

Connecting curriculum to a meaningful learning

Paula Oliveira
Pedagogical Director at Little Maker
Americana/SP
Brazil
www.littlemaker.com.br
paula@littlemaker.com.br

Diego Thuler
Founder/CEO at Little Maker
Americana/SP
Brazil
www.littlemaker.com.br
diego@littlemaker.com.br

ABSTRACT

Identifying the increasing need to think about education in a way linked to experience, this text proposes an account of the experiences and thoughts that go through Little Maker's program and practices, aiming by building authorial projects into learning visibility. Thus, we present here our work aiming the approximation between Maker activities and the curricular contents of the school, focusing on the potentialization of knowledge meaningfully flow to the students.

Thus, we intent to share some strategies we have adopted to promote a fluid learning relationship, through the insertion of Papert's microworlds, the ideation process and learning reflection during our Maker activities.

Keywords

Education, Maker, Meaningful Learning, Curriculum.

1. DESCRIPTION

1.1 Motivation

Through Little Maker's 4-year experience working with Maker Education, we experienced several challenges, especially when we focused on formal education maker settings. Many of these challenges were already shared by peers that have been documented in a variety of articles and books on Maker Education^{[7] [8]}. Thus, we will address here the challenges faced trying to give visibility to learning connecting the students interests to curriculum objectives. Sharing our approach and results we intent to contribute, problematize and encourage new experiences.

To a better understanding the proposal described here, it's necessary to present how we perceive the subject and learning relationship. Therefore, our starting point is an integrated education, understanding that for the learning process to be given in a significant way we need to start from the interest point of the learner himself and, so, the authorial creative freedom is fundamental. Thus, by questioning and sensitizing our eyes to the innumerable connections that link the creation process to the knowledge aimed by school, it's possible to provide a deeper, fluid and transdisciplinary learning, crossing the frontier that usually segregates knowledge from practice.

However, as we enter the school environment, we are confronted with the contrast between the education proposals, propelling us to adopt strategies, techniques and tools aiming to make learning more visible, making goals and results clearer for students, parents and educators.

1.2 Educational context

Little Maker is a brazilian company that works with Maker Education in partnership with schools. We have been working with two main age groups: Students from 6 to 11 years old (1st to 5th grades) and from 12 to 15 years (6th to 9th grades), in a regular weekly courses with 1h30 duration per meeting. The courses are applied in Maker Spaces that gather a great diversity of tools and materials, aiming the development of each student in a continuous way throughout the schoollar year. So far we are present in about 20 schools.

These courses basis, begins by boosting connections between what is significant to the student and the school curriculum through a creative learning^[6], highlighting the relationship between learning and experience during the project development, moving and giving meaning for the discoveries and knowledges of each individual. Thus, the courses establishes differentiations between the two age groups, for the youngsters the students originates from themselves, their surroundings, their experiences to think about the project, while for the elders there is a stimulus to to take other community members perspective in order to think about their creations, moving better between the self, the other and the environment, seeing himself as environmental change maker.

1.3 Proposition

As we sought a closeness to the school, we felt the need to enable the expansion and unfoldment of the learning that occurred in our Maker activities and that this could be linked with the classroom and that the opposite movement also occurred.

Starting from the challenge of constructing a meaningful learning that draws from the student's interest points, we find in the concept of Papert's Microworld^[5] the ideal tool in which through a playful environment we could insert our intentionality at the same time as the freedom to build their own ideas.

The microworlds are presented in our Maker activities as environments designed for each of the age groups, being more playful and starting from a storytelling for the younger students, while bringing an adventurous content in the form of an exploration and discovery of the space invite for the older students. Thus, in addition to the intentionality behind the construction of the microworld that already speaks to themes and contents of the curriculum of each grade, we realized that when presenting the microworlds there was a power that fomented the ideation process, because at the moment, there is the possibility of a learning sensitization through the space problematization, starting from their own references to imagine this world in its social, cultural, economic, technological and scientific aspects.

In this process we achieved a first awareness of the curriculum, in which we do not pretend to teach the content itself, but to instigate curiosity, to problematize points to be provoked, to construct hypotheses, to reflect on its surroundings and to understand the student vision of the inserted environment.

From the immersion and problematization of the place the ideas will arise and the projects will be built. These steps have their own processes and challenges that are not the focus of this text and will not be detailed.

Therefore, after project idealization and construction, there is a second moment in which we return to the curriculum, because we understand that during construction sometimes learning is so connected to the doing process that we end up not being aware that we learn. Thinking about it, we have developed the reflection stage at the end of the project.

In the reflection, we propose to the teacher some activities and questions to students while they play, explore and share their projects, approaching curriculum subjects, but with the concern that these actions always comes from students buildings.

Then, there is the rescue of the teams working and gives visibility and voice so that students share their opinions, thoughts and experiences, connecting what was built with the school contents, daily life and the world . In addition the reflection generates a rich repertoire to be accessed by addressing these subjects through other methodologies in the classroom, being the Maker an agent that generates meaning and engagement for the most diverse subjects.

Thus, the program proposes to bring this teacher support in order to enable, disseminate and catalyze creative learning in a very meaningful way, linked to a fluid sensitization of the curriculum while the creation process.

1.4 Hands on cases

It is important to emphasize that what we present here is not intended to bring to the maker education the solution or a "right" way of doing this approximation between Maker activities learning and formal education spaces, but what present are based on one of the multiple existing paths, from which our experiences flowed.

I will return here to the steps already presented on how we carry out approximations and sensitizations, but we will look at a more practical perspective of how this work occurs during the Microworld Presentation, Ideation and Reflection stages.

The Microworld Presentation: Although it has a contrast in the way microworlds are presented according to age groups, they are always based on a series of intentions for each schoollar grade. This intentionality does not appear directly to the students during the activity, but during storytelling (students 6 to 11 years old) or the curiosities presentation (students from 12 to 14 years old), these elements are present and being stimulated by the provocation questions.

The provocation questions are part of the ideation process, helping students to problematize that place, how people live there, present technologies, jobs, how people look like, buildings, food, sports, among others. These questions feeds the ideation process, opening space to understand the students references, while arousing curiosity to research and to know more about the place. The key point of this provocation is to support student to find something they like or want to do, linking/thinking how this would work in the presented place, while feel safe in this process to expose their ideas and contributing to the colleagues ideas.

In the figure below, we see that the presented place was a Chinese Magic Garden, designed for 7 year old students. In this case, the ideas that have been raised are of the most diverse possible, because they started from this relation between the place and what they like. An example is that one of the students in this figure gave the idea of doing a meditation temple, another student sometime thought in a dragon spa, while a third thought of a public flower shower. Thus, the students themselves identified that these ideas could be mixed and thought of a project with all these elements to do in a group.

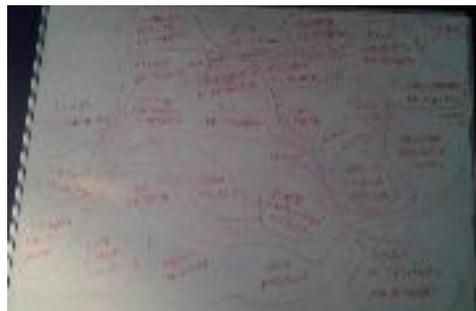


Image 1. Process of Ideation of 7-year-old students.

Thus, we do not teach content, but we sensitize it to it, we instigate to identify how things are done and what learning we have or need for it, we involve practice in situations that generate knowledge that overflow the makerspace and classroom environment, giving tools for the student as a change maker of himself and his environment. Aiming as next steps to promote more and more the integration of the teachers of makerspace and classroom, being able thus, to be closer to use of maker activities repertoire for future unfoldings.

2.2 Broader Value

We note that the effort to bring Maker learning visible is critical to breaking the barrier of change. The search for tools and techniques that connect to established principles and concepts is fundamental to a gradual and healthy change. We do not believe in a sudden break in the education system, we believe in a soft transition, bringing new proposals that speaks to the establishment while we mature our understanding of the advantages and disadvantages, the failures and improvements we must make, sharing and remixing experiences. We can and should have goals for the Maker education, but surely this route will change, we still trying and testing possibilities, this is also a lesson from the Maker approach.

2.3 Relevance to Theme

Generally, when thinking about maker education within Brazilian schools, two extremes are identified in which either the maker activities appears as a totally divergent activity of the schools routine, just focusing on the practice, or it tries to be integrated by practical experience of the classroom and bring the contents in a hard way, excluding the individualities of the students. In our proposition, we have sought a way to integrate them, sensitizing to the contents that are seen in each grade, but respecting the connection and bond the subject with the project while giving authorial freedom. Thus, the relevance of this text is to share our experiences in this integration challenge, seeking the fluidity of learning.

3. BIOS

Diego Thuler is graduated in electronic engineering with degree in biomedical engineering at Universidade Estadual de Campinas (UNICAMP/BRASIL) and specialization in Control and Automation at École Nationale Supérieure d'Arts et Métiers (ENSAM/FRANCE). Maker and tech enthusiast has been working in education since 2014 when he founded Little Maker.

Paula Oliveira is graduated in Visual Arts with a focus on Education at Universidade Federal de Pelotas (UFPEL/ BRASIL). Artist and educator, currently working as Pedagogical Director at Little Maker.

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