2nd World Conference on Teaching and Education

19-21 February, 2021 Vienna, AUSTRIA

WORLDCTE
World Conference on TEACHING & EDUCATION

Genius Hour Project in Brazil: An Experience Report with 5th Graders, 10-Years-Old Students

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Abstract.

Many technology companies have implemented what is called the Genius Hour: employees have time, within working hours, where they can devote themselves to projects of their own interest. In this context, this project has been adapted by A.J. Juliani to the classrooms as an inquiry learning instructional technique and a project-based learning. To the best of our knowledge there is no report in the literature about Genius Hour approach in Brazil, a country with its own educational challenges and issues. In this case report, we aim at presenting an experience report about the Genius Hour Project in Brazil, with 5th graders, 10-year-old students. Children define the subjects of their projects following an awareness-raising work based on the question, "How can I use a passion of my life to answer a problem or question that I have"? Students receive weekly guidance from a PhD. teacher with background on health, mathematics, music, pedagogy and engineering. The family gets involved in the process. Other school professionals are involved (eg. computer science, arts) are invited to support the students. Since 2018, we have already accomplished a total of 142 projects. This pedagogic approach brings to school the four pillars of 21st century education (learning to know, learning to live together, learning to do, and learning to be), looking for an entrepreneurial education. Students could develop important characteristics to be a successful entrepreneur. Besides, the school created a student-centered environment, developing critical thinking, social learning and opportunities to boost individual strengths.

Keywords: problem-based learning, elementary school, radical autonomy, entrepreneurship.

1. Introduction

It is well known that schools must be prepared for the challenges of the 21st century. Some current issues such as "globalization, new technologies, migration, international competition, changing markets, and transnational environmental and political challenges" have to be considered in depth by elementary and high school educators (Scott, 2015).

Brazil still faces several challenges in Education, mainly in public schools: violence in their day-to-day lives and low-incomes for teachers are among the main concerns. Activities related to the valorisation of education professionals, dialogue, a joint effort between school and family, and the resignification of school as a space, become essential (Abramovay, 2003).

Many technology companies such as Google have implemented what is called the Genius Hour: employees have time, within working hours, where they can devote themselves to projects of their own interest. Several innovations arose from this activity. In this context (promoting innovation and entrepreneurship), this project has been adapted by A.J. Juliani to the classrooms as an inquiry learning instructional technique and a project-based learning (PBL). The so-called 'radical autonomy' is considered since students are in control of their project and how they communicate their learning (Juliani, 2014).

Aksela and Haatainen described some important aspects which have to be present in scholar PBL practices: first, students must have a driving question or problem to initiate and organize the project activities; they have to present a final product addressing the driving question; they also have to control the learning process, i.e., make decisions about pacing and the content of learning.

Several researchers have already presented their experiences with Genius Hour in classrooms (Maiers, 2017; Coke, 2018), however, to the best of our knowledge there is no report in the literature of this experience in Brazil, a country with its own educational challenges and issues.

Therefore, the aim of this case report is to present an experience report about the implementation of Genius Hour Project in an elementary school in Brazil, with 5th graders, 10-year-old students.

2. Setting and participants

Genius Hour project is being implemented at Colégio Marly Cury, a private institution in the city of Niterói (state of Rio de Janeiro, Brazil), member of the UNESCO Associated Schools Network. It was founded in 1969, and nowadays it has 650 students from preschool to elementary school. The institution is located in the neighbourhood of Icaraí, which has one of the best rates of human development in the state.

For this case report, we present data from 2018 (N = 76 students) and 2019 (N = 64 students), all students aged between 10 and 11 years old, at the 5th grade.

Activities are supervised by a PhD. teacher with background on health sciences, mathematics, music, pedagogy and engineering. The team also counts with two coordinators and two Portuguese language teachers.

3. Genius Hour Implementation

Genius Hour project has been implemented in our school since 2018. A PhD. teacher with background on health, mathematics, music, pedagogy and engineering supervises all the students during their journey. A weekly one-hour meeting takes place since the first week of scholar activities, and seven steps are followed.

In Step 1, students are sensitized with motivational videos and text activities that talk about creativity, innovation, the importance of sharing ideas, persistence ("never giving up"), and the possibility of using a passion in our lives to propose solutions.

In Step 2, a reflection process begins with the question, "How can I use a passion of my life to answer a problem or question I have"? At this time the students have to define his/her own subject. Projects with the same theme, but with different delimitations are accepted. At this step we aim at developing the search for opportunities and initiative.

Step 3 consists of the "Shark Tank" pitches. Students prepare a 3 to 5-minutes presentation showing the conception of their idea in four items: what, why, how and indicative of success. Colleagues and teachers actively participate in this moment, making suggestions, criticizing, and evaluating the viability of the project. Many colleagues create working groups to assist each other. Persuasion and networking are developed here.

Step 4 is the elaboration of the steps and schedule. Students develop a logical sequence of actions to achieve their goal, and draw the timeline of each activity (literature research, acquisition of materials, prototype development and refinement, presentation rehearsal, and final presentation), facilitating the monitoring of actions. At this point, some characteristics of the entrepreneurial spirit are clearly at work, such as taking calculated risks, seeking information, setting goals, and planning.

In step 5 they begin the project design. A constant monitoring is done by the supervisor, through spreadsheets with headlights: green (OK), yellow (attention), red (delay). Students are encouraged to always have the green light, which touches on the issue of quality, efficiency and commitment. Independence and self-confidence are also developed, as the student feels the main actor of the process, knowing that, despite the teachers and family, the project development depends essentially on him/her.

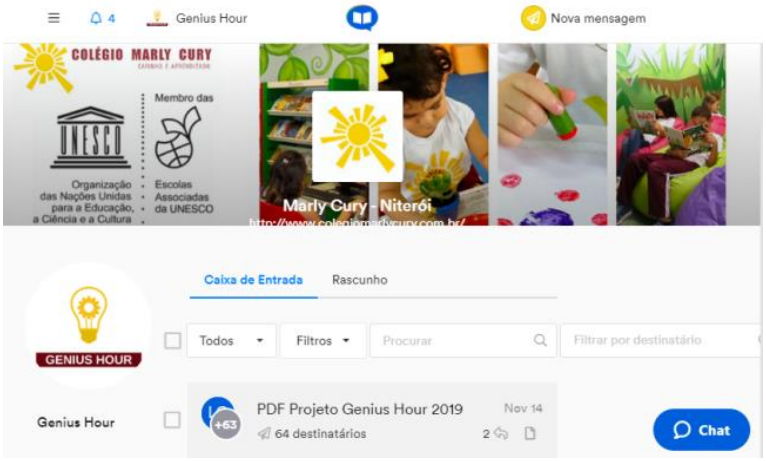
In Step 6, the student prepares his final presentation at school. With his project in hand, he demonstrates in five minutes what, why, and how he developed his idea.

Finally, Step 7 consists of "sharing the idea". A document is produced by the communication team, with all projects prepared during the year, being shared with the entire school community. Projects with greater entrepreneurial potential are oriented to continue. It is noteworthy that students change schools at the end of the fifth year because there is no offer of the sixth grade.

As soon as the students choose their own subject, the Genius Hour team classify them in three categories according to their difficulty: (1) Easy (the student alone may be able to develop the project, rarely receiving help from an adult); (2) Moderate (the student may need sometimes the help from an adult); and (3) Hard (the student should have a help of an adult).

The family gets involved in this process. A brief report is always done at every parent-teacher conference. Moreover, the student must choose one adult to be his/her "Angel": the person responsible for guiding the child at home, being the direct contact with the supervisor in case of questions. Parents and the Angel have direct contact with the Genius Hour team by means of a mobile application (ClassApp™) (Figure 1).

Figure 1. Mobile app used for communication with family and the Angel during Genius Hour project



Source: Authors.

4. Results and Discussion

Table 1 shows the number of projects for each field of knowledge in 2018 and 2019. It is worthy to mention that every student enrolled at the 5th grade participate in this project. It is possible to observe that the majority of projects were about "toys/games" (N = 59), followed by "robotics" (N = 14), scale models (N = 10) and video production (N = 10). It is well known that play is a child's primary and most important occupation (Miller & Kuhaneck, 2018), and it may explain the fact that 42% of our projects were toys or board/card games.

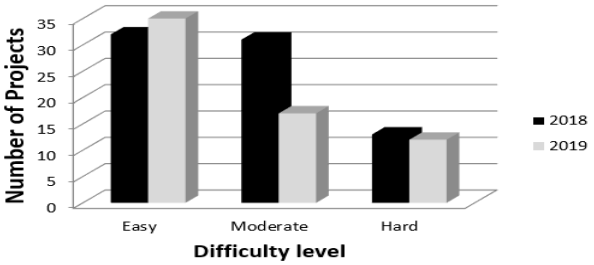
Table 1: Number of projects for each field of knowledge in 2018 and 2019.

Fields of knowledge	2018	2019	Total
Mobile app	2	1	3
Toys/games	29	30	59
Cinema	1	0	1
Culinary	1	0	1
Dance	1	0	1
Drawing	2	0	2
Education	0	1	1
Fashion	1	0	1
Lecture	0	2	2
Literature	5	3	8
Music	3	1	4
Robotics	11	3	14
Scale models	1	9	10
Science/Technology	0	9	9
Project of sustainability	0	1	1
Photography	3	0	3
Theatre	4	0	4
Videogames	6	0	6
Video production	6	4	10
TOTAL	**76**	**64**	**140**

Source: Authors.

Figure 2 shows the number of projects for each difficulty level. The students frequently choose subjects which are easy to develop. Once they make a choice, the Genius Hour team get together to plan strategies directed to projects classified as "Hard", for example inviting other teachers at school with different backgrounds (Arts, Mathematics, Theatre, Music) to assist them.

Figure 2. Number of projects for each difficulty level, in 2018 and 2019.



Source: Authors.

The next figures show some examples of projects developed in 2019 which were innovative with a high level of creativity. Figure 3 shows a scale model of the Solar system. The planets can spin around the sun which has its own light. In Figure 4, a doll house made of recyclable materials. Another scale model is shown in Figure 5, presenting each sector of an airport. In Figure 6, some scenes of a stop motion video using Legos™, about missing children cases (more specifically, kidnapping). Figure 7 shows two mock-ups of water dams: upstream and dry (the safest one); the student was motivated by the upstream dam collapse in Brumadinho, state of Minas Gerais (Brazil), in January 25th 2019, with at least 249 deaths. Finally, a student made pencil cases using rolls of toilet paper (Figure 8). These cases were an example of how children can successfully join their passions to solve problems or answer unsettling questions.

Figure 3. A scale model of the Solar system.

Source: Authors.

Figure 4. A doll house entirely made of recyclable materials.

Source: Authors.

Figure 5. A doll house entirely made of recyclable materials.

Source: Authors.

Figure 6. A stop motion using Legos™ about missing children cases (kidnapping).

Source: Authors.

Figure 7. Mockups of two types of dams (upstream dam– left, and dry dam– right).

Source: Authors.

Figure 8. Pencil cases made of rolls of toilet paper.

Source: Authors.

Each year the Genius Hour team tries to identify projects with a high level of innovation and originality and boost them, encouraging students for further development. We have been experiencing some interesting outcomes, for example, in 2018, a girl developed homemade squishy toys and sold them in a nearby square. She continues to sell them nowadays. In 2019, a boy proposed plates to be fixed on trees with information about how to safely walk with pets on the streets. The family is in contact with a pet shop to consider the production of these plates for selling. The boy who constructed the Solar system scale model, seen in Figure 3, donated it for our school so other students can use it in the future.

It is worthy to mention here the inclusive aspect of this project. In 2018, we had a student with autism. We worked together with his robotics teacher to develop a robot which moves under a white line on a black ground. At the end of the year, he presented his results on stage with an audience of more than a hundred parents. His communicative and social skills have improved according to the family and teachers.

In addition, several books and videos were considered to be used in classroom with other students, for example books about bullying, hunger in Africa, and exotic animals.

Corroborating the work of Maher and Yoo (2017), this PBL approach in our school had a variety of benefits for our students. They developed critical thinking, acquired motivation to learn and to collaborate with other colleagues. Creativity and innovation, problem solving, and communication were other observed skills.

5. Conclusions

The present paper presented a case report about the implementation of the Genius Hour project in a private school in Brazil. It could be observed that fifth graders, 10-years old students can profit from this pedagogic approach for several reasons. First, they can develop important characteristics to be a successful entrepreneur, for example, self-motivation, discipline, confidence, determination, and creativity. Secondly, since it is a PBL method, the school creates a student-centered environment, developing critical thinking, social learning and opportunities to boost individual strengths. Finally, we connect students to the real world, keeping them engaged to solve problems using their passions.

Our school continues to implement Genius Hour project, and further improvements are to be done, for instance the creation of a hackaton-like event (a moment to use technology and programming to solve a problem together with other people) including the student and his/her Angel, and a previous introduction to scientific thinking and methodology.

Acknowledgment

The authors would like to thank Prof[a]. Marly Cury and Eliane Lewicki for supporting this project.

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