; Meucci et al., 2014).

The study found that the training intervention had an effect: it increased the knowledge of the participating teachers also it helped to resolve some misconceptions that teachers had, especially regarding the meaning and graphic notation of some main concepts of ICF - such as *barriers* and *facilitators*. On this aspect, therefore, it confirms previous researches according to which teachers should be supported in better distinguishing *barriers/facilitators* (Meucci et al., 2014; Raggi et al., 2013) in order to elaborate IEP.

It leads us to reflect on the effectiveness of the mediators used in teacher training.

In general, the well-known graphic model used in phase I (Table 2) - presenting 'Activity and Participation' and 'Environmental factors' (Figure 1) -, is functional for understanding meanings (declarative knowledge) but not relationships (procedural knowledge). The exemplary IEP-ICF used in phase III Reconstruction (Table 2) - which directly describe this relationship seem more useful for the *learnings* of teachers, in terms of knowledge and skills. Specifically, the way in which the questions are formulated within the pre-post questionnaire seem to have an effect on the teacher's ability to retrieve personal information on the topic - the relationship of significance *performance*-environmental factors-*capacity* - and, for this, on the verification of the effectiveness of a training intervention. If the hypothesis were verified, this would be an interesting topic to discuss at a scientific level about the tools for verifying the effectiveness of training interventions with adults and with trainees in particular. There would be the conditions to work on a questionnaire to be used as a refined and effective tools for gathering knowledge and investigation.

The study has also as a limit the small number of participants, although the group involved has homogeneous characteristics, with the exception of length of service which, as has been pointed out, seems to be an influencing factor on the increase in knowledge, based on the data available.

The conclusion of this study supports Norwich (2016, p. 10) which, referring to the gap between ICF theory and IEP development practice, suggests working on the innovation of an ICF policy that would also improve teacher education, even through the development of a transnational platform. This platform would encourage sharing practices, difficulties and solution hypotheses and develop a common knowledge on teacher training on the bio-psychosocial ICF model.

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ⁱ *Participation* as involvement in a life situation and *environmental factors* as 'attitudes or physical-social environment in which people live and lead their existence'.

ⁱⁱ 'The letters b, s, d, and e represent the different components and are followed by a numeric code that starts with the chapter number (one digit), followed by the second level (two digits), as well as third and fourth levels (one extra digit each). For example, the following codes indicate a 'mild' problem in each case' - b2.1 Sensory functions and pain; b210.1 Seeing functions; b2102.1 Quality of vision; b21022.1 Contrast sensitivity – WHO, 2013, p. 17.

ⁱⁱⁱ The 'designer' socially builds a design model, negotiating his/her own individual knowledge (past experiences, even implicit mental habits - Polanyi, 1967; Perla, 2010) with shared culture (experiences of colleagues and families, school organization procedures etc.) and sharing a controlled vocabulary/glossary, a specific taxonomy/thesaurus (Rossi & Toppano, 2009).

^{iv} Other levels are: 1. *Reaction* - how participants react to the training (e.g., satisfaction, feelings); 4. *Results* if there is a positive impact on the participants' organization (Kirkpatrick, 1996).