

INCLUSIVE LEARNING ENVIRONMENTS AND *UNIVERSAL DESIGN*: AN EXPLORATORY INVESTIGATION FROM A *STUDENT VOICE* PERSPECTIVE¹

ENTORNOS DE APRENDIZAJE INCLUSIVOS Y DISEÑO UNIVERSAL: UNA INVESTIGACIÓN EXPLORATORIA DESDE LA PERSPECTIVA DE LA VOZ DE LOS ESTUDIANTES

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ABSTRACT: Introduction: In recent decades, there has been a strong growth in the awareness of creating inclusive learning environments, i.e. those that guarantee each learner the right to actively participate in and benefit from a quality education by fostering the achievement of well-being. Space and learning environment play a fundamental role in determining the way people learn and in creating optimal conditions that make learning itself meaningful and profound for all (Atkin, 2001; Fullan, Quinn & McEachen, 2018; Caprino *et al.*, 2022). **Method:** The present contribution starts from a reflection on the construct of Universal Design (Mace, 1985; Story, Mace & Muller, 1998) as a research framework capable of ensuring the creation of flexible, adaptable, engaging spaces that take into account the specific needs of each student (Gemma, 2016). The work also returns the outcomes of an exploratory

1 The authors shared the conception and drafting of the contribution. For the purposes of attribution, it is specified that L. D. Sasanelli wrote the following parts: «2. Methodology» and «3. Results»; M. Baldassarre wrote the paragraph «1. Introduction» and the subsection «1.1. Universal Design as a framework for structuring inclusive learning environments» and M. Caringella the paragraph «4. Conclusions».

investigation in a Student-Voice perspective (Czerniawski & Kidd, 2011; Fielding, 2004; 2012; Flutter & Rudduck, 2004) that involved, in the academic year 2022-2023, 151 students of the Single-Cycle Master's Degree Course in Primary Education at the University of Bari «A. Moro», engaged in direct internship activities in primary schools in the Apulian territory. The main objective was to implement observational and reflective skills in students/trainees regarding the design and evaluation of inclusive and innovative environments. **Results:** From the results of the administration of a specially constructed exploratory questionnaire, inspired by the principles of UD, it emerged that there are many challenges and inequalities in the effective use of inclusive spaces and that the real process of innovation starts with the involvement of the entire school community. **Conclusion and Discussions:** In this sense, the learning environment is confirmed as the means through which inclusion itself, in its multiple dimensions, can be conceived, shared and disseminated. It is essential to adopt an integrated approach, involving teachers, school staff, families and the whole community, in order to guarantee specific training aimed at redesigning school spaces from an inclusive perspective.

KEYWORDS: learning environments; Universal Design; inclusion; exploratory investigation; Student-Voice.

RESUMEN: Introducción: En las últimas décadas ha aumentado considerablemente la concienciación sobre la necesidad de crear entornos de aprendizaje inclusivos, es decir, entornos que garanticen a cada alumno el derecho a participar activamente en una educación de calidad y beneficiarse de ella, favoreciendo así su bienestar. El espacio y el entorno de aprendizaje desempeñan un papel fundamental en la determinación de la forma en que las personas aprenden y en la creación de condiciones óptimas que hacen que el propio aprendizaje sea significativo y profundo para todos (Atkin, 2001; Fullan, Quinn y McEachen, 2018; Caprino *et al.*, 2022). **Metodología:** La presente contribución parte de una reflexión sobre el constructo de Diseño Universal (Mace, 1985; Story, Mace y Muller, 1998) como marco de investigación capaz de garantizar la creación de espacios flexibles, adaptables y atractivos que tengan en cuenta las necesidades específicas de cada estudiante (Gemma, 2016). El trabajo también presenta los resultados de una investigación exploratoria en la perspectiva Estudiante-Voz (Czerniawski y Kidd, 2011; Fielding, 2004, 2012; Flutter y Rudduck, 2004), en la que participaron 151 estudiantes del Curso de Maestría de Ciclo Único en Ciencias de la Educación Primaria de la Universidad de Bari «A. Moro», comprometidos en actividades de prácticas directas en escuelas primarias de Apulia. El objetivo principal era desarrollar la capacidad de observación y reflexión de los estudiantes en relación con el diseño y la evaluación de entornos inclusivos e innovadores. La administración de un cuestionario exploratorio especialmente construido, inspirado en los principios de la UD, arrojó que existen muchos retos y desigualdades en el uso efectivo de espacios inclusivos y que el verdadero proceso de innovación comienza con la implicación de toda la comunidad escolar. **Resultados y conclusiones:** En este sentido, el entorno de aprendizaje se confirma como el medio a través del cual la inclusión, en sus múltiples dimensiones, puede ser concebida, compartida y difundida. Es fundamental adoptar un enfoque integrado que implique a los profesores, al personal de la escuela, a las familias y a toda la comunidad para garantizar una formación específica que permita rediseñar los espacios escolares desde una perspectiva inclusiva.

PALABRAS CLAVE: entornos de aprendizaje; Diseño Universal; inclusión; indagación exploratoria; voz de los alumnos.

1. INTRODUCTION

In recent times, in scientific circles, at an international level (OECD, 2015), the construct of «learning space» has been placed at the centre of pedagogical reflection (Oblinger, 2006; Barrett *et al.*, 2016; Tosi, 2020; Weyland & Galletti, 2018; Byers *et al.*, 2018; Vanacore & Gomez Paloma, 2020; Carro & Tosi, 2023) as a pedagogical device capable of influencing teaching and learning processes.

The expression «learning environment», in fact, refers to that ecosystem within which the learning experience takes place and, at the same time, places the focus on the learning subject and its process (Castoldi, 2020). The evolution of this concept took place at the same time as the change of perspective recorded in the psycho-pedagogical field, which saw the transition from the teaching paradigm to the learning paradigm and again, from a vision focused on what to teach to a perspective focused on the learning subject and thus on its processes, with particular attention to the construction and organisation of the context as a support to learning. International research has linked space to collaborative, motivating and student-oriented learning processes (OECD, 2015), to teaching methodologies and contexts that support differentiated activities (Fisher, 2005) and to the achievement of core learning objectives (Atkin, 2011). The structure of space², through the use of flexible and diverse furnishings, materials and technologies, is considered one of the «favourable conditions» to facilitate the acquisition of skills and knowledge (Laneve, 2005).

Space assumes, in educational and didactic action, the function of «active agent» (Oblinger, 2006): its design and structuring can favour or hinder the participation of all the actors involved in the teaching-learning process. Reasoning in this direction invites, therefore, to assume a design logic in a strong sense, starting from the formative intentionality of those who set up the environment itself. In today's school, in fact, characterised by the constructs of *complexity* and *heterogeneity*, it is fundamental for teachers to be able to design and organise spaces in an inclusive sense, i.e. *accessible*, *flexible* and *functional*. An inclusive school space (INDIRE, 2016) guarantees the possibility for each student to find in it the most functional languages that best suit their needs and learning styles (Edwards *et al.*, 2017). To teachers, to design teaching activities under the banner of personalisation and balance between individual, informal, group, exploratory moments, and community encounters, capable of providing an inclusive educational proposal for everyone (Caprino *et al.*, 2022). The ultimate aim is to develop inclusive and welcoming school communities, in which each student is an integral and participating part.

2 There is an important distinction, pedagogical and didactic in nature, between environment and learning space, although the two dimensions are well anchored to each other and are to be read in a kind of synergetic connection. The space, unlike the environment, has a much more defined connotation in educational terms since it is configured as «that which hosts and makes possible», thus configuring itself as its own mediator that welcomes and orients educational processes and, at the same time, supports all growth processes on an individual collective level (Vanacore & Gomez Paloma, 2020).

1.1 UNIVERSAL DESIGN AS A FRAMEWORK FOR STRUCTURING INCLUSIVE LEARNING ENVIRONMENTS

The debate on inclusion in the Italian school space has mainly focused on the issue of *architectural barriers*; this implies that, for a considerable period of time, the relationship between space and disability has been understood and experienced mainly in terms of the challenges of overcoming motor disabilities (Caprino *et al.*, 2022). In recent years, regulatory and cultural developments have changed the approach of schools and training towards disabilities. In particular, the *bio-psycho-social approach* proposed by the International Classification of Functioning, Disability and Health (ICF-WHO, 2001) has redefined the concept of disability, which is not linked to individual characteristics, but results from the interaction between the health condition and an environment that is unfavourable to full participation in activities. According to the ICF, environmental factors, together with personal factors, significantly influence *participation*.

In the 1970s, architect, designer and educator R. L. Mace of North Carolina State University, choosing an environment-centred, rather than a person-centred perspective (Mangiatordi, 2017, p. 17), drew attention to the difficult issue of barrier-free design by conceptualising, for the first time, the problem of accessibility.

Thus, the term *Universal Design (UD)* was coined, also known as *Design for all* or *Inclusive Design* (Mace, 1985; Story, Mace & Mueller, 1998; Helvacioğlu & Karamanoglu, 2012) with the aim of designing products, structures, programmes and services that can be used by all people, to the widest extent possible, without the need for adaptations or specialised design, not excluding, however, supportive devices for particular groups of people with disabilities (UN Convention, 2006).

In the theory proposed by Mace (1985), the structuring of space and furnishings, materials and technologies is seen as an indispensable affordance (Gibson, 1979) that determines learning (Young, Cleveland & Imms, 2020) and does not create barriers and access problems. It is, therefore, a design aimed at inclusion and anchored on seven important principles³, summarised briefly:

- 1) *Equitable Use*: the project must be useful and marketable for people with different abilities.
- 2) *Flexibility in Use*: the project adapts to a wide range of individual preferences and abilities.
- 3) *Simple and Intuitive Use*: the use of the project must be easy to understand, regardless of the user's experience, knowledge, language skills or current level of concentration.
- 4) *Perceptible Information*: the design must communicate the necessary information to the user, regardless of the condition of the environment or the user's sensory abilities.
- 5) *Tolerance for Error*: the project must minimise risks and negative, accidental consequences or unintended actions.

3 <https://universaldesign.ie/what-is-universal-design/the7-principles/> (consulted on 10 January 2024).

- 6) *Low Physical Effort*: the project must be able to be used efficiently and comfortably with a minimum of fatigue.
- 7) *Size and Space for Approach and Use*: appropriate size and space must be provided for reaching, handling and use regardless of body size, posture and mobility.

These principles constitute the reference point when designing inclusive environments, since, «the key to this type of [universal] design is to include alternatives in the design phase, rather than making subsequent adaptations so that the products or environments built are more accessible and functional for all» (Savia, 2016, p. 29).

The UD approach ultimately «promotes differences [...] in order to strive for the universality of everyone's and everyone's right to enjoy environments, services, objects» (Baroni & Folci, 2022, p. 63), giving rise to a *culture of and for inclusion*.

2. METHODOLOGY

For more than two decades in the international context, a pedagogical movement identified as *Student Voice* (Czerniawski & Kidd, 2011; Fielding, 2004, 2012; Flutter & Rudduck, 2004) has been gaining ground with the aim of enhancing and promoting the role of students in school and university contexts. The idea behind this perspective is that students are the main actors in school/university life who are able to make important reflections and offer meaningful insights into educational practices (Cook-Sather, 2009). Inspired by approaches such as Deweyan activism and Freire's pedagogy, Student Voice, looks at the student as a co-lead actor in teaching and learning (Grion & Maretto, 2017), as well as a «political subject» (Smyth & McInerney, 2012) with the right to express opinions on the creation and organisation of their own educational journey. In the light of this approach, the protagonists of our exploratory survey were 151 students enrolled in the Single-Cycle Master's Degree Course in Primary Education at the University of Bari «Aldo Moro» and engaged, in the academic year 2022/2023, in direct internship activities within primary schools in the Apulia Region. It should be pointed out that the entire research was not intended to offer an assessment of the level of inclusiveness of the learning spaces encountered, but rather to attempt to promote, in students, that mental *habitus* essential for their future professional teaching practice: *reflexivity* (Shon, 1983, 1987). The priority objective was, therefore, to induce students to observe, by means of the questionnaire instrument, the inclusive dimension connected to learning environments in order to understand how much and in what way the latter affects well-being, health, emotions, the quality of work and the sense of belonging of those who inhabit it (Sanoff *et al.*, 2001). Subsequently, during indirect traineeship meetings, organised in groups and with the guidance of their coordinating tutor, the trainees were able to reflect extensively on the data that emerged from the exploratory survey.

The survey instrument used was a questionnaire, appropriately constructed taking into account the seven principles of the UD, from which four sub-areas of survey were derived: **well-being, flexibility, sense of belonging and the social dimension** (Tab. 1).

Table 1. Articulation of the survey instrument

AREA	CORRELATION UD PRINCIPLES	ITEMS
WELL-BEING	- Principle 1: Equitable Use - Principle 5: Tolerance For Error - Principle 6: Low Physical Effort - Principle 7: Size And Space For Approach And Use	- <i>Are soft furnishings provided in the classroom and/or section and/or common areas?</i> - <i>Can students and children easily reach, with the help of vertical and horizontal signs using different languages (Alternative Augmentative Communication, Braille, tactile flooring, etc.) the outdoor and/or indoor spaces where they can move or run?</i> - <i>Are there easily accessible relaxation areas where students, children and teachers can linger for reflective activities?</i> - <i>Are the furnishings and spaces between furnishings suitable in terms of size and ergonomics with respect to the age and needs of students and children?</i> - <i>Are the walls of the classrooms coloured or customised with posters or other products of the students and children?</i> - <i>Are the furniture, teaching spaces and common areas maintained, clean and tidy?</i> - <i>Can students, teachers and other school staff with reduced mobility access all areas of the school?</i>
FLEXIBILITY	Principle 2: Flexibility In Use	- <i>Are students allowed to move desks or other classroom furniture?</i> - <i>Do classroom tables allow adjustments (height, tilt...) according to the different needs of teachers and students?</i> - <i>Are students allowed to carry out certain educational and teaching activities outside the classroom in unconventional environments (e.g. corridor, garden, library, etc.)?</i> - <i>Are there at least two different types of teaching settings in the classroom to support activities of various kinds (e.g. group work, presentations, brainstorming, circle time, play activities, etc.)?</i> - <i>Is there space in the classroom for individual work or reflection?</i>

AREA	CORRELATION UD PRINCIPLES	ITEMS
SENSE OF BELONGING	- Principle 2: Flexibility In Use - Principle 3: Simple And Intuitive Use	- <i>Is the school equipped with vertical signs (e.g. placed on signs.) and horizontal signs (e.g. placed on the pavement) in different languages (illustrations, tactile signs, Alternative Augmentative Communication, pictograms, auditory signs, etc.) to stimulate orientation and mental representation of the route?</i> - <i>Is the school entrance used by children, families, school staff and is it set up in such a way as to welcome everyone, reflecting their different identities (e.g. with photographs, posters and information in different languages, traces of work done by the children, furniture and decorations built with the collaboration of children and parents, etc.)?</i> - <i>Do the pupils have boxes or shelving where they store objects and/or personal work materials with such characteristics (height, visibility, ease of opening, different languages, etc.) that they can be easily reached and used independently?</i> - <i>Do teachers contribute to the maintenance and/or decoration of the rooms (notice boards with notices and photos, painting of walls, decorations, respect for furniture and objects, small tidying and cleaning jobs, etc.) also with the support of students and/or children?</i>
SOCIAL DIMENSION	- Principle 3: Simple And Intuitive Use - Principle 4: Perceptible Information	- <i>Is the school equipped with spaces for informal discussion (sofas, relaxation areas, etc.)?</i> - <i>Does the school have structured and distinct spaces to take into account the different needs of each child and offer different ways of interacting with adults and peers during activities (individual work, group work, rest, etc.)?</i> - <i>Are there quiet, collected spaces in the school for relaxing, thinking or reading a book?</i>

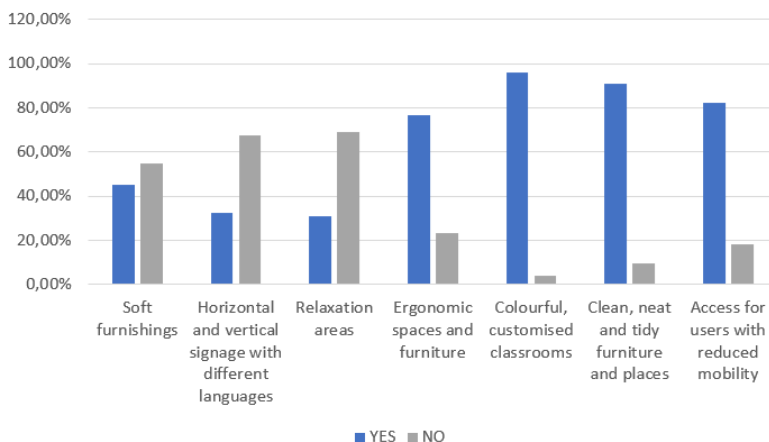
The research involved the administration of the questionnaire, using a form from Google Forms, a very user-friendly service that allows one to create questionnaires online and in which the answers received are recorded in a Google Sheets file that can be exported to Excel. Socio-demographic data show that 95.4 % of the sample is female and that the most frequent age group (72.6 %) is between 20-25 years old. The majority are enrolled in the fifth (45 %) and fourth (21.2 %) year. This is followed by those enrolled in the third year (14.6 %), the second year (14.6 %) and finally out-of-course students (4.6 %).

70.9 % of the students surveyed hold a secondary school diploma, followed by 18.5 % with a Bachelor's degree, 8.6 % with a Master's degree and, finally, 2 % hold a Master's degree/postgraduate degree.

3. RESULTS

The first section investigated, that of *well-being* (Fig. 1) shows a widespread presence of suitable and ergonomic furniture that respects the age and needs of all students (76.8 %), classrooms with colourful and customised walls (96 %), clean and tidy environments (90.7 %) and adequate accessibility for users with reduced mobility (82.1 %). However, there appears to be less attention and concrete use of soft furnishings (45 % of the respondents answer negatively about the presence of these elements), vertical and horizontal signage, in different languages, useful for spatial orientation (only 32.5 % affirm their presence) and «relaxation areas» useful for relaxing and reflective activities (only 31.1 % answer affirmatively).

Figure 1. Distribution of elements related to WELLNESS

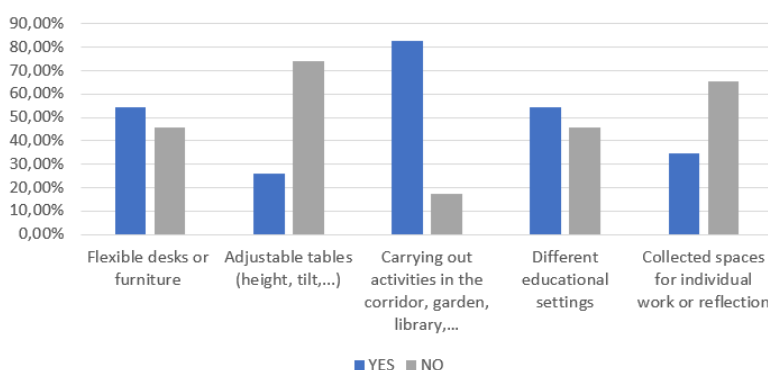


From the analysis of the second section of the questionnaire, that concerning the *flexibility* of classroom spaces (Fig. 2), 54.3 % of the sample affirms that there is the possibility of moving desks or other classroom furniture to carry out non-traditional educational and didactic activities; 82.8 %, moreover, affirm that they make use of non-conventional environments (e.g. the garden, the library or the atrium). 54.3 % state that they have observed, in the classroom, the presence of at least two different types of didactic settings to support activities of various kinds (group work, brainstorming, circle-time reflection activities, playful activities, etc.). These initial data are particularly encouraging since they reveal the profile of educational

institutions in which spaces are appropriately designed, in a flexible form, to co-exist with diversified didactic situations (traditional lecture, presentation, elaboration, discussion, etc.).

However, the answers to the remaining two items show us that the road to inclusion is still a long one: 74.2 % of the respondents state that they did not find, in the schools where they did their training, tables and other furniture to be adjusted to the different needs of the students (different adjustments, height, inclination...); 65.6 % state, finally, the lack of spaces for individual work or reflection. These spaces also appear to be fundamental for facilitating processes of autonomy, appropriation, management of attention and concentration times, and useful for mitigating any sensory overstimulation.

Figure 2. Distribution of elements related to FLEXIBILITY

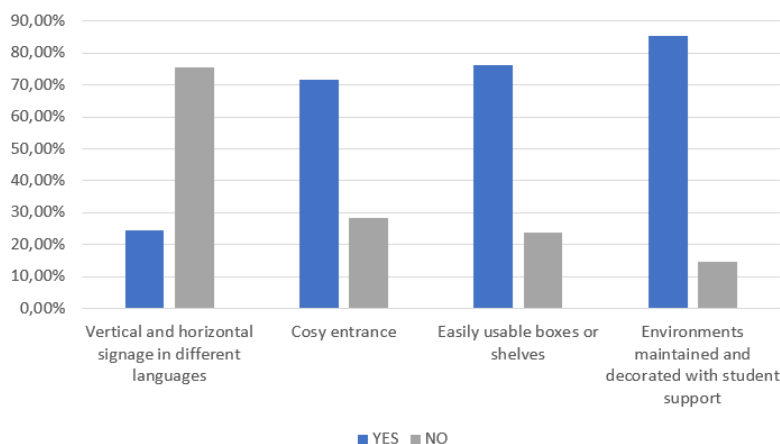


The third section of the exploratory survey included a reflection on the *sense of belonging* that the school space conveys and which recalls the principles of welcoming and belonging and a sense of identity (Mosa, in Tosi, 2019).

The data collected (Fig. 3) turn out to be rather comforting, as 71.5 % of the respondents affirm that the school's entrance/lobby was appropriately set up in order to welcome all the children and become a favourable environment for the development of the «school community»; 76.2 % state that they found specific boxes or shelves in the classrooms containing objects and/or personal work materials with characteristics (height, visibility, ease of opening, different languages, etc.) such that they could be used independently by everyone. A significant percentage of trainees (85.4 %) confirm that teachers contribute, with the support of students and/or children, to the maintenance and/or decoration of the rooms (by putting up notice boards with notices and photos, decorating walls and doors, taking care of the furniture present and objects, even with small tidying up and cleaning jobs, etc.). However, 75.5 % of the respondents report that educational institutions do not use the different languages (illustrations, tactile signs, Alternative Augmentative Communication, pictograms, auditory signals, etc.) for vertical signs (e.g. placed on signs...) and horizontal signs (e.g. placed on pavements). Therefore, there is still a lack of useful information for students to stimulate

orientation and mental representation of the surrounding space. This finding is also confirmed by the ISTAT 2022 Report «School inclusion of pupils with disabilities/A.S. 2021/2022» according to which only 16 % of schools have visual signs for pupils with deafness or hearing loss, while relief maps and tactile routes, necessary to make spaces accessible to pupils with blindness or low vision, are present in only 1.5 % of Italian schools.

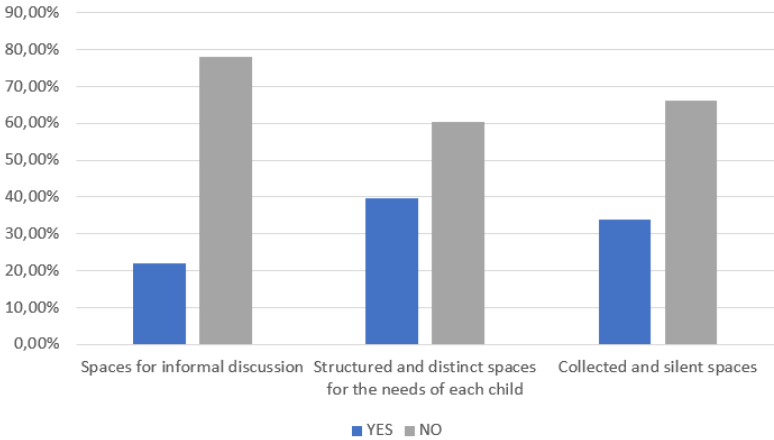
Figure 3. Distribution of elements related to SENSE OF BELONGING



Finally, the last section stimulated students to observe and reflect on the *social dimension* of environments as a factor stimulating interaction and cooperation between the different components (Tosi, 2019).

From the results that emerged (Fig. 4), it is clear that the schools surveyed are still not equipped with spaces for informal discussion (78.1 %), that they do not have structured and distinct spaces that take into account the different needs of each child and thus offer different ways of interacting with adults and peers during educational activities (60.3 %). Finally, for 66.2 % of the sample, there is no presence of quiet and collected spaces to relax, think or read a book. There is therefore still a lot of work to be done in the direction of structuring spaces in such a way as to allow everyone to participate and with the possibility of creating small areas (e.g. with movable panels/screens, etc.) for cooperative group work.

Figure 4. Distribution of elements related to SOCIAL DIMENSION



4. CONCLUSIONS

The creation of inclusive learning environments is a fundamental objective for the entire education system, a priority for the development of equitable and quality education for all students, regardless of their individual abilities, characteristics or challenges.

In fact, an inclusive environment promotes students active involvement and encourages the development of social and emotional skills. Furthermore, the design of flexible and accessible spaces offers the opportunity to adapt the environment to the different needs of students, facilitating their active participation and ensuring a meaningful learning experience for all.

The adaptation of school environments in the inclusive perspective of UD implies considering space as an «active element» that influences and supports activities and interactions; in this way, the configuration and characteristics of space become a determining factor for inclusion, since the level of accessibility, with the presence or absence of barriers, can include or exclude specific categories of people (Lettieri, 2013).

However, creating inclusive learning environments is not only a mere architectural issue, but also requires a cultural and pedagogical change. In fact, inclusion is a process that does not only concern students with disabilities or special educational needs, but extends to all students and passes through the functional *reorganisation of school contexts* (Capperucci & Franceschini). As emerged from the exploratory survey conducted, the design of spaces and teaching methodologies based on the needs of the 'typical' student inevitably risks limiting the number of people able to fully participate in school activities (Weyland & Galletti, 2018). An inclusive environment respects individual differences and enhances diversity as a valuable resource for collective learning, through the redevelopment of spaces that promote collaboration, creativity, and mutual interaction, thus favouring the construction of a collective identity and a sense

of belonging to the school community. The idea of an environment aimed at the prosperity of functional spaces, both formal and informal, both internal and external, inevitably needs to be based on a shared pedagogical perspective. This aims to transform the school structure into a *learning architecture*, where the centrality is represented by the quality of educational interactions, the level of participation and well-being.

It is therefore indispensable to adopt an integrated approach involving teachers, school staff, families and the entire community, in order to guarantee specific training aimed at re-configuring school spaces with an inclusive perspective. This perspective, in Italy, is pursued, in particular, by the «Inclusive Spaces» research group belonging to INDIRE (Istituto Nazionale Documentazione, Innovazione, Ricerca Educativa). Their commitment, which began in 2016 with the drafting of the «Manifesto for 1+4 Educational Spaces», has evolved to the creation of numerous scientific contributions. Currently, their focus is on the importance of inclusive design, both for environments and educational situations, taking inspiration from the international principles of *Universal Design* and *Universal Design for Learning* (Caprino *et al.*, 2022).

In conclusion, the theme of improving the quality of inclusive processes at school, refers to the awareness of the use of different educational settings as tools to promote educational and didactic innovation, implying a transition from the simple descriptive plan to a planning perspective, in which architectural design represents only the beginning of a complex and prolonged path involving the entire school community (Carro & Tosi, 2023).

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