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## Unusual materials in pre and primary schools: presence and actions

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### Abstract

The theme of unusual materials – new or used materials unfinished, unrecognizable, not immediately definable – is of growing interest in the fields of pedagogy and teaching and are more frequently found within educational services and schools. The reason for this is due to sensitivity to environmental education, as well as comparison with adherence to contemporary life, besides being a precise strategy for active learning. Its diffusion still needs to be thematized and systematized, in order to explore the different possibilities inherent in the use of these types of materials. The paper gives some results of a study on unusual materials in pre and primary schools in the Lombardy Region, investigating the presence, types and uses designed and implemented by students enrolled in the Education Faculty of a University in the North of Italy during their internship for use in their thesis projects and at the host schools.

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### 1. Introduction

Reflection on unusual materials found in schools today has become increasingly central because of their connection with the theme of sustainability, contemporariness and their didactic potential. This paper is part of a wider study on objects and materials in education and aims specifically at investigating unusual materials in pre and primary schools, as well as the actions that these materials suggest. Our purpose is to understand how these new materials, related to every day life, have entered the school system and whether they have influenced actions and brought new meanings or if they have simply been added without taking on particularly different and innovative aspects with respect to materials already in use at schools for some time. Another issue is whether these newer materials are taken into account by future teachers during the final year of their degree course in Education Science.

### 2. Some definitions of materials at school

The importance of objects and materials, attested to by educators since the earliest reflections on this subject (Comenio 1974, 1993; Froebel 1993; Rousseau 1989; Gabelli 1870; 1880; Montessori 1969, 1970; Pizzigoni 1934, 1971; Dewey 1948, 1953), is an element of paramount importance in this digital age for children at ECECs, pre and

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primary schools. They are equally important even with older children (Hawkins 1979) and they are increasingly offered in workshops designed in universities (Kanizsa 2004; Frabboni 2004)

An important reflection regards the value of the questions and thoughts that arise from doing (Piaget 1975; Mounod 1995; Zuccoli 2010), and the conceptualizations which develop thanks to the thoughtful intervention of adult educators and teachers, able to grasp the thoughts, the processes and the potential stemming from the manipulation of objects and materials.

For a better understanding of the characteristics brought into play by these actions and to further articulate unusual materials and here attempt an albeit partial identification and ongoing explanation of what we mean, an overview of objects and structured, unstructured and natural materials is needed.

A preliminary outline of the types of materials that can be found in educational and teaching proposals is useful for defining what we refer to as unusual materials, with emphasis on both the possible similarities and specific differences.

We will base our observations on traditional pedagogical literature and on some educational experiences, both at school and at in-school workshops, still in progress.

We will begin by defining useful objects, by which we mean "things" in our daily environment that may be brought to school for a specific educational use. Objects may be further distinguished between those brought by teachers or by children, spontaneously or at the request of the teachers. The classic reference draws on the thinking of the Agazzi sisters and their Museum of Objects, which did not include materials designed for use at school (Agazzi, 1938, 1950a).

We agree with the definition of structured materials, i.e. materials linked by a specific network of relationships, promoting educational objectives previously identified by adults (Anolli & Mantovani, 1981). Such educational materials were designed for specific educational purposes and single action(s) for proper use.

In contrast, we define as unstructured those materials that allow for more open combinations, supporting creative thinking. These materials do not necessarily have specific educational purposes and in any case offer the possibility for flexible, composite actions.

Another important category is natural materials (Goldschmied, Jackson 1996), i.e. materials that are found in nature, the opposite of artificial ones, which instead are the result of human intervention. Their educational value has long been recognized in the pedagogical tradition (Froebel 1937; Agazzi 1950b; Pizzigoni 1934, 1971; Lodi 1970), still focused on in recent experiences. If the first meeting with nature and natural materials was a element that was part of the daily experience of most children, today we need to safeguard this relationship through intention. For some children, contact with nature is new and not usual. We mention two experiences recalled by Célestin Freinet and Mario Lodi (Freinet 2002; Lodi 1970; 1982), among many others. In everyday school life, it often happens that children bring pieces of the natural world they found on their way to school, or other significant things that they want to share with teachers and peers.

Reflection on objects and their potential use is now also present in other closely linked contexts, such as museography, which reminds us how "objects are real but able to express themselves in a triply interactive way: manually interactive ("hands on" in today's museum jargon), mentally interactive ("mind on") and culturally interactive ("heart on"). They are objects that tell stories, that talk to each other and to the visitor. They are objects with associated events, living objects, objects that change. It is one thing to exhibit a sedimentary rock on its own and another to associate an experiment that shows the process in real time of how the rock was formed" (Wagensberg, 2005, p. 311).

Regarding these definitions, we wish to make a further reflection: the details above are only a step which serves to arrive at greater clarity regarding the intentional use of the materials on the part of teachers and educators. We do not think it desirable to have a precise definition, almost like fence that separates materials from objects and determines their irrevocable, specific use.

Real life is so complex that each of these explanations, if fully analyzed and applied to one context rather than another, may not be fully compatible, exhaustive, or may even seem to be false. What is an object? When does it become an instrument? What is the difference between materials and objects, between structured and unstructured materials? Based on these questions, we look for answers, we reflect more carefully and then do or make significant

actions. The proposed definitions are, therefore, only an attempt to deepen the impact of choice in order to add meaning to the proposed actions, illuminating the field of individual activities and more complex paths.

### **3. A possibile definition**

Based on the above, we define materials which are unfinished, unrecognizable, not immediately definable as new, "unusual". These include artificial materials, like industrial discards, which are different from recycled materials. The latter, in fact, are already used and have reached the end of their life cycle with regard to their original purpose.

This definition was arrived at thanks to a research-training project we have carried out over the past three years with a group of students engaged in their thesis projects (Guerra, Zuccoli, in press). This area of study is rapidly evolving, with the introduction of new variables that emerge in the study, research and practice of action. Whenever these materials are the object of further exploration, new perspectives emerge, and the very process of naming can be enriched and modified. One of the latest aspects considered, for example, concerns the "lack of function" that these materials have, as they are mostly waste materials or the result of overproduction. The majority, in fact, were not designed to perform any function and they did not play an active role in the production cycle. In general, these materials are left over at the end of a production process, or they are production process discards or production errors. Thus they have a life of their own only when they are retrieved and used for education and teaching. They would otherwise be discarded and disposed of or recycled, depending on what they are made of (Remida, 2005).

In any case, these materials are multi-poly-functional (Fusina, 2012), never named or defined for a specific use. They may play different roles in the proposed actions each time they are used. The intrinsic symbolic dimension appears evident, thanks to the possibility for continuous and successive transformations, depending on the framework in which the material is placed. Another peculiarity of these materials is the need for greater participation in play activity than for other more structured objects or materials, especially during the ideation-invention phase. There is a difference, in fact, with respect to an already finished object. The definition by Remo Bodei (Bodei 2009; Zuccoli 2010) states that the change of use can be imagined, going beyond the limit to imagine another use, as in the classic example of "riding horse on a broomstick" (Gombrich, 2001) or the connections, binomials, the reinterpretation of Bruno Munari (Munari 1972, 1999, 2004) and many artists, such as Picasso, among others.

Another useful distinction regards the difference from recycled materials. At first glance they may appear to overlap in meaning, significance and in teaching proposals, but going deeper into the specifics of their design and the actions that can be done, the differences are very striking. Recycled materials always start from the use for which the object was designed. This can certainly be changed in an educational project, but this aspect will always be necessarily taken into account, thus becoming the undeniable starting point. This action/function is always evident and it is not invalidated despite subsequent changes. It lingers in the new choice, directing and conditioning it. Actions can be in contrast, in symbiosis, or they can push the limits.

With unusual materials, however, the potential is free and depends on: the type of material, the gradation of colors, the consistency of sound, the strength of the shape. These elements can be in agreement or in disagreement with other materials (also from production surplus) which require the same necessary participation. The many possibilities require constant, unlimited experimentation, because there is no real destination point. This does not lead to the recreation of some definite form, but rather the idea is to continue to experiment and re-experiment, paying attention to hypothesis and verification, trial and error.

### **4. The definition and actions in the field**

Our survey developed alongside and in support of experiences in the research project-training referred to above. Among our key priorities was the administration of a series of questionnaires to students during their last two years of the Degree Course in Early Childhood Education. This paper is based on the results of one third of these questionnaires, involving 68 students, oriented towards exploring the meanings attributed in a general way to the theme of materials at school and the relationship between the childhood experiences and adult choices regarding the

use of specific materials (Guerra, Zuccoli, in press). The specific knowledge and representations about the different types of materials mentioned above were investigated. In particular, we present the initial results of four open-ended questions that invited reflection about the possible definitions of materials in general, and then asked for more specific definitions of structured, unstructured and unusual materials at school, supporting each with examples. The questionnaire also served to ascertain whether these materials were taken into account, and if so in what way, in the schools where the students had carried out practice teaching internships or were employed.

An initial analysis of these responses allowed us to understand how we define more structured materials - as shown by 66 of the 68 responses - a material that has a specific purpose, a single mode of operation and action and an end already provided for in its design. In proposals featuring them, their proximity to more convergent thinking was highlighted. Examples of these kinds of materials include puzzles, some Montessori materials, some board games, as well as work sheets.

Unstructured materials were defined those materials which allow for a greater freedom of action, not necessarily confined, along with a many explorations. Examples included tangram games, textiles, construction games, natural materials ... Many students stressed the use of different methods, the possibility for arriving at different solutions and explicit or implicit connections with divergent thinking.

The definition of unusual materials, however, highlighted the characteristic of novelty compared to the more common materials found in schools. All of the questionnaires stated that these materials are not usually found at school, but they belong to other contexts, including industrial, familial and natural ones. They can be brought to school and then "reinvented", meaning they used differently from how they were originally designed to be used. Some categories frequently mentioned for these types of materials: they were unusual, alternative, unconventional, they did not meet safety standards, they were unfamiliar or not part of daily life at school, and they were not didactic. The element of divergence here is even more explicit and inherent based on the material discussed, defined and qualified by these aspects.

Almost all of the respondents (i.e. 63 of 68) claimed they understood the use of materials in the proposals would develop during the fourth and final experience into the planning and implementation of an experience with children, subsequently to be elaborated in the thesis. Among the types of materials listed, compared to previous questionnaires (there is an initial survey in Guerra, Zuccoli, 2012), there was a prevalence of materials characterized by their openness: among the materials indicated, only 22 preferred structured materials, while 46 chose unstructured and 31 unusual materials. The choice of unusual materials in particular suggests that explicit reflection on the meanings and types of materials in this category, included in this questionnaire and not in the previous ones, might have favored a more detailed reflection on the different types of less common materials at school.

## Conclusion

In conclusion, the definitions of materials proposed by the students appear to be very consistent with those outlined in the literature and follow experiences in the field, showing not only targeted knowledge, but also a willingness to introduce and use materials characterized by greater openness and flexibility in future school experiences. However, there is a greater clarity of definition regarding structured and unstructured materials, and there is less focus on the specific characteristics of those considered unusual (i.e. different from the usual materials, those normally not present...) due to their exceptional qualities.

Continuing our investigation, especially through field research, would be interesting and serve to arrive at a definition that allows for showing and sharing their potential more precisely.

## References

- Agazzi R. (1938), *Come intendo il museo didattico nell'educazione della infanzia e della fanciullezza*, La Scuola Editrice: Brescia.  
Agazzi R. (1950a), *Guida per le educatrici dell'infanzia*, La Scuola Editrice: Brescia.  
Agazzi R. (1950b), *La lingua parlata: esercizi pratici ad uso della scuola di grado preparatorio e delle prime classi elementari*, La Scuola Editrice: Brescia.

- Anolli L, Mantovani S. (a cura di) (1981), *Giochi finalizzati e materiale strutturato*, Franco Angeli: Milano
- Bodei R. (2009), *La vita delle cose*, Laterza: Roma-Bari
- Comenio J. A. (1974), *Opere*, Utet: Torino
- Comenio J. A. (1993), *Grande Didattica*, La Nuova Italia: Firenze
- Dewey J. (1948), *Esperienza e natura*, Paravia: Torino
- Dewey J. (1953), *Esperienza ed educazione*, La Nuova Italia: Firenze
- Frabboni F. (2004), *Il laboratorio*, Laterza: Roma-Bari
- Freinet C. (2002), *La scuola del fare*, Junior: Azzano SanPaolo
- Froebel F. (1937), *L'educazione dell'uomo e scritti scelti*, Cedam: Padova
- Froebel F. (1993), *L'educazione dell'uomo*, trad. it. La Nuova Italia: Firenze
- Fusina M. (2012), in Gariboldi A, Cardarelli R., *Pensare la creatività*, Edizioni Junior-Spaggiari: Parma
- Gabelli A. (1871), *L'uomo e le scienze morali*, Le Monnier: Firenze
- Gabelli A. (1880), *Il metodo dell'insegnamento nelle scuole elementari*, Paravia: Torino
- Gombrich E. H. (2001), *A cavallo di un manico di scopa: saggi di teoria dell'arte*, Leonardo arte: Milano
- Goldschmied E., Jackson S. (1994), *Persone da zero a tre anni: crescere e lavorare nell'ambiente del nido*, Edizioni Junior: Bergamo
- Guerra, M., Zuccoli, F. (2012), *Finished and unfinished objects: supporting children's creativity through materials*, *Procedia - Social and Behavioral Sciences*, 51, pp. 721–727
- Guerra, M., Zuccoli, F. (in press), *Materials from Childhood to Adulthood*, *Procedia - Social and Behavioral Sciences*
- Hawkins D. (1979), *Imparare a vedere. Saggi sull'apprendimento e sulla natura umana*, Loescher: Torino
- Lodi M. (1970), *Il paese sbagliato: diario di un'esperienza didattica*, Einaudi: Torino
- Lodi M. (1982), *La guida al mestiere di maestro*, Editori Riuniti: Roma
- Kanizsa S. "Laboratori e tirocinio nella formazione universitaria degli insegnanti" in Nigris E. (a cura di) (2004), *La formazione degli insegnanti. Percorsi, strumenti, valutazione*, Carocci: Roma, pp.63-87.
- Montessori M. (1969), *La scoperta del bambino*, Garzanti: Milano
- Montessori M. (1970), *La mente del bambino*. Mente assorbente, Garzanti: Milano
- Mounod P. (1995), *Dal pensiero all'azione*, La Nuova Italia Scientifica: Roma
- Munari B. (1977), *Fantasia*, Laterza: Roma
- Munari B. (1999), *Design e comunicazione visiva: contributo a una metodologia didattica*, Laterza: Roma- Bari
- Munari B. (2004), *I laboratori tattili*, Corraini: Mantova
- Piaget J. (1975), *La costruzione del reale nel bambino* (La construction de réel chez l'enfant, 1967), trad. it., La Nuova Italia: Firenze
- Pizzigoni G. (1934), *Linee Fondamentali e Programmi delle prime sei classi della Scuola Rinnovata "Giuseppina Pizzigoni"*, Ufficio di Propaganda dell'Opera Pizzigoni: Milano.
- Pizzigoni G. (1971), *Le mie lezioni ai Maestri delle Scuole Elementari d'Italia*, La Scuola Editrice: Brescia
- Reggio Children (2005), *REMI DA day*, Reggio Emilia: Reggio Children
- Rousseau J. J. (1989), *Opere*, trad. it., Armando: Roma
- Wagensberg J. (2005), *The "total" museum, a tool for social change*, *História, Ciências, Saúde - Manguinhos*. 2005; 12 (Suppl):p.309-21
- Zuccoli F. (2010), *Dalle tasche dei bambini... Gli oggetti, le storie e la didattica*, Edizioni Junior-Spaggiari: Parma