Design Culture in school. Experiences of design workshops with children.

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Abstract: This paper discusses the social and cultural roots of the emerging need for project-based didactic approaches within education systems, showing the advantages of the adoption of design tools and specifically of the Service Design Thinking method. These are presented in relation to extant literature in the pedagogic field, giving an overview of the domains within which Service Design Thinking can be beneficial. A series of workshops carried out with children are then presented, highlighting the most relevant findings that have been gathered from them and discussing their methodological potential toward an implementation of design education in primary schools.

Keywords: Education, Design Thinking, Service Design, Didactic Methods, Learning

1. Introduction

In the 21st century society, it has become clear that knowledge will become increasingly more important than the tangible resources we have at our disposition (Robertson, 2005). In fact, it will be more and more a fundamental asset to support us in the attempt to overcome those wicked problems that are a daily issue in our societies. This confronts us with the need to ensure that the educational system is ready to take this new challenge onboard. Three key topics inspire this debate.

1.1 Holistic understanding, autonomous discovery, critical thinking

When we talk about the importance of teaching students how to solve open-ended problems, there is a stream of literature about logic and creative thinking to draw on. Experts have observed that one of the key processes that enable problem-solving outside of closed systems is the capability to transfer knowledge between fields and to generalize, zoom out and see the underlying complexity. This relies on what Bartlett describes as ‘adventurous thinking’, which is the capability to go beyond the obvious, a skill that can be nurtured and trained also by exposing children to a stimulating
environment that allows them to experiment, move between fields of knowledge and make autonomous discoveries (Bartlett, 1958). On the contrary, traditional school programs often confront children with pre-packaged information and a simplified understanding of reality, offered in the form of distinct school subjects: in this approach, the learner acts as an “independent observer of objects” (Scheer et al., 2012, p.9). Schools should ever more promote a holistic understanding of the world, to help kids become better individuals, equipped with strong logic and creative skills.

1.2 Adopting a variety of methods to fit different learning styles

Existing research has widely shown evidence of how different the learning process is for each child: students may be naturally inclined to use certain intelligences more than others (Gardner, 2011; Azzali & Cristanini, 1995), for instance being more at ease exercising their verbal-linguistic competence than their visual-spatial or logical-mathematical. The different extent to which intelligences are developed for each person results in endless combinations and a huge diversity of learning styles. Although some degree of generalization is needed in order to come up with a replicable methodology, it is clear that there is an opportunity for schools to recognize this variety, allowing students to exercise those competences that are easier for them, but also stimulating them to train “other intelligences” through a variety of activities, ranging from the more theoretical to the more practical (Cornoldi, 1999).

1.3 Fostering collaboration and encouraging group work

A third dimension that cannot be overlooked has to do with the broader context within which learning occurs, the classroom. A lot of research has been done on how to facilitate the exchange between teacher and pupils but ‘the concept of pedagogy needs to be extended to allow for other social relations, in particular, those involving co-learners or peers’ (Blatchford et al., 2003, p. 6). Research has shown that collaboration between members of a classroom can improve both learning achievements and attitude/motivation toward activities. This, in turn, reinforces the importance of fostering cooperation with the aim to generate more debate and therefore to help children to nurture critical thinking skills.

The debate around these topics is still open as they pose numerous challenges when it comes to turning these principles into actionable guidelines and implementing them through activities. It takes more than a simple manifesto to promote a cultural shift: the combination of a solid methodological approach and the re-organization of internal processes are both equally essential for this evolution to take place.

2. Design Culture

Nurturing a design culture within the school system is seen as a phenomenon that can result in beneficial outcomes for the school itself. Design culture is here intended as the headline under which two major contributions fall. First, it takes the form of a project-based didactic approach that encourages children to perform design activities and “contextually informed actions within the development of a design” (Julier, 2005, p.70). Second, it appears as a specific attitude towards change and a sense of agency that can be seen within the school as an organization and in relation to
the outside world. In this paper, we will mainly focus on experiences concerning the didactic approach per se.

Promoting change within the school in these two directions would mean, on one hand, allowing students to gain more active control over their learning process through design and, on the other hand, absorbing these methodologies at the institutional level and putting them in use by continuously improving the way educational experiences are offered, thus turning the school into a learning organization itself.

On a more practical level, the key enabler of this cultural shift is the Service Design Thinking methodology, a set of tools and methods that could both help teachers to deliver engaging learning experiences to pupils and sustain this change at the organizational level.

In particular, the Service Design methodology has recognized the importance of design as a process and not just as an outcome expressed through an artefact, with a certain form, function, and visual language (Stickdorn & Schneider, 2012). The Service Design approach adopts a human-centered approach as opposed to a more traditional feature-centered process. It has also pushed designers to look beyond single objects and to explore the complex system of information, interpersonal relations, and contextual dynamics within which they exist. This perspective could help educators to focus more on the learning process and develop their educational approach by taking the point of view of their learners, but it could also help them to connect the didactic experience with the broader context of interpersonal relations, environmental influences, ...

In other words, educating through Design will help children to use their creativity beyond the limits of expressing themselves and as a tool to become critical thinkers and problem solvers, towards a future generation of more conscious individuals.

| What                           | How                                      |
|-------------------------------|------------------------------------------|
| Project-based approach with students (classroom) | Design tools and methods, Service Design Thinking methodology |
| School’s attitude towards change (institution) |                                           |

This whole approach sets its roots in the stream of constructivist ideas of learning, aiming to spread design culture among existing programs. It also differs from the other constructivist approaches in the following regards:

- While constructivist learning methods are seen as “opposed to” those derived from behaviourism and realism (Scheer et al., 2012), the goal here is to promote the integration of different learning methods and not to generate a “brand-new” one nor to add new disciplines to an already crowded curriculum.

- The methods and tools are derived by those developed for Service Design and Design Thinking.
3. Hypotheses

A fundamental assumption of this research is that Service Design methods can provide support to different moments of the learning experience, all the way from discovery to execution. Likewise, it is assumed that this didactic approach results in children not only absorbing knowledge in a different way but also engaging in design activities and producing knowledge.

Starting from this preliminary definition of design culture, a set of hypotheses has been defined to be used as parameters against which to evaluate the outcomes of experimental projects.

- Service Design Thinking allows learners to exercise different intelligences and can match different personal attitudes (Cornoldi, 1999).

- It facilitates a deep understanding of topics, facilitating the understanding of cause-effect relationships and correlations, increasing awareness and helping children to form opinions.

- It encourages the interaction between people, both between peers and asymmetric, (teacher-pupils relation).

- It supports permanence of knowledge: in Bruno Munari’s words, “If I see I remember. If I do I understand”.

- It helps children to evaluate the feasibility and viability of a solution.

- It encourages empathy and helps those who practice it to take other people’s perspective (user-centric approach).

- It fosters a holistic understanding of the world and encourages spontaneous connections between different fields of knowledge.

A series of experiences that bring children closer to the Service Design Thinking approach has already taken place.

4. Lessons from the field

4.1 Introduction

Initiatives promoting the use of design methods with and by children have taken place since 2014. Fuelled by the contribution of designers, educators, and teachers, these initiatives adopted a project-based approach with the goal of applying Service Design Thinking methods in educational contexts.

Design sessions mainly took place during Design Events in Primary and Secondary schools, in Italy and abroad, or were hosted by institutions like Children and Science museums, often with the support of the local Municipality and of design associations.
Overall, it has been made use of three formats, which differ in terms of goals, length, activities and tools used by the students:

- Design Jams
- Workshops
- School Programs

In all of these cases, the traditional Double Diamond divergent-convergent approach (Design Council, UK, 2005) has been taken as a reference but adapted to the needs of the session, sometimes modifying phase length as required.

The backbone of the process adopted in all the three formats is structured as follows:

- **Receive (the challenge):** the session begins with the presentation of a challenge, often related to the everyday life of the pupils. At this level, the facilitators’ role is crucial in driving the children to embrace the challenge empathically.

- **Understand (the problem):** children are engaged in a process of defining research questions, finding critical points to solve and gathering key information through desk and field research; they are then guided through a reflection about what they have learned.

- **Develop (an idea):** this is a manual and creative phase in which children are asked to sketch workable solutions on paper, using different techniques and a mix of visual and verbal language.

- **Prototype (the solution):** by using different kinds of materials and probes, children give visibility and tangibility to their ideas by mocking up objects, key interactions or spaces in which their design sits.

- **Present (the project):** after collecting feedback on the prototype, children arrange a public presentation of their project, explaining to their parents, teachers or the rest of the audience the advantages of their proposal and describing the salient aspects of the design process they have gone through.

Also, some experience pillars characterize the experience across phases:

- From complex to simple: breaking down complex notion into simpler facts and using storytelling to deliver concepts to kids
- From abstract to concrete: focusing on everyday life topics and practical challenges
- From knowledge to involvement: promoting engagement through role-playing and gaming and relying on kid’s self-consciousness and responsibility in taking action
- From talking to doing: learning with their hands, activating behavioural change in children

On the other hand, the main difference between the formats is referred to the duration and how time differently stress each design session phase and the interactions among participants.
4.2 Design Jams

Design Jams are activities open to children and pre-teens and characterized by a strong emphasis on improvisation and fast prototyping. They are usually carried out in less than 4 hours and aim at teaching how to transform ideas into prototypes to be tested.

The goal of the Jams is to help participants to try out the basic principles of a Service Design Thinking process, by showing them that we live in a “designed environment” in which products, services, and interactions can be improved through design. They are also encouraged to conceive solutions that take into account what “the others think” and need, understanding their perspective as users and assessing the complexity of situations which include multiple actors and points of view.

The schedule is tightly built around 6 activities: kick-off and challenge presentation (15-20 min), brainstorming session (30 min), user interviews (40 min), project insights generation (30 min), rapid prototyping of solutions (60 min) and presentation to the audience (20 min).

The Jam’s activities are carried out in groups of 3-5 kids each, supported by a facilitator, usually a designer or an educator. Groups of this size have proven to be the most effective in terms of internal collaboration and peer-to-peer exchange, while the support of a facilitator helps them to follow the process, make decisions and focus on “doing” rather than talking.

Figure 1. Interviewing a passer-by

Characteristic of a jam is to introduce the topic at the very beginning of the session. This is a critical phase in which it is important to make children feel emotionally connected to the given challenge, which can be encouraged through a role-play activity in which all the participants are asked to tell what their ‘superpowers’ are and are then called to use them into the specific context outlined by
the topic. To increase empathy, facilitators are asked to take part into the role-play too. Perceiving themselves as “heroes” called to action helps kids to embrace the challenge in a more enthusiastic way. Plus, choosing themes that touch upon aspects of their daily life increases relevance. Examples of topics are: “A visit to the dentist”, “The fear of darkness”, “What if I could fly”.

Through brainstorming, children explore and deepen their understanding of the given topic, sharing opinions and starting to collect “preliminary insights” upon which to create a discussion guide for the interviews. Large sheets of paper and a series of printed images related to the topic act as icebreakers in the discussion and help the participants to share personal experiences. Interviews require kids to ask questions to adults or peers and to report the insights they have gathered. Parents, teachers, and passer-by are often interviewed. The use of sticky notes is encouraged to better organize user feedback, while props such as fake microphones or badges are used to help kids interpret the role of researchers. Interview notes are clustered by affinity and discussed to select those that can be more easily developed into prototypes in the limited available time.

Prototyping is the activity that takes the longest: children use this time to give life to their ideas through artefacts and to perform the key actions/interactions related to their solutions, focusing on the entire ‘user journey’. Acting out, simulating gestures and talking out loud help kids to better imagine how the experience will be like and to ideate faster. Prototypes are built with poor materials, such as cardboard and glue, coloured plastic sheets, fabric, and modelling clay.

Eventually, each group is asked to pitch their proposal to an audience composed of all the participants and their parents by staging their solution, showing the key features and main interactions but also explaining the process they have followed throughout the Jam: this also becomes a moment of feedback on the potential of the Service Design Thinking approach as a learning method.
4.3 Design Workshops

Design Workshops differ from Jams in respect to three factors:

- they are mainly carried out in schools with the presence and participation of teachers
- they are composed of different design sessions: 2-3 short encounters
- the topic is agreed upon with the teachers and presented to the kids some days before the first design session.

While jams are usually offered to an open audience, workshops are offered to children from the same school or even to single classes. Therefore, teachers play a crucial role as part of the team who prepares and delivers the activities, making sure that there is integration between the design sessions and the other curricular activities:

- They prepare the ground for design activities through preliminary group discussions or short lectures focused on the topic of the workshop
- They gradually introduce a project-based approach also to form project teams based on kids’ personal attitudes in advance.
- Their presence throughout the sessions facilitates the workshop process, increases children’s participation and helps to create or make more evident the link with previous curricular activities or experiences.

Exercises are formulated in order to drive children to propose workable solutions around a topic related to their everyday life or experience at school: themes can be concrete, such as “Redesign the school canteen”, or more abstract like “How to help teachers to teach love for nature at school”. The question that triggers the design session is never seen as a task or a homework but rather as an invitation to explore, understand, elaborate, prototype and present, thus fostering a diversity of responses and moving beyond conventional mental models.

In order to facilitate this outcome, pupils are engaged, not instructed, by being provided with a clear, but open, end-goal to reach and a selection of tools (toolkit) from which they can choose the ones they want to use. The toolkit is based on the most common and easy-to-use Service Design and Design Thinking tools: it includes a guide to contextual interviews, a diary, a storyboard, some worksheets that guide children through the “five whys” and “what if” tools, rendered more apt to children by adding playful content and by making these tools part of a game in order to encourage them to participate.

The concept of “workable solution” requires children to draw on their personal experiences and on previously-learned notions from different disciplines. As in the jams, they are also asked to evaluate other people’s opinions by interviewing them or creating a list of questions on the topics they are less familiar with, usually involving parents and teachers in this process.

Overall, the workshop process encompasses the same phases of a Design Jam, all the way from research to ideation and share-out, with the exception that activities are stretched over a longer period and divided between sessions: this gives time for in-home interviews and for more group discussions at different stages to ensure that kids get to reflect upon their activities and consolidate their learnings.
4.4 School programs

The peculiarity of school programs is that they are planned around an existing didactic program in order to introduce a holistic approach to learning: programs touch upon different school subjects at once and provide teachers with new tools and methods to create a “learning by doing” experience. These programs take place at school over a period of time of one or several months and topic and methodology can vary according to the age of the students and their background.

Among other examples, two stand out as the prototypes of this format.

- A game-based program on food education, in which children are guided to discover the characteristics of vitamins and nutrients in fruits and vegetables, by transforming them into “super-powers”. According to the game rules, children are challenged to eat fruits and vegetables regularly, both at home and in school, so to increase the powers of their favourite super-heroes and get strong enough to defeat the villains, represented by unhealthy food. Using games creates a moment in which the concepts learned in class and through the activities at home fuel action, thus encouraging children’s collaboration and competition.
- A 6-month long weekly program on ‘design and basic entrepreneurship’ offered to pre-teens (10 to 12 yo), with the goal to help them ideate, produce and launch a product or service. The duration of this program allows teachers of different disciplines to contribute to the project with specific lectures (e.g. basic principles of economics) around which design activities are developed.
In both examples the contribution of the Service Design Thinking method lies in:

- the creation of a game or a plot, the narrative of which enhances the learning experience and the behavioural change and the collaboration among children (storytelling)
- the activities and the tools designed in order to promote active and enthusiastic participation and facilitate the development of their design skills and strategic thinking.
- the transposition of complex concepts into simple facts that can be used to design or refine ideas (which can help teachers to replicate the same didactic approach later on).
- the definition of a “user journey” of the learning experience, which takes all of the actors into account.

5. Conclusions

Although these experiences represent the first steps towards a more consolidated methodology, they already show some advantages of a project-based approach to learning.

Apart from the natural enthusiasm shown by the pupils all along the design sessions - very likely also caused by the novelty of the experience and the possibility to work with a very clear goal but very little constraints – other benefits of this methodology have been observed.

Overall, these activities have facilitated a deep understanding of topics: at the end of a session or during moments of share-out children were capable of recalling what they had learned and where the insights came from, referring to feedback received during interviews or their direct experience during the session. This has often been matched by high-quality outcomes that stood out in terms of conceptual complexity and completeness: mock-ups and acting-out activities often showed a complete understanding of the entire user experience and of all its different aspects. This has been the case even during Design Jam, the shortest format, in which many groups succeeded in quickly developing solutions, mainly according to two patterns: by surfacing the entire user journey and giving a hint of the experience or by deep-diving into a few selected aspects.

Availability of time influences depth, especially during the immersion phase, while it seems to be less influential on prototypes quality, probably reflecting children’s natural inclination towards manual activities. Longer programs, therefore, deliver better on building a conceptual structure.

Children approach the activities in different ways, depending on their attitudes and natural inclinations: short formats have proven less effective in allowing facilitators to fruitfully exploit this diversity and help children to exercise different intelligences (visual, verbal, ...), whilst longer formats allowed enough time to witness an evolution of their skills.

Providing Design tools with minimal instructions gradually showed increased autonomy: this helped them to organize their activities both in the exploratory and the generative phases.

This methodology also seems to reinforce permanence of knowledge: a few months after the end of the food education program, a follow-up with the school has shown that children’s behaviors and
choices were still informed by the notions they had acquired during the workshop and that consumption of fruits and vegetables was still higher than before.

From a relational point of view, a project-based approach implies a lot more emphasis on collaboration and empathy than a traditional lecture set-up. However, the very same activities yield different outcomes when embedded different formats, as children’s reactions to them are different. For instance, using the metaphor of ‘heroes’ and encouraging children to use their superpowers offers an immediate hook to get started during Design Jams, in which time is a scarce resource and improvisation is welcome, whilst, if used in longer programs, it pushes participants to come back to their individual resources and act more independently, not necessarily facilitating cooperation.

In general, it can be concluded that Design Jams prove effective in making children and parents more familiar with a new methodology that helps them to tackle unexpected challenges, go beyond their personal opinions and biases, create solutions collaboratively and present their ideas in front of an audience. On the other hand, more complex formats allow the generation of long-lasting outcomes both for kids and for teachers and educators.

However, it is too early to measure the impact of this methodology in the long run. The experiences discussed in this paper have already shown the potential of the design thinking approach in changing the way children learn and retain knowledge, but further investigation is needed to prove its benefits. During a recent workshop, some preliminary work has been done on the application of these methodologies to the STEM subjects: these disciplines are a particularly interesting testing ground as they offer numerous possibilities for the kids to produce prototypes and conduct experiments. However, it will be essential to collaborate with schools to integrate Service Design Thinking into their traditional curricular activities.

This can eventually help kids to learn from their experiences (learning by doing), to express their potential without fears, to see educators as facilitators and enhancers of their learning experience and to finally grow a responsible way of thinking that can better prepare them for being citizens of this world.

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