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INSPIRATIONS FROM LEONARDO DA VINCI

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Abstract: The present work was based on research carried out by students on the life and work of Leonardo da Vinci that inspired them and made them reflect on the diverse and varied skills and competences of the researched, for being a great observer of the problems and curious of the context in which he lived. and creative to try to solve them. Thus, it was asked how creative learning can instigate and arouse the interest of students, since they are from a generation where technologies are at their disposal, as well as curiosity and creativity using an unknown topic, since they make part of a fully connected generation. Aiming to arouse curiosity and creativity for students to build a meaningful project, encouraging them to research something new and interesting, help solve problems and propose solutions to current problems in the school space. To support this research, bibliographic research was carried out in scientific articles, reports, internet repositories, books and websites. As a methodology, action research was developed with “hands on” workshops based on the Creative Learning spiral of Mitchel Resnick, with the principles of the “4 Ps” plus the “P” on purpose, as well as Tim’s design thinking approach. brown. As a result, it was observed that the theme went beyond expectations, which arousing in students to work in a participatory, interactive and cooperative way, the interest in researching other subjects that helped them to develop sustainable projects, that creative learning needs to be worked within the spaces students to develop the necessary skills and abilities that are essential for the student’s professional future, enabling the solution of diverse problems that can be solved using creativity, interest, collaboration among peers, passion for what they do, interacting and acting autonomously, meaningfully and proactively.

Keywords: Curiosity. Creativity. Creative Learning. Innovation. *Maker*.

INTRODUCTION

With the implementation of the innovation and restoration project of a Farol do Saber e Inovação, attached to a municipal school in the city of Curitiba, which serves students from pre-school to the 5th year of cycle II, the first attitude to be carried out was the survey of topics that would arouse the curiosity of the students involved for the elaboration of questions pertinent to the research project that would be developed for the reopening of the maker space on the mezzanine of the Farol do Saber e Inovação.

We then sought to develop a project that aroused the creativity, curiosity and interest of all those involved and for that it was decided together, an unknown and curious subject for the children, but that would lead them to research and delve deeper, which serve as a model for the new creations and inventions that the students would build in that place, that is, arouse curiosity. Thus, the project had as its theme Leonardo da Vinci, with the title “InsPirações de Leonardo”.

The theme emerged from an internet report that caught attention and said, “500 years of the death of Da Vinci: Discover the main works of the Renaissance genius” (QUERO BOLSA, 2019), where it described that Leonardo da Vinci was not a simple painter as he had studied in art classes until then, but a great genius. That was enough to be chosen among all the suggestions, arousing curiosity about the chosen one. And the first question among the students was, “How did he manage to be and do so many things at that time?” As well as other questions that were raised as the research and readings were carried out in different sources of information such as internet sites, books and articles of all kinds.

And here some questions arise, how can creative learning instigate and arouse the interest of students, since they are from a

generation where technologies are at their disposal, where access and use of them are indiscriminate outside the school space? How to implement an innovation project that arouses students' curiosity and creativity in a meaningful way? How to work with such different subjects in an innovation project? What can Leonardo da Vinci teach with his life trajectory?

It is known that the objective was to arouse curiosity and creativity so that students could build a meaningful project, encouraging them to research something new and interesting, help solve problems and propose solutions to the current problems of the school space, which were observed during the studies of Leonardo da Vinci.

For this, bibliographic research was carried out in scientific articles, reports, internet repositories, books and websites. Action research was also developed with "hands-on" workshops based on Mitchel Resnick's Creative Learning spiral, with the principles of the "4 Ps" plus the "P" on purpose, as well as Tim Brown's design thinking approach.

DEVELOPMENT

The Lighthouse of Knowledge and Innovation in Curitiba "is an evolution of the current lighthouses of knowledge, which originally function as libraries for schools and communities" described in *Cadernos Faroes do Saber e Inovação* (2018, p.17), where the mezzanine that was offered as a space for internet research, the so-called "Lan Houses", in 2017, were transformed into maker spaces to offer workshops, projects and activities for the cultivation of innovation, within the proposal of Creative Learning.

In mid-2019, the school (cannot be cited for security reasons and the Data Protection Law), started the inauguration project with the development of a project that involved innovation, creativity and especially the

curiosity of students. During the construction of the project, the important role of student involvement was observed to arouse curiosity to seek new information that would help them transform the school into a better and more meaningful space.

After some questions and reflections that did not result in the choice of topic and problem to be solved, the teacher asked what they knew about Leonardo da Vinci and what they had already studied.

There was general astonishment, answering that he was an artist who painted the picture of Mona Lisa and that they had studied for a short time. Asked if they knew more about him, they replied that he was Italian and nothing else. It was then that the teacher presented a news headline that made the eyes of the students who were present shine, "500 years of the death of Da Vinci: Discover the main works of the Renaissance genius" from the website *Quero Bolsa* (2019). The report said that Leonardo was a genius and that that year was celebrated the 500th anniversary of his death, and Da Vinci had been an inventor, sculptor, scientist, among many other professions that left the students extremely curious and at the same time amazed with so much information.

Here we can mention Resnick's Spiral of Creative Learning (2020, p.11-12), "Imagining, Creating, Playing, Sharing, Reflecting, Imagining", where the spiral "is repeated countless times", with different and varied materials. Bringing Resnick's quote to the moment when the theme is presented to the students, the children's imagination phase is clearly observed, where they raise hypotheses and imagine what the context in which Leonardo da Vinci lived was like at that time and making a parallel of what he could have done had he been born into our reality. If with few resources he can do wonderful things, imagine if he were still alive today.

Just like Brown (2017, p. 16), who cites design thinking as “an exploratory process”, and describes the spaces for innovation where,

We can think of them as the inspiration, problem or opportunity that motivates the search for solutions; ideation, the process of generating, developing and testing your ideas; and implementation, the path from the design studio to the market. Projects can traverse these spaces more than once as the team hones their ideas and explores new directions. (BROWN, 2017, p.16)

Here it can be seen that the methodological strategies complement each other in spirals, one describes the path and the other the spaces, which meet the project to be built, both defend creativity to solve problems.

Resnick (2020) describes that his inspiration came from Froebel’s studies on kindergarten, where children’s creativity and curiosity develop, but that when they reach school age they are pruned, reducing the time for playful explorations, and believes “that the rest of school (actually, the rest of life) must become more like Kindergarten” (RESNICK, 2020, p. 10), and uses the kindergarten interaction and construction model to describe the process learning process in a creative and exploratory way, where you make mistakes and try again, fall and rebuild, learning in an interactive, exploratory and collaborative way, making clear the importance of peers in this process. Defending that this process of learning with creativity must happen for the rest of people’s lives, not only in the school phase. His studies had as a constructivist influence his colleague Seymour Papert, who was a student of Jean Piaget and the works of John Dewey.

The author also describes the guiding principles of Creative Learning which are the “4 Ps” (Projects, Passion, Pairs and Thinking while playing (play)), Resnick (2020, p. 15), exemplifies that “the best way to cultivate creativity whether it’s helping people work on projects based on their passions, collaborating

with peers, and keeping the spirit of playful thinking.” (emphasis by author)

The Municipal Secretary of Curitiba (SME) with the intention of supporting the work carried out in the makers spaces of the city proposed the 5th P, the Purpose, to reinforce and “promote learning experiences that contribute, in some way, to the transformation of reality” , which is based on and based on *Cadernos Faroís do Saber e Inovação* (2018, p. 35), from Curitiba.

With the development of the project entitled “Leonardo’s InsPirations”, students were able to discover new possibilities, new knowledge and with that, they had the opportunity, like the great inspirational Leonardo da Vinci, to develop several inventions to build the “school of the future”. , it was time to move from the research phase to the creation phase.

Resnick (2020) makes clear his admiration for the maker culture, which involves all the principles of Creative Learning, as he describes,

I believe it has the potential to be not only a technological and economic movement, but also a learning movement that offers new ways to engage with creative learning experiences. As people make and create, they have the opportunity to develop as creative thinkers. After all, creating is at the root of creativity. (Emphasis by the author) (RESNICK, 2020, p. 32)

Here the students were able to put all their potential for creation, invention and put on paper what they had kept in their minds and with their idealized and designed projects it was time to get their hands dirty, time to experiment, investigate, build, test and play. Thus Moran (2017, p. 15), argues,

Interesting schools are those that know how to manage creative, autonomous, collaborative learning; who ask big questions, support and encourage students to research and learn together in all spaces, inside and outside the school; involving

students, families and the community. In them, the curriculum increasingly explores active methodologies, emphasizing learning through experimentation, working with projects, investigation, problem solving, production of digital narratives and development of maker activities, in a personalized and collaborative way in attractive and flexible spaces, face-to-face and digital. (MORAN, 2017, p.15)

Thus, the creation and prototyping phase become moments of multiple, interdisciplinary learning, in which students make connections with the most different contents, materials and knowledge. And Moran (2019, p. 71), still defines that, “Maker means “to do” and the maker movement defends the “do it yourself”, encouraging teachers and students to create and develop their projects.”

By proposing the exploration of new themes and contents that aroused the interest, curiosity and creativity of students, it is possible to see how students developed their skills by going through the Creative Learning spiral several times through the principles of the “4Ps”, project, work in pairs, their passions and especially having fun (play), without losing their purpose of learning in a conscious and meaningful way, not forgetting the innovation process as inspiration, ideation and implementation of their projects inspired by the story of Leonardo da Vinci.

What Resnick (2020, p. 12), defines the creative learning spiral approach as,

It is the engine of creative thinking. As kindergarten children go through the spiral, they develop and refine their skills as creative thinkers, learn to develop their own ideas, test them, experiment with alternatives, get other people’s opinions, and create ideas based on their experiences. (RESNICK, 2020, p.12)

When observing the change in behaviors stimulated by creative learning such as collaboration between peers, verifying that their projects involve the well-being of those

around them, using content that they would never have studied in such a natural way, but experiencing in practice what that would be something uninteresting in a normal classroom, but that has become usable and palpable in their hands, that is, significant, the student makes them responsible for their learning, as they are actively participating in the construction of that concept.

As exemplified here with the engineering studies and love for nature of Leonardo da Vinci who encouraged students to build a model of the school, to make it self-sustainable with the installation of photovoltaic panels to take advantage of sunlight, (which they had to study and delve into the subject), installations of gutters to collect rainwater and cisterns to store it for use in washing sidewalks, a sports court and watering the garden, the construction of a reading space with alternative materials such as the use of pallets for comfortable seats for readers, an automated garden using Arduino and recyclable materials. All this led them to study more about different contents and subjects, from engineering to electronics and programming.

FINAL CONSIDERATIONS

Building an innovation project in a school space where the methodologies used in the classroom are basically traditional has become a challenge due to the distrust of some colleagues and the anxiety and curiosity of others who already want changes in the classroom. Arriving proposing changes is challenging, so the simplest way to show that creative learning is not only based on the use of digital technologies, but on the exploration of different materials, tools and resources ranging from the simplest of cardboard, to the more sophisticated is the use of the 3D printer for prototyping objects that would not be built or replaced by another material.

Proposing a discovery project that can be

developed with the direct participation of students from the choice of theme, with the definition of what will be built, researched, investigated and developed, transforms the school space into a true hotbed of curiosity, creativity, research, fun, interaction, collaboration, experimentation, creation, exploration, among others.

The project showed that students, when well oriented and free to create, were simply surprised, because they were interested in other contents that were both directly and indirectly involved with the theme, when they became interested in building a fully sustainable school, they were reading the discoveries of Leonardo da Vinci on the use of the sun for the use of solders and to heat water for domestic use due to his concern already at that time with the excessive cutting of trees.

While getting involved in the artist's history and achievements, they were learning, investigating, creating, exploring diverse subjects and content, making connections with the present and projections for the future. What Leonardo da Vinci taught was that curiosity, passion and creativity led him to transform the space and context in which he lived, he tried to make a difference in the lives of the people who were close to him and that with studies, research and mainly the ability to observe everything around him led him to improve things around him, even not prototyping everything he designed, he influenced and still influences several inventions and constructions carried out and based on his ideas and inventions.

Therefore, the project showed that creative learning needs to be worked within school spaces to develop necessary skills and abilities that are essential for the student's professional future, enabling the solution of diverse problems that can be solved using creativity, interest, collaboration among peers, passion for what you do, interacting and acting in an

autonomous and meaningful way.

School is a place of meaningful learning, it is necessary to offer more possibilities, more options for choices, experimentation, creativity, activities that arouse the student's interest and curiosity. The student is no longer the same student as a few years ago, he is proactive, connected, likes to investigate and build new things, is always informed, does research on his own and when he has doubts he accesses the virtual world.

When the school proposes to develop more fun and interesting activities, it proposes disruptive activities and projects and manages to evolve together with its students, transforming itself into a place of innovation and meanings.

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