Europeana Learning Scenario

Title

Robotkind: i-dolls in the mirror

Author(s)

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Summary

This learning scenario is the initial phase of a project exploring real and fictional robots in our culture so as to deepen students' understanding of an era of robotic revolution. The need for incorporating diverse cultural material in the educational content directed the project towards Europeana sources. For the principle underlying this teaching intervention is to provide texts and tools to help students tackle social issues and go beyond the technical matters that may monopolise the STEM trend. Inspired by the methodology and the very history of action research, the project suggests a broader scope to embark on technical subjects, cross the interpretative paradigm and head to critical theories. The cornerstone of this effort is supporting reflective practices on the ways we pre-conceive, foresee (or 4C[1]) and shape our "robotic" future.

Facing the multitude of aspects and representations falling under this goal, I was in search of narrowing down to a starting point. The category of humanoid robots, with its semiological density in actual and fantasized spaces, appeared to be a sensible option for the first lessons, but an interesting turn happened with students' feedback. "Shall we bring our own robotic toys in school?" "Can we make something more creative in robotics lab?". So, we depart from our toys and our time to explore the horizons opened up with a couple of concepts: Robotic toy.

The structure is articulated as a time travel with intermediate learning snacks of information to cover the history of robotic toys. The definition of robotic is historically perceived and gradually formed by participators. The last part explores the concept of a toy and sneaks into aspects of life-like design.

Structure:

a. Present
    i. Our toys A (Presentation of kids' toys)
    ii. Our toys B (Building and Programming a robotic toy)
    Snack Back: Automata
b. Past
    i. Automata of Europeana (A virtual exposition)
    Snack Back: Vintage and '90s
    ii. Lilli…put it another way/ Puppy or Puppet. (Creative Writing)
    Snack to the future

[1] Let's pick up Creative and Critical Thinking, Cultural Understanding, Collaboration.

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c. Future
    i. Model 2039 (Creative thinking)
d. What robotic means? (on definitions)
e. i-dolls in the mirror: Questioning life-like design (Discussion, P4C)

This learning scenario is part of a project funded by the John S. Latsis Public Benefit Foundation within the framework of the "Learning together" programme for the school year 2018-2019.

Table of summary	
Subject	*Interdisciplinary (ICT, Language, Mathematics, Programming, Arts, History of Technology)*
Topic	*Robot toys: The concept of robotic and aspects of life-like creatures*
Age of students	*10-12*
Preparation time	*6 hours*[2]
Teaching time	*10 hours (approximately)*
Online teaching material	*Europeana_LS_Supplement_Tziampazi (see Worksheets and Presentations):* https://drive.google.com/open?id=1VKKlwQedbpuZFaRlSrP7LJYzl8Swicdc https://padlet.com/ttziampazi/vrlwgnsmbitm https://edu.cospaces.io/Universe/Space/C57Y2ep9cKNsKPkrJEqtRZ https://cospac.es/tflx https://education.lego.com/en-us/lessons/maker-elementary/make-a-dancing-robot
Offline teaching material	*Presentations and worksheets mentioned above* *Paper, pencils, markers* *Laptops* *Camera (phone/tablet)* *Lego WeDo 2.0 kit* *Lego WeDo 2.0 App*
Europeana resources used	https://www.europeana.eu/portal/en/record/9200518/ark__12148_btv1b8409201z.html?q=De+Vaucanson#dcId=1550165780708&p=1 https://www.europeana.eu/portal/en/record/2020801/dmglib_handler_biogr_24730004.html?q=De+Vaucanson#dcId=1550168294291&p=1 https://www.europeana.eu/portal/en/record/09102/_CM_0839928.html?q=automaton#dcId=15476624

[2] Estimated time about the implementation by another teacher. I spent time in creating the worksheets and devising the activities, so my preparation time was, of course, longer.

62610&p=1

https://www.europeana.eu/portal/en/record/09102/_CM_0922665.html?q=automaton#dcId=1550165780708&p=1

https://www.europeana.eu/portal/en/record/09102/_CM_0967239.html?q=automaton#dcId=1550165780708&p=1

https://www.europeana.eu/portal/en/record/90402/BK_17010.html?q=automaton#dcId=1550165780708&p=1

https://www.europeana.eu/portal/en/record/2064109/Museu_ProvidedCHO_Spielzeugmuseum_der_Stadt_N_rnberg__Museum_Lydia_Bayer__49732__Datensatz_.html?q=what%3A%22Blechfigur%22#dcId=1548965727488&p=1

https://www.europeana.eu/portal/en/search?per_page=48&q=what%3A%22Blechfigur%22&qf%5B%5D=robot&view=grid&f%5BREUSABILITY%5D%5B%5D=restricted

https://www.europeana.eu/portal/en/record/916118/S_TEK_photo_TEKI0014423.html?q=robotics#dcId=1545927765003&p=6

https://www.europeana.eu/portal/en/record/2064109/Museu_ProvidedCHO_Spielzeugmuseum_der_Stadt_N_rnberg__Museum_Lydia_Bayer__71839__Datensatz_.html?q=robotics#dcId=1545927765003&p=13

https://www.europeana.eu/portal/en/record/2026012/submission_2011_IA_40911_.html?q=Android+Theater#dcId=1550185988978&p=1

https://www.europeana.eu/portal/en/record/2020108/https___www_culture_si_en_File_Kiblix_07_1_jpg.html?q=robovox#dcId=1550378567362&p=1

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Integration into the curriculum

Robotkind is expanding and bringing technical, socio-economical transformations and cultural complexities.

This is a project enhancing 21st century skills in the context of a meaningful topic about the current and the upcoming world.

These elements align it with the principles of Greek curricula (2003) which allows space for projects transcending subjects and have critical, creative and collaborative orientation.

Aim of the lesson

By the end of the lesson studentswill have:

- *Explored the concept of robotic and how it crosses the history of technology and the demand for more autonomous machines*
- *Reflected on life-like design in robot toys and robots in general to raise questions*
- *Shed light on cultural aspects of toys and robots*

What is more, they will have been engaged in many activities aimed at empowering digital skills, along with analytical and creative thinking.

Trends

List the relevant trends that the lesson incorporates: http://www.allourideas.org/trendiez/results

- Project-Based Learning: students get fact-based tasks, problems to solve and they work in groups. This kind of learning usually transcends traditional subjects.
- Collaborative Learning: a strong focus on group work.
- STEM Learning: Increased focus on Science, Technology, Engineering, Mathematics subjects in the curriculum
- Learning materials: shift from textbooks to web resources and open source books.
- Snack Learning: small and attractive bits of learning rather than pro-longed forms of study
- Lifelong Learning: learning does not stop when leaving school.(This goes especially for the teacher)

21st century skills

Add here how the learning scenario corresponds to 21st century skills. To find out more: http://www.p21.org/our-work/p21-framework .

LEARNING & INNOVATION SKILLS

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Collaboration

INFORMATION, MEDIA & TECHNOLOGY SKILLS

- Information Literacy
- Media Literacy
- ICT (Information, Communications, and Technology) Literacy

PRODUCTIVITY AND ACCOUNTABILITY

MANAGE PROJECTS

- Set and meet goals, even in the face of obstacles and competing pressures
- Prioritize, plan, and manage work to achieve the intended result

Activities

Name of activity	Procedure	Time
Our toys A. Presenting our present.	Students are asked to bring their own robotic toys (or any toy they consider to be robotic[3]) in the classroom and present them. While demonstrating a toy, they explain its features and may share the story behind it (how they obtained it, what they liked most on it).We take photos of presentations and we upload them to the padlet *Robot toys* which is gradually filling throughout the duration of this LS.	20 mins (depending on the number of toys)
Our toys B. Making our present.	We refer to the programmable robot toys made in our school's educational robotics lab[4].Two groups proceed to the implementation of the Lego Education lesson plan Make a dancing Robot. According to this open project we build upon a model (Wobble) and experiment to remix it. Our dancers set in motion and …rock! Video document is added in *Our toys* column of the padlet.[5] The coding part becomes a bit more creative with the addition of sound clips (audience applauding, a short recording e.g. introduction of a fantastic dance competition). Such ideas can ignite narratives in cultural contexts and they are typical of our will to animate the inanimate. Their emergence is discussed in the last activity.	1 hour 10 mins
Snack back. Automata.	Our robotic dancers and a dancing automaton from Europeana are contrasted. See the slide *The power of dance*. Teacher makes a short presentation of a few famous automata of the 18th century (namely Vaucanson, Droz). We compare the sophisticated mechanisms of then and the electrical components and digitization of now. The concept of 'automaton' is introduced with this century's striking mechanisms contextualized in Enlightenment visions preluding the developments followed by in history of technology. We also comment on the activities these automata make (playing instruments-representations of making art).	10 mins
Automata of Europeana: A Virtual	A group of students curate an exposition titled *Automata of Europeana*.	6 hours (shared in 3

[3] …or any other toy they want-unless they have/want a robotic one. Openness will be useful in comparisons between toys' characteristics in our attempt to define the concept of robotic in a following activity. Even a simple doll may share with robotic toys at least the common of life-like design.

[4] Educational robotics workshops are implemented in our school after receiving a grant by John S. Latsis Public Benefit Foundation and its programme *Learning together 2018-2019*.

[5] The previous *our* was that of possession-this is *our* of creation: It is our idea, we came up with this toy.

Exposition	The aim of this activity is to design a virtual space with 3D objects and walls to which pictures of automata are attached. The digital tool used is CoSpaces Edu and the images depict automata found in museum collections or documents of the past. Virtual talking characters present automata in an attractive and interactive way. First, students go to Europeana and make relevant searches (automaton, Vaucanson). They explore the results available and select these they prefer to expose. In the next steps they: • save them in a folder • build the walls onto which the images are pinned. • choose their avatar • study online articles and texts, take notes, write summaries/presentations of automata their characters will present • and record them with their voice. One student cooperates with the teacher in programming of the virtual space. He explores block programming and debugging (e.g. trial and error in lip sync animation and sound file). In the process of creating this digital art product, we combine language (e.g. presentation text) and mathematics (degrees in rotation of the character) tasks. Teacher introduces the STE**A**M trend, now that students have gotten a first-hand example of what it can mean. Our space is pinned in the padlet in *Toys of the Past* column.	meetings)
Snack Back: Vintage and 90s	Our journey in the past continues. Europeana collection includes many vintage robot figures, like the Lilliput, the first robot toy. This and alike toys are listed in the padlet (*Toys of the past* column). Students comment on their looks and express opinions. Our padlet also contains emblematic robotic toys (My real Baby, Furby, Aibo). Students spot what has changed and are given some trivia about these toys to open up new horizons and food for thought (how My real baby works, why Furby was a hit and deemed frightening?, AIBO's evolution, recent re-launches of aibo and Furby). After the presentation students are grouped and work in parallel. The worksheets incorporate creative writing tasks.	15 mins
Lilli…put you back!	Group A. Worksheet *Lilli…put it another way* Lilliput is the first robot toy and it is quite different from our toys. With their imagination, kids time travel 70 years ago and keep a	30 mins

	diary, into which they write two entries[6].	
Puppy or puppet?	Group B. Worksheet *Puppy or puppet?*[7]. Discussion on how last advances in technology and Artificial Intelligence have renewed the original model released almost 20 years ago. How different is aibo than a real dog? What would we prefer?	30 mins
Snack to the future	After being informed about robots of the past, children search in Youtube cool futuristic toys already available in the market . Padlet's *Futuristic toys* column mentions typical examples.	10 mins
Model of 2039	We imagine future models with impressive designs and incredible capabilities. Kids brainstorm, sketch and paint unique robotic characters. They choose either teamwork or individual work.	30 mins
What robotic means?	At this point, teacher poses questions around the definition of 'robotic' in order to make children recognize similarities and, also, differences between the toys they have seen. Some key categories in this analysis emerge: appearance, voice, movements, teleoperation, sensors, degree of autonomy and user's operation/player's engagement. The examination of this concept is supported by the presentation *What robotic means*[8] utilizing the sources we have met/created so far. Eventually, we assume robotic reflects an urge for achieving bigger autonomy and smartness in our machines. Besides, there are some contradictory interpretations we give to the word (positive-smart and effective/negative-heartless, unemotional). There is a latent metacognitive goal here: to present a case of a fluid concept which takes the shape of different criteria over time[9]. In the end we search for a few official definitions.	15 mins

[6] Writing and analyzing the texts emerged proved quite a reflective practice, as it helped us realize the contextual discrepancies and challenges happening when we try to project ourselves in another era (past), bearing the experience and lenses of our era. This can also be applied for limits in future predictions (will be used when talking about sci-fi and other prophecies).

[7] In the presentation, aibo stealed the show.

[8] The reader misses some parts in online view. It is recommended to download the presentation.

[9] The same can happen with *toy* or *life* concepts later on, but it goes beyond the scope and the length of this LS. It is a try to acquaint kids with the nature of definitions. We abandon the goal to strictly define a term and end up watching the evolutionary rearrangements of its components, while heading towards an ideal (autonomy).

i-dolls in the mirror **Just toys?** **Questioning life-like design**	We show the presentation *i-dolls in the mirror*. It includes: • Student's works and words to be analyzed. • Europeana sources (available in the table of summary) – A search showing humanoid robot toys – RoboVox (Art Installation in the shape of a giant humanoid robot) – Android Theater. We watch a theatrical part Sayonara where a human actor and a robot co-star. We follow children's reactions and organize a discussion around questions like: • Why do we create life like robots? • Why do we create life-like toys? • Are recent androids a kind of state-of-the-art toys or attractions? • Can you imagine a future android more as a friend or as a toy? • What is serious about a toy? • What is serious about robotics? The aim of this discussion is the raising of philosophical questions about practical and cultural aspects of life-like design, of our deeply rooted and historically obvious tendency to create more and more realistic replicates of us and animals. This activity is the first part followed by a more structured second part not included in this LS. In the next phase of the project we focus on Robots in Literature and Cinema, thus on more, imaginary i-dolls in the mirror…	40 minutes

Assessment

The assessmnt is formative and descriptive with verbal and non-verbal feedback, when teacher encouragesstudents to think, to question, to improve, to dare, to cooperate more effectively.

********** **AFTER IMPLEMENTATION** **********

Student feedback.

Upon the completion of the lesson, students are asked to write freely their thoughts, comments, suggestions about what and how they learned. Additional information is found in the notes I keep in my research diary (some of the data collected there are used in the Presentations).

Generally speaking, we are in constant search for students' feedback, since a child-centered approach is adopted in many levels of the scenario: its topic, the style of activities but also the parts where students' works and words are valued, commented and analyzed next to other texts found in official public spheres.

Concerning the gender roles, girls are likely not to bring toys in the first activity (if so, it is an educational opportunity for gender issues), but, overall, they can participate in equal terms.

Students are intrigued by the subject and too engaged in the learning process. First, they find cool and useful all this stuff around today's robotic toys and the snack learning about it. They express their enthusiasm with creative activities and participate actively. In some activities they realize how time-consuming may a work be and they learn to estimate better the amount of effort needed and acknowledge what appears easy or amateurish at first sight.

Teacher's remarks

This may look an extended scenario, but it was implemented with flexibility and differentiation. Students were split into groups and were working on different smaller projects (e.g. VR workshop, Robotics team).

Regarding the aims of this scenario and the general purposes of the pilot action research it introduces, the professional development is of great significance. Along with the students, I found myself learning new software, discovering new sources, designing prototype teaching material, exchanging ideas with colleagues via this project. I am not promoting myself as an expert, but as a role model -an adult who enjoys learning and experimenting. For example, I present my progress in virtual reality design Pygmalion not only to spark a discussion on the relationship between the creator and the creature (relevant teaching content) but also to share my artistic experiments in a new tool (for inspiration). That is to say, as far as the preparation time concerns it takes time but I ensure it is totally rewarding!

Taking a look at the structure of the scenario, the kind, the sequence and the interconnections of activities we recap our learning journey routes: We stand in our present, travel in the past, return here and now to jump into the future and come back. We move between tangible and virtual, fact and fiction, animate and inanimate. We meet definitions which are not static, but scaffolds to communicate continua and tendencies. Obviously, we speak of analyses attached to philosophical questions seeking more to be posed than to be answered, for they may indicate guidelines for consciously being and acting in this technologically driven century. At last, toys are serious and brought us at the last transitional activity of the LS, which bridges it with the next extended phase of our project: Robots in Literature and Cinema. Still playing…

About the Europeana DSI-4 project

Europeana is Europe's digital platform for cultural heritage, providing free online access to over 53 million digitised items drawn from Europe's museums, archives, libraries and galleries. The Europeana DSI-4 project continues the work of the previous three Europeana Digital Service Infrastructures (DSIs). It is the fourth iteration with a proven record of accomplishment in creating access, interoperability, visibility and use of European cultural heritage in the five target markets outlined: European Citizens, Education, Research, Creative Industries and Cultural Heritage Institutions.

European Schoolnet (EUN) is the network of 34 European Ministries of Education, based in Brussels. As a not-for-profit organisation, EUN aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. European Schoolnet's task in the Europeana DSI-4 project is to continue and expand the Europeana Education Community.