



USING FINE ART TO TEACH PROGRAMMING

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Abstract

When people enter the gallery of contemporary art, they are met with interactive projections which fill up the room, react to the observer and take them on new adventures. Programmers, animators, architects, musicians, draftsmen, graphic artists, and engineers participate in this kind of works of art as co-creators of the work. The classic notion that an artist is someone who can draw or paint beautiful is misguided in modern art. Today the so-called artists are people who use all their knowledge and skills at their disposal to convey their message or view of the world.

Art has always reflected the time in which it was created. So how do we include content in art lessons that require students to develop competencies they will need in the 21st century?

Animated film as a style of artistic expression is not exactly modern but is something new in the curriculum of fine arts. I tried different techniques and procedures to teach students the concepts of creating animations. From drawn animation, stop-motion animation to computer animation. The latter has many production methods and procedures, but I think combining animation and programming the students can achieve many goals and competencies necessary for their future lives or careers. The student has to understand how the animation is created, and plan how to implement the programming code to display their wishes. Programming develops logical thinking, which allows children to break down complex problems into smaller and more manageable ones which are easier to solve.

My goal for the students is they learn to use construction knowledge, collaboration, communication, and ICT in art classes and additionally learn how to program.

Keywords: *computer animation, interactive projections, visual art, Scratch*

Introduction

Fine art is a form of storytelling through visual communication. Its purpose is to convey a clear message about inner experience and to create through various techniques and media. Animation is an excellent medium for artistic expression, as it connects various art techniques with other artistic fields such as music and language. Thus, different ways of communication are combined and connected in the illusion of movement.

The manual for the animated film *Let's Animate*, quotes: "For animated films can be said to accompany us throughout our lives. They are an important mass medium and a versatile means of artistic expression."

In art classes, we use animated films both as a didactic tool and as an artistic product. For students, the combination of technology and self-expression through visual communication is interesting and fun. "In today's world, the use of technology is required and expected in every profession or workplace and is an integral part of everyday life. Information technology enables and supports different approaches to teaching and learning. Technology enables rapid feedback. Technology should not diminish the role of the teacher and students in artistic expression." (Curriculum, 2011). By using digital technology in art classes, we enable students to learn new ways of expression, creation, and visual storytelling.

I myself started introducing animation as a medium into my teaching work in 2010 as an attempt to enrich the leisure time of primary school students during their extended stay. With a laptop, a camera and a simple stop-motion animation program, I learned together with the students about the expressive possibilities offered by the medium and the software. The students were already impressed by the fact that they could animate toys, cars, and legos with a few clicks. In doing so, I also encouraged them and taught them how to create and convey a story or message in a visually interesting way that will be understandable to everyone, not just the creator of the animation. I quickly realized that making animations is relatively easy for students. What presents them with a significantly greater challenge is how to convey a clear and comprehensible message through the medium of animation. This is precisely why this type of creation holistically enables the development of all areas of the students' personal development.

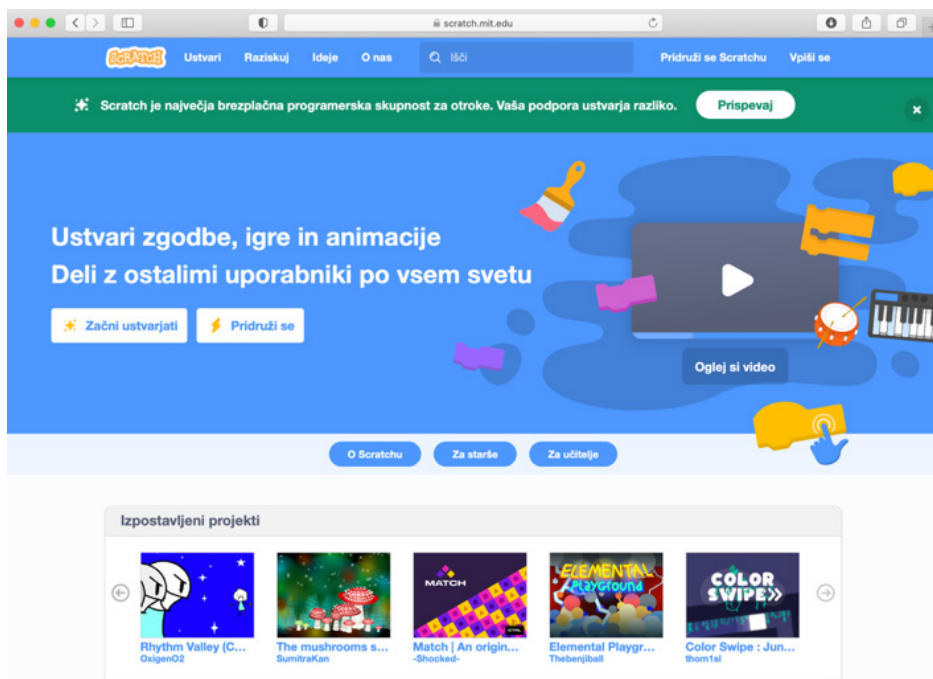
"The basis for animation is always a story. We need to know exactly what we want to deliver with it. As with a film or a video, we need to break down the story into smaller parts, sequences, dynamic framing, which in sequence clearly express our thought. The space of the cartoon is the space of our imagination. That's why the most incredible things can happen in cartoons (hands grow, bodies fall apart and reassemble, submarines fly)." (i-textbook for Fine Arts in high schools)

"A picture is worth a thousand words." However, the problem that my students most often face is how to convey just one message with a picture that is comprehensible to others. I have found that it is much easier to convey a message through words than through a picture. Thus, through practice, I developed and learned different didactic approaches, how to effectively lead students to an integrated product. In the process of research, the question also arose, which animation technique is the most suitable for the purpose of the lesson. The concept of creating an animation is relatively simple, but there are many techniques for creating it (stop-motion, pixelation, computer animation ...). Therefore, it is necessary to consider which of them are appropriate or meaningful for the purpose of the lesson, the age of the students, the school's technical equipment, etc. In this process, I discovered the Scratch tool, which in the creative process of making animation also enables learning the basics of programming.

Pedagogical Application

What is Scratch?

Scratch is a visual programming language that is widely used by children all over the world. This colorful and dynamic language consists of blocks and allows the user to create web projects, games, animations, and many other things. It is designed to teach programming and programming concepts for building a code by using simple commands. The purpose of the program is to learn how to make the program do what we want it to do. We build the commands as a chain, one after the other. With this program, we tell it what it has to do, when and in what sequence.

Figure 1*The Introductory Page of the Scratch Website*

On the website <https://scratch.mit.edu> or in the Scratch Junior application, students tried their hand at making animations. First, they were able to master simple block programming procedures through tutorials. They animated digital figures, taught them to dance, fly, talk ... Then they learned to program various figures to react to each other. In doing so, they were able to manipulate the background of the animation so that it changed. The students learned through the process of tutorials, in which they follow pre-prepared videos that clearly showed them which commands they needed to put together block by block in order for the program to do what they wanted. Since the videos are clear and the program works in many languages, the students quickly mastered these basics.

Figure 2
Tutorials on the Website

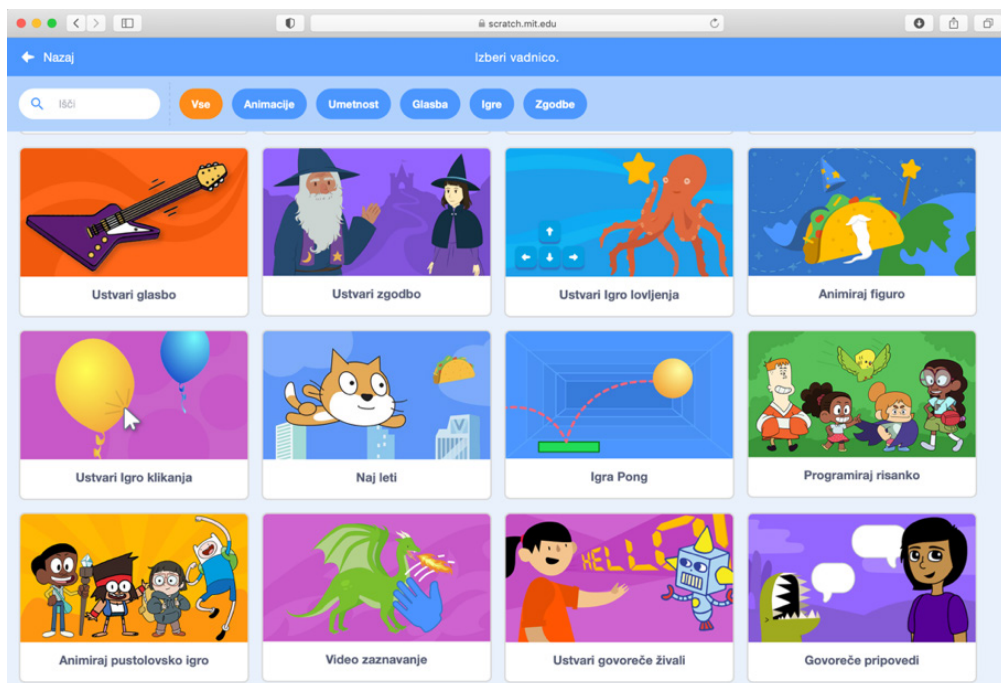
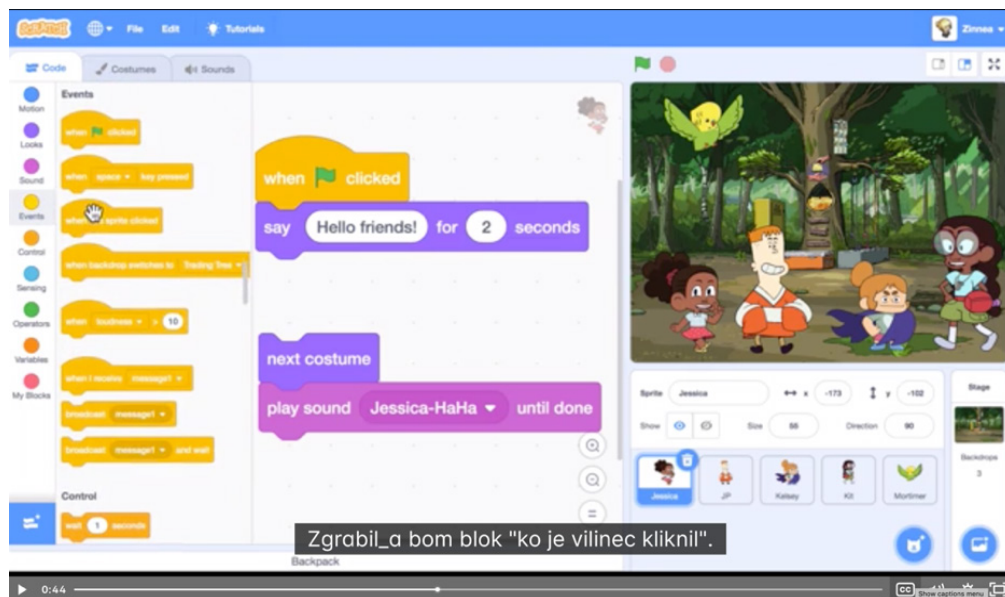


Figure 3
Tutorial Program a Cartoon



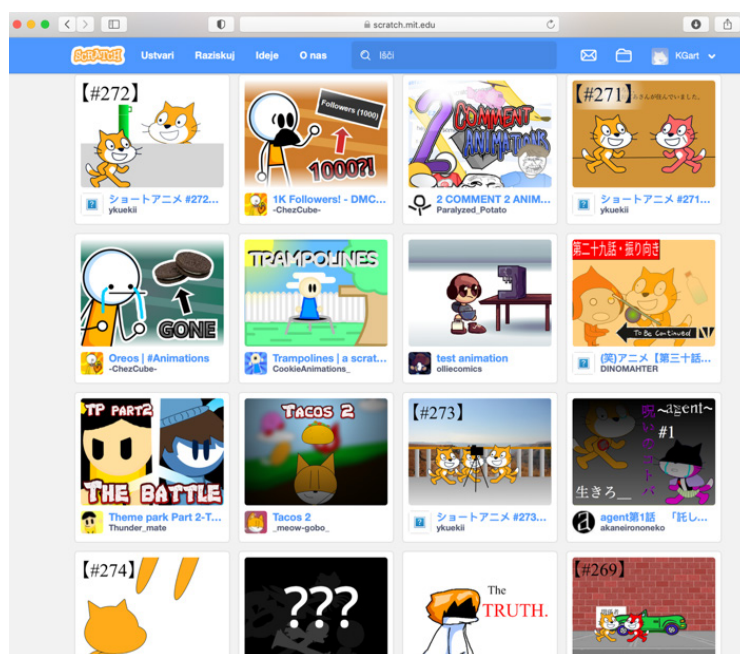
The tutorials proved to be an excellent didactic tool, as each student could stop the recording and thus repeat the procedures more easily. They could play the same recording several times and thus created their own version of task. Students were able to work at their own pace continuously and without waiting unnecessarily for others, which is usually typical for this type of learning.

Once the students had mastered the basics, they started their art assignment. Make your own animated film with a clear message. It should involve several characters who will talk and respond to each other. The scene should change at least once, and the story should have a clear conclusion.

For motivation, the students previously viewed the works of other authors, where they could also see their programming codes. The purpose of the assignment was to learn through research and collaboration. They mastered the programming language and at the same time learned the rules of the visual language. They had to use art elements such as composition, color theory, framing ... The advantage of such tasks is that students learn how to use their knowledge of fine art in other forms of expression.

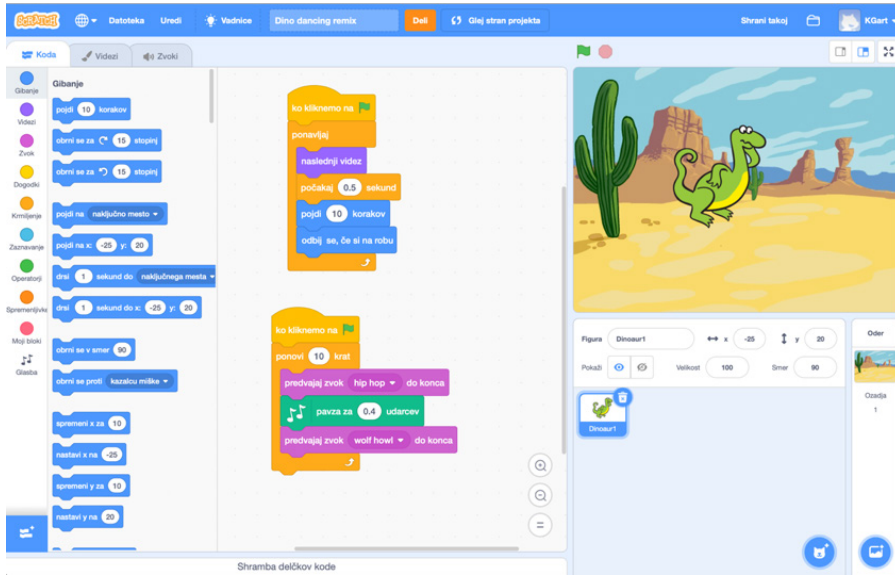
Figure 4

A Collection of Animations by Other Creators



I conducted the art assignment, both in different age groups of students, as well as in the form of remote learning. I was satisfied with the results. In the process of creating visual communication, the students mastered the concept of animation, the concept of programming and the importance of telling an understandable story. Learning by exploring what others have already created is faster and the students have analyzed the code and explored the causal sequences of the code. In doing so, they learned what happens if one part of the code is changed or removed and how it affects the course of the animation.

Figure 5
Animation View and Animation Programming Code



I also repeated the task with younger students at the optional subject of the grade level. In doing so, we used a simpler version of the program in the form of Scratch Junior application on tablets. Here, the commands are simpler and more clearly displayed as pictures. Students just put the pictures in a sequence like a train, and as a result they quickly learn the sequence of events. Animations are simpler, but they still allow students a lot of expressive possibilities.

Figure 6
Scratch Junior Application



Conclusions

Programming is an activity that every child should learn as independently as possible. Through the creation of such learning opportunities, we can place students in the active role of creators and thus at the center of their own learning process. With meaningful and effective use of technology, the teacher takes on the role of organizer and mentor, leaving learning and creation to the students. Writing code is a big step up from learning the basic concept of animation. Through simple visual commands, children learn the basics needed to understand programming. Students learn from their own mistakes, through exploring and playing. This is only the first step on the way to becoming a real programmer or animator, but every journey begins with the first step.

When we think of fine art, most people think of its classic art fields: painting, drawing, sculpture, graphics ... It is less known that students can learn the basics of programming in fine art classes. I personally think that this kind of multidisciplinary knowledge, which encourages a divergent way of thinking, is one of the main competencies that students need today for a creative and quality life in the future.

When students watch cartoons on TV or play video games on various devices and consoles, they don't see the graphic designers, visual programmers, animators, and other artists who create them. Through these kinds of tasks, I try to bring them closer to the idea that knowledge is universal and applicable everywhere. Thus, they can transfer and use the knowledge they acquire in my art classes almost anywhere.

Through the presented learning process, students learned to use construction knowledge. During programming, they learned how to use a computer gadget to perform the operations they wanted. While learning, they had to research the instructions in the video tutorials, help each other and analyze the codes of others who have already succeeded. In doing so, they had to create a clear and comprehensible message in a visual form, using the requirements of art theory and artistic concepts. This kind of holistic knowledge and competences are invaluable in today's world.

Why fine arts and programming? My answer is that creativity manifests and expresses itself in many individual ways that are unique to individuals. Developing long-term competences such as holistic and critical thinking, problem solving, cooperation and creativity, which are supported by digital literacy, are the so-called competences of the 21st century. This is what the students will need, regardless of their further life path, either as users of contemporary art or as potential future artists.

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Note

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References

- Digital school. <https://www.digitalschool.si/scratch-platforma-za-ucenje-programiranja/>
- Goetz, A., Kranjc, M., Krušič, S., Lader, T., Peštaj, M., Prassel, I., Repše, H., Saksida, K., & Šturm, M. (2016). *Animirajmo! Priročnik za animiran film v vrtcih in šolah* [Let's animate! Handbook for animated films in kindergartens and schools]. Ministrstvo za izobraževanje in šport, Ljubljana.
- Henigsmann, V., Karim, S., & Kern, R. (2015). Likovna umetnost 9, i-učbenik za likovno umetnost v 9. razredu osnovne šole [Fine arts 9, i-textbook for fine arts in the 9th grade of elementary school] (pp. 40-46). Zavod RS za šolstvo. <https://eucbeniki.sio.si/lum9/2429/index.html>
- Kocjan, M., Kotnik, B., Opačak, Ž., & Rau, P. (2015). *Likovna umetnost, i-učbenik za likovno umetnost v gimnazijskem programu* [Fine arts, i-textbook for fine arts in the high school program] (221-224). Zavod RS za šolstvo. <https://eucbeniki.sio.si/lum/3196/index4.html>
- Kocjančič, F. N., Karim, S., Kosec, M., Opečak, Ž., Prevornik, M., Rojc, J., Velikonja A., Zuoančič, T., Kepec, M., Prevodnik, M., Čerkez T. B., & Selan, J. (2011). *Likovna vzgoja Učni načrt, program osnovna šola* [Art education Curriculum, elementary school program]. Ministrstvo RS za šolsvo in šport, Zavod RS za šolstvo. https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/Osnovna-sola/Ucni-nacrti/obvezni/UN_likovna_vzgoja.pdf
- Scratch. <https://scratch.mit.edu>

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