Construction of an Inclusive Learning Environment: towards a New Ecological Class

Bagnariol Silvio
Cà FoscariUniversity (Italy)
silviobagnariol@hotmail.com

Abstract

The Italian school inclusion and integration process still involve considerable troubles and difficulties: "integration is not at issue, yet it is often unsatisfactory" [1].
Junior high school and high school students with intellectual disability tend to take little part in the learning process or, even worse, to remain in a situation of separation most of the time [2].
This two-group experimental study focused on six classes from a vocational high school.
The assumption was that a learning environment expressly designed [3] to encourage "analogical" tools, processes and languages can effectively help all students – not only students with intellectual disability - to learn and to relate better.
The "ecological" approach [4], started from a rearrangement of the traditional classroom, which was divided into different "learning environments", specifically designed for static, movement, materials and new technologies.
The "setting" of student tables and of the teacher's desk - which is no longer an "active mediator" in high school [5]- was rearranged in order to allow all students to play an active part in the learning experience.
Throughout a few weeks, the new learning environment based on the "capability approach" made it possible to set [6] the specific analogical languages of that student with intellectual disability *– such as images, pictures, charts, cards, drawings, videos, concept maps – allowing the whole class to experience a laboratory learning training.*
Cognitive tests proved that the experimental classes managed to develop better learning processes in specific cognitive domains. Furthermore sociometric test results, which were recorded in a few socio-grams, showed an increase in popularity and involvement of the students with intellectual disability.

1. School inclusion as environmental approach

The data of the year 2013/2014, show us that the students with disabilities - 222 917 of all school levels - in Italy, grew by 3.2% over the previous school year and the 66.7% of them have a level of "intellectual disability" [7].
The "Italian approach to disability" [8] is characterized by a growing active participation of the students with intellectual disability in the mainstream classes, so that the inclusive approach evolved from assimilation, to integration and, in these last years, to inclusion [9]. As Ianes supports [1], integration is not at issue, yet it is often unsatisfactory: in spite of the Italian innovative legislations on school inclusion, integration still has problems in the practical experiences [10].
The inclusion process is founded on the mutual support among all the students, on the active participation of the student with disabilities [11] and on giving equal opportunities [12] in the same learning context [13].
In order to construct an inclusive environment [14] the common and the special need should be considered together to realize a "special normality" [16].
Indeed, contextual and environmental factors of the ICF paradigm [16] are so important to influence learning and relationship qualities of all studentsand also to reduce, or amplify, the handicap of the students with disabilities [17].
Recent researches [2] point out as the percentage of the students with disabilities that study in common situations, *decreasesas the students grow.* In secondary school these students often learn in separated contexts, in classrooms far from their classmates [18].
According to Zigler, intellectual disability has genetic and environmental factors [19], so it is important to modify the environmental elements to try to reduce learning difficulties.
In this paper are presented the results of an experimental research, in which some students of a secondary school with intellectual disability, have taken part with their classmates, in the same suitable learning environment [3].

In order to satisfy the Special Educational Needs, all the students shared some tasks in an analogical learning laboratory.

2. Methodology

Students with intellectual disability make use of a concrete thought, they need to learn by perceptive elements [20] and they often encounter resistances in the verbal language, in the lecture skills and in the lexical and phonological development [21][22]. So, they need to be helped in the process of the abstraction and comprehension of the reality [23], through the shared construction of analogical behavior, objects, performances and situations.
Starting from these last considerations, the research wants to prove if it is possible to improve the level of learning and the quality of the relationships of all the students, using a learning environment that promotes analogical tools, processes and languages.
The Special Educational Needs of the students with intellectual disability, the learning environment, the classmates mediation and the tools, have been planned as a single pedagogical configuration [24] where the analogical laboratory has been placed [6] in ecological modality.
Four students with intellectual disability and their own classmates of a secondary school formed the experimental group, and just as many students of the control group went on with the usual learning.
The experimental group took part to the analogical training twice a week for two months, in order to solve some exercises, with contents taken from their daily life experiences.
These students, solved the exercises in little groups, using their favorite analogical tools, which were placed in the analogical zone (Fig. 1) of the new ecological classroom.
Students with intellectual disability cut and glued cardboards to build some conceptual maps, they did word cloud and pictures and then they studied graphics and charts.

3. Towards a new ecological class

Concurring with Vayer and Duval [4], the environmental design of an ecological class is the planning of all the material data that subsequently create the condition for the relationships into the classroom.
First of all, the environmental design is the first practical action [25] defining the different kind of spaces where to allocate the different material data of the analogical laboratory.

The construction of the new ecological class involved the following steps:

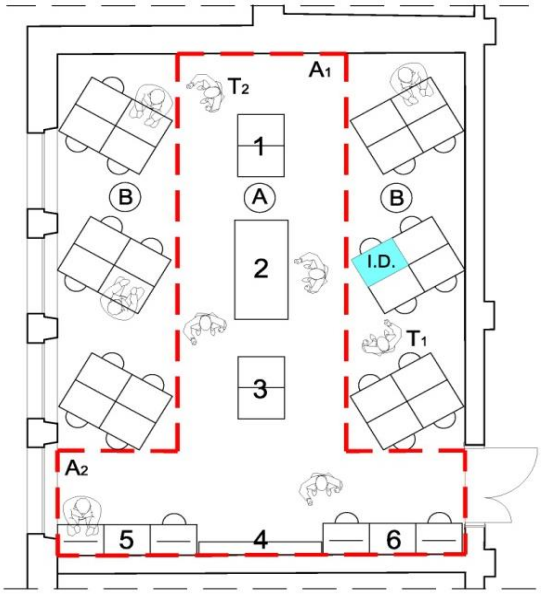
a) Design of "functional places"
b) Design of the "movements"
c) Design of "material data"

a) Design of "functional places". In this step some sub-areaswere identified to allocate the more relevant
functions for the fulfillment of the laboratory. These functional areas must be easily identifiable, well characterized, and so much distinguishable to be considered “functional places” by all students.
The students with intellectual disability (I.D. in fig.1) require an environment that does not have to be random but ordered and structured [25] and, according with the "capability approach" [26], these students can easily combine their internal resources with those they find in the environment.
The space of the class has been divided here in two "functional places": the "analogic area" (A in Fig. 1) and the " work group area" (B in Fig. 1). The analogic space is the core of the new class, it has an “inverted T” form and it is divided in others two sub-areas: the materials’ space and the new technologies’ space (A_1 and A_2 in Fig. 1).
The two functional places, due to their agentive property [27], were the first "mediator" [5] helpful for the students.

b) Design of "movements". In the secondary school the "movement" of the students is rarely taken into account as an element of the learning. The solution here adopted proposes to divide the space of the new class into two components of the movement: the "space of movements" and the "static space".
The students must be able to know where they have to move less and where they can move actively and explore the entire new environment.
In this way, all students have perceived the new classroom as a capability environment and, stimulated by cognitive tasks, they have explored it in search of materials and tools that they have seen fit to the task’s resolution.

Compared to a traditional learning experience, *being able to move in the new learning environment has allowed the increase of the participation of the students with intellectual disability too.*

c) *Design of "material data".* Students with intellectual disability find real barriers to learn in the "traditional setting" of classroom, for example in the disposition of benches, professor's desk and shelves.
In order to facilitate the learning and to facilitate the movement inside and out the groups, the benches were arranged in small groups along the perimeter of the classroom in a "fishbone" form.
This solution avoids the students to get distracted with the students in the other groups and allows them to concentrate better on the task.
The professor's desk - deprived of any institutional meaning - was put in the middle of the analogic area with other benches: here the students were able to find all types of materials, colors and papers (1,2 and 3 in Fig.1).
In the short side of the analogic area the students could use some desktop computers and one laptop, a printer, a digital camera and an interactive whiteboard (4,5 and 6 in Fig.1).



Legend

A : analogic area

A_1 : materials' space
1 : colored cards and posters
2 : scissors, glue, stationery
3 : colored pencils, tempera, markers
A_2 : new technologies' space
4 : Interactive multimedia Whiteboard
5–6: Computers and new technologies

B: work group area

T_1: teacher
T_2 : support teacher
ID : student with Intellectual Disabilities

Fig. 1: Design of the new ecological class

4. Results

The variation of the literacy in reading, mathematics, and science of all the students has been evaluated by the questions of a set-test divided into continuous and non-continuous questions.
Tests for students without disability were selected from OCSE PISA tests, while those ones for students with intellectual disability from TIMMS, PEARLS, INVALSI and MT tests.
In the POST-TEST, the right answers obtained from all the experimental group are increased compared to those obtained in PRE TEST: for the students without disability the number of correct answers is increased of the 62%, 50% and 21% and the students with disability of the 39 %, 51 % and 34 %, respectively for the literacy in reading, mathematic and science.
All the students of this group have obtained better improvements in the non-continuous questions compared to the continuous questions.
The tests' results of the control group did not show a significant increase, for students with and without disability.
The results of the level of popularity, measured in response to some socio-metric questions and reported in some socio-grams, showed that the level of the students with disability, who have completed the analogic training, is significantly increased.

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