Statistics for inclusive design and teachers' research activities

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As in all experimental scientific research, in education science as well the knowledge of concepts and statistical methods is essential to deal with different types of problems. In this perspective, in order to design a successful inclusive education for learners with Special Educational Needs and Learning Disabilities, the operating tools identified by two important conceptual frameworks of reference can be constructively used: the International Classification of Functioning, Disability and Health for Children and Youth and the Index for Inclusion. The role of statistics is also relevant to support the design of educational research based on sampling plans like randomized controlled trial within the scientific orientation of Evidence Based Education.

Key words: School inclusion, ICF-CY, Index for Inclusion, inclusive education, Evidence Based Education.

INTRODUCTION

The purpose of this article is to describe and highlight the possibility of using tools provided by statistics to implement a process of detection, analysis and knowledge of all the elements that make up the educational processes in an inclusive perspective. The aim is to activate a virtuous circle of continuous and gradual improvement of the educational system, particularly for students with disabilities or special educational needs.

Two important tools are therefore described that can be used for this purpose: the International Classification of Functioning, Disability and Health for Children and Youth (WHO, 2001, 2007) and the Index for Inclusion (Booth and Ainscow, 2002, 2008, 2011).

This paper reports findings in a working hypothesis for a synergic use of the ICF-CY and the Index for Inclusion, which can be validated with a number of appropriate and subsequent empirical research.

Knowing for deciding

As in all experimental scientific research, in education science as well the knowledge of concepts and statistical methods to deal with different types of problems is essential: from support indicators to the (re-) definition of instructional design, to indicators dealing with assessment; from indicators related to research methodology to those related to school evaluation and to the education system as a whole.

The school has to operate in a systemic perspective where a flow of suitable indicators is very important to systematically provide feedback at different levels and to support the decisions making process within the school system in its different aspects: micro, meso and macro aspects. A need felt over time both at international (OECD PISA project) and national level (INVaLSI)²

¹P.I.S.A. (Programme for International Student Assessment) is an international survey realised on a periodic basis promoted by the Organization for Economic Cooperation and Development (OECD). It is aimed at assessing the knowledge and skills of fifteen years olds students regularly attending school. The survey offers international comparisons.
is to check education quality and to develop a set of indicators.

In addition, it is essential to deepen the relationship between research methodology in general and teaching in particular, mainly at microsystem level, to assess and validate the effectiveness of educational experimentation and innovative designs concerning students’ learning, keeping a specific focus on the implementation of inclusive education for pupils with Special Educational Needs (SEN) and Learning Disabilities (LD).

In order to validate and interpret the results of experiments and to define specific indicators, a strict planning is needed throughout all phases of the research, from the definition of research objectives and data collection, to their description, analysis and interpretation of results (Kish, 1987; Campbell and Stanley, 1996; Jenkins, 2000; Lazarsfeld, 2001; Newbold, Carlson and Thorne, 2010, Hattie and Gan, 2011; Chiaro, 2012; Hattie, 2012; McMillan and Schumacher, 2013).

An incorrect data collection, an inadequate presentation or an inappropriate statistical analysis do not make it possible to understand and check the results, or the comparison with other educational research analysis, as required by the recent research orientation Evidence Based Education (EBE) (Hattie, 2009, 2012; Calvani, 2013).

As a matter of fact, for the progress of any empirical discipline, an important purpose of any research, even a small one, is to provide the simple opportunity to combine experiences and to compare results with other researches, either realized under similar conditions or deliberately different. In this way it is possible to cumulate knowledge, to test already known theories and to formulate new hypotheses. As it will be demonstrated later in this work, in order to design an educational inclusive planning for students with SEN or with LD, international literature - adopted also by Italian law on this specific topic - provides two important conceptual frameworks of reference with their respective operational tools: the International Classification of Functioning, Disability and Health for Children and Youth (WHO, 2001, 2007) and the Index for Inclusion (Booth and Ainscow, 2002, 2008, 2011).

### Educational inclusion

The international and national scientific community widely debates on the change of perspective from the idea of integration to inclusion. This process is not only based on strategies aimed at bringing students with LD or with SEN to be as similar as possible to other students, measuring the distance from a supposed standard of adequacy, but also on the recognition of the importance for all individuals, students with SEN in primis, of full participation to school life.

In Italy, the model of inclusive education, or rather its inclusive pedagogical perspective, has been the subject of a considerable legislative activity: from the approval of law no. 517/1977 until law no. 104/1992, which indicated among other things, the specific tools to exercise the right to education in order to encourage the learning process and the organization of teaching: the Functional Diagnosis, the Dynamic Functional Profile and the Individualized Education Plan.

Progress towards an inclusive education system have been made since the UN Convention on the Rights of Persons with Disabilities, ratified by Law no. 18 of 2009, which recognized the "social model of disability" and introduced the principles of non-discrimination, equal opportunities, autonomy and independence (Law 2009, 3rd march, no. 18). All those principles are aimed at achieving full social inclusion through the involvement of the disabled people themselves and their families. According to the Convention, even the cultural and social environments are a major factor for the experience that an individual makes of his/her own health condition, thus leading to define disability as "the result of interaction between persons with impairments, attitudinal and environmental barriers that prevent their full and effective participation in society on an equal basis with others" (Preamble, par.e).

In accordance with the principles of the convention, the Law no. 170 of 2010 grants the rights to education for pupils with Learning Disabilities; while the ministerial directive of December 27, 2012 and its circular of March have expanded the range of action for students with Special Educational Needs (Law 2010, 8th October, no.170; MIUR, 2012; 2013).

In the international perspective, an inclusive school for all students where learning barriers are eliminated and participation of everyone is promoted, first and foremost for students with disabilities, is also widely discussed within the theoretical framework of inclusive education and disability studies where the social model of reference focuses on full inclusion, i.e. the idea of an inclusive education for all pupils and not just for students with SEN.

In this context the use of the ICF-CY and the Index for Inclusion in all phases of a cyclic teaching process become more than relevant, it starts from the initial definition of specific teaching strategies with their educational designs, to be then integrated in field assessment on their effectiveness and efficiency.
typically based on a process of controlled or Evidence Based Research.

**TOOLS FOR TEACHING DESIGNING IN AN INCLUSIVE PERSPECTIVE**

**ICF-CY to support instructional design**

The ICF-CY classification fully reflects the social model of disability, considering the person not only in terms of "health", but promoting a comprehensive approach, which includes global capabilities, the various resources of an individual, while keeping in mind that the personal, natural, social and cultural context clearly affects the possibility of expression of these resources.

According to this approach, considering the various aspects related to a person's health condition and the relative context, disability is defined as "a health condition in an unfavorable environment" (WHO, 2001, 2007).

In this framework context plays a major role, where various elements can be qualified as a "barrier" if they obstruct the activities and participation of the person, or as "facilitators", if on the contrary they encourage activities and participation.

In particular, the standard scheme provided by the ICF-CY tool for teachers and educators allows to observe and distinguish the "functioning" of the child or adolescent in an integrated view of the different aspects of growth and in different environmental contexts, so that it can be used operationally as a basis for designing inclusive education.

For example, using a standard language it is possible to detect unambiguously and systematically different important aspects in the daily learning modules, such as: whether and how the child or adolescent accesses an educational program, whether and how he/she goes from one level to another, if he/she makes or not progresses within a school education program, if he/she terminates an educational program or some school stages and so on (Chiappetta Cajola, 2012).

The use of the ICF-CY as a tool to support an inclusive education design highlights a new dynamic development between the Functional Diagnosis, the Dynamic Functional Profile, the Individualized Education Plan and life plan, as it extends the concept of Individualized Education Plan even beyond the school term; furthermore, it refers to all students who have difficulties not only in learning, but in every area of their physical, mental and social development. Operatively the use of the ICF-CY helps to describe the student with regard to the difficulties he/she might experience in the fields of education and extracurricular activities, even as far as his/her development potential in the short and medium term is concerned, thereby putting in a curricular perspective the objectives for development areas (sensory, motor-praxic, neuropsychological, emotional and relational, communicational, autonomy related etc.) (Chiappetta Cajola, 2012).

In Italy recent regulations of Ministry of Education (MIUR) promote an increasingly widespread and radical use of ICF-CY also in educational institutions with special reference to the "Environmental Factors" that characterize the school context. In particular, in 2008 the Ministry of Education in collaboration with the Ministry of Health has established among other things, the abolition of the Dynamic Functional Profile and its absorption into the Functional Diagnosis, in order to draw a Functional Profile based on the ICF-CY model (State-Regions Conference 2008).

Within this view, despite some criticism on the fear of new labeling and consequent discrimination, the ICF-CY proves to be at present the most effective and widely shared tool to identify special individual needs without reducing them to special problems of the individual, but rather extensively connecting the functioning and the disability to environmental factors in a holistic and interactive view of the individual himself (ONU, 1989, 2006; Fougeyerollas and Beauregard, 2001; Norwich, 2002; Barile, 2003; Wedell, 2005; Cavevaro, d'Alonzo and Ianes 2009; Chiappetta Cajola, 2012; Ianes 2013).

**Index for Inclusion**

One of the first attempt to characterize the operational concept of inclusion at school is represented by the Index for Inclusion, proposed in 2002 by Booth and Ainscow and radically revised by the same authors in 2011. The authors consider the inclusion as a cyclical process (Figure 1), given that at school pupils, regardless of ability, gender, language, ethnic or cultural origin, can also be valorized through the provision of equal educational opportunities.

The Index for Inclusion goes beyond the concept of diagnostic labels assigned to the individual; however their difficulties are interpreted as barriers to learning and participation that can "depend on the educational context or arise from the interaction of the students with the environment, that is, with the people, rules, institutions, cultures and socio-economic characteristics that affect their lives" (Booth and Ainscow, 2002, 2008, 2011). According to this orientation, inclusion concerns all students, not only those with a deficiency or those who experience difficulties, as it aims at transforming the culture and practice within schools to lead them to become schools for all, considering a set of differences with the objective of enhancing all potentials. From an operational standpoint, Booth and Ainscow propose a

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3For further details on the Ministerial regulations see the website http://www.istruzione.it/
structured collection of indicators of inclusion, using predefined questionnaires. This indicators together with a methodology for self-assessment and self-improvement can help to identify strengths and situations that instead require specific planning interventions. The flexibility of the tool concerns the possibility of adapting and/or modifying the indicators provided in the questionnaires according to different types of schools and instructional design object of the self-assessment. As a matter of fact, the indicators represented by the questions allow a detailed analysis of the various aspects defining the inclusive process so as to identify those requiring improvements. The areas investigated and the related indicators are organized in three dimensions: inclusive culture (the values and the relational atmosphere of the school), inclusive policies (the organizational aspects and the accessibility of the school) and inclusive practices (everything related to the processes of learning, teaching and the resources used for these processes).

Conclusions

The tools supporting instructional design described so far represent significant methodological supports capable of supplying those minimum information which are necessary for the effective development of collected indicators, for a correct interpretation and a uniform representation mode, and for using the results obtained from their elaborations.

As a matter of fact, the concept of disability according to the ICF-CY conceptual framework introduces important elements of language universalism and information recording within an integrated approach in a multidimensional model of functioning and disability. The benefits of ICF-CY in the early stages of instructional design allow us to consider the various existential dimensions of the individual, not only in how individuals live with their disease, but also to establish and implement appropriate educational plans aimed at improving the quality of their lifetime. In particular, using the required standard language, it is possible to provide a scientific basis to understand and compare different experiences of learning design within the same class or between classes of the same school or different schools at macro-system level. The effects of an instructional design based on the ICF-CY can then be evaluated in accordance with the process of the Index for Inclusion, considering in particular phase 3 of Figure 1, namely the design of an inclusive teaching plan. In this way it is possible to activate a cyclical process of assessment which, starting from phase 1, as shown in Figure 1, returns to phase 2 with an objective evaluation of what was planned, and the ability to properly decline the self-assessment questionnaire with specific indicators. The possibility of using a standard language and statistical and systematic procedures of surveys allow to compare results in both a synchronic and a diachronic way with respect to the inclusive process in progress.

Finally a last - but not least - consideration concerns the relevant support of statistics in the evaluation process of educational design which integrates the inclusive process described. This concerns the possibility of designing educational research based on Randomized
Controlled Trial (RCT) sampling plans, that fall within the conceptual framework of Evidence Based Education, although it is possible to apply a less "rigid" sampling design, since the EBE can ".. also accept almost experimental or empirical systematic surveys or observations collected under controlled conditions .." (Calvani, 2012, p. 26).

REFERENCES


4The RCT method employs an experimental group and a control group randomly. Randomization concerns the random choice of the elements that go to constitute the sample.