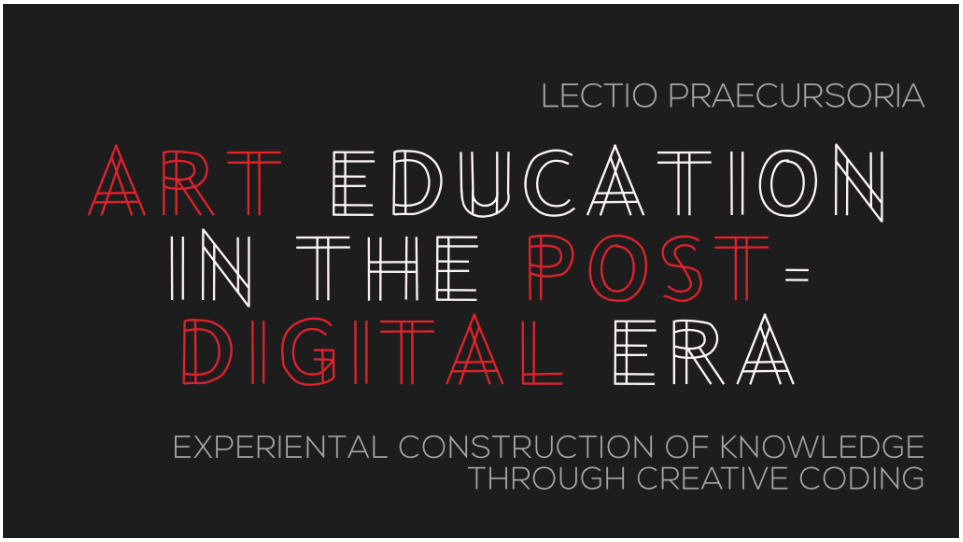
Lectio Precursoria

Tomi Dufva



Honoured Custos, honoured opponent, ladies and gentlemen, I want to start by reading a short text from Jaron Lanier's book "You are not a gadget".

> "It's early in the twenty-first century, and that means that these words will mostly be read by nonpersons–automatons or numb mobs composed of people who are no longer acting as individuals. The words will be minced into atomized search-engine keywords within industrial cloud computer facilities located in remote, often secret locations around the world. They will be copied millions of times by algorithms designed to send an advertisement to some person somewhere who happens to resonate with some fragment of what I say. They will be scanned, rehashed, and misrepresented by crowds of quick and sloppy readers into wikis and automatically aggregated wireless text message streams.
>
> Reactions will repeatedly degenerate into mindless chains of anonymous insults and inarticulate controversies. Algorithms will find correlations between those who read my words and their purchases, their romantic adventures, their debts, and soon, their genes. Ultimately these words

> will contribute to the fortunes of those few who have been able to position themselves as lords of the computing clouds".

Lanier's text, written in 2010 was one of the starting points that got me interested in digital technology from a more critical and pedagogical standpoint.

I had been using programming and digital technology in my art for some time, but Lanier, among some others, got me interested about the effects and problematics of digitalisation, and asking how could art and art education answer to these growing challenges brought by digital technology.

Albeit a bit dystopian, Lanier's text describes the traits and the biases of the digital technology and how these traits can work for or against us, depending on how we choose to develop them. It is these challenges that I have aimed to find some answers to in this dissertation.

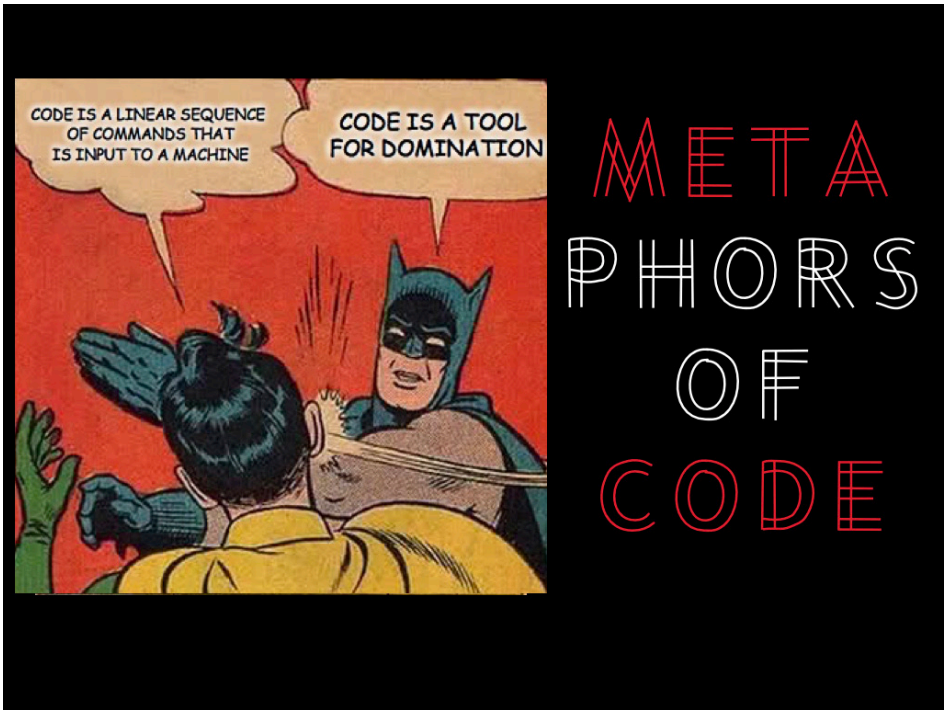
Digital technology continues to have large-scale effects on almost every aspect of modern society. From economy to everyday social interactions, as well as from culture to education, digital technologies have transformed the way we communicate, work, relax and even exist in this world.

Even though digital technologies are tied to the physical compounds of the digital device, and use increasing amounts of natural resources, and continue to load the landfills in an emerging pace, the primary focus in my research

is the code, the underlying nature of digital technology. Digital technologies differ from earlier technologies through the use of code, a sort of meta-layer to the technology. The programmability of the computer was the breakthrough invention of the digital computer and enabled the digital revolution;

The code allows a machine to change its function from a calculator, to a word processor and further to a communication device, entertainment center and so forth, without any concrete change in the machine itself. The abstract world of code allows for fabrication of a world that simulates our own, but equally, it allows for the creation of a world utterly different from ours: An apple may fall in the head of someone sitting under a tree, or, it might just as well transform into a spaceship. The code enables the creation of these worlds, but at the same time makes them invisible to the naked eye: We cannot comprehend the digital world by just looking at the black silicon chip.

Coupled with the Internet and fast global connections, digital technologies offer unforeseen possibilities as well as challenges. The current questions within privacy, surveillance, and ownership of data, for instance, are all results of the growing use of digital technologies.



As an example, sharing a photo to a social media service is not analogous to showing a photo in physical form: Code allows sharing things beyond the physical form of the photo: Digital image contains metadata such as location, time of the photo being taken, the camera used, and so on. Furthermore,

through the use of code in the form of machine learning or other complex algorithms, people, landmarks, products and text in the photo can all be recognised. All this data can then be analysed and compared to millions of other photos or other points of data, to advance someone's objectives somewhere, not always for the benefit of the user.

Digital code constructs the digital world; it structures and constrains the way in which we can act in the digital domain. The way digital technology is architectured affects the way we perceive it.

The code can be considered from the viewpoint of functionality, as a straightforward technological instruction set made to operate the digital devices, but it also includes more complicated perspectives that require a more critical and broader understanding of the code. Thus, code can be seen as an exchange of ones and zeros, but also as a power struggle between, usually, white male programmers, and those who think who are users, but who are in fact, the product being sold.

In this dissertation, I use the term post-digital to describe the current state of our use of digital devices, where digital technologies are so commonplace that not using them becomes a statement of alternative values. For instance, we do not "go to the internet" anymore, instead digitality and "being online" surrounds and pervades our everyday lives. Living without a smartphone or social media account does not anymore reveal that a person still lives in the

stone age. Instead, it might even imply a certain status of intelligence and individualism.

Thus, post-digital does not denote a world after digitality, quite contrary the will to digitalise everything is more extensive than ever, -we talk about digileaps and digitrains one must catch- but post-digital is post in the same sense as in post-feminism or even post-punk. Post-digital presents itself as a term to describe a world where digital technology and its underlying code is complexly intertwined with the everyday life. Digital technologies can even be seen to become appendages of our body, where we outsource some of our cognitive processes to the digital device. Or, digital code operates as a non-human actor, that processes, analyses and reprograms information about the world where we live in.

For instance, code, in the form of complex algorithms, handles a significant portion of the world's stock trading, finds the next summer's hit songs, or predicts our future purchases.

Digital and the post-digital world has become under research, particularly under the last decade, for instance, digital humanities, as well as comparative media studies, have reflected their position and aim in the post-digital age.

New fields of research have been established, such as critical making studies, critical code studies and software studies.

Moreover, societal and political studies have taken an interest in the digital technology. Common to all these distinct lines of research is to show the complicated and coiled nature that digital technology has concerning the culture, society, politics, economy and everyday life.

Digital technology has been a part of education ever since the beginning of personal computers, and in recent years we have seen a rekindled interest in teaching programming.

In art education, visual culture and media-studies have tackled some aspects of digital technology on their part.

However, in this dissertation, I suggest that programming in education has remained unproblematized and the broader issues within the digital code have remained without much attention. Furthermore, in art education, very

little focus has been given to utilising coding in art education or inspecting the cultures created by the code.

When programming was reintroduced to primary education in Finland in 2016 the focus was, and still is, much on the functionality of programming, where more complex issues of programming, such as the political or philosophical ramifications are not dealt at all. Furthermore, programming is seen as only a part of mathematics and craft subjects, leaving many relevant school subjects outside. As the post-digital world touches almost all the aspects of the modern life, it could be asked if programming should be treated more broadly in education?

Although recent initiatives within programming and engineering have taken art into account it has mainly been on the surface level: Art has been needed in designing the look and feel of the products, or it has been harnessed to serve the needs of the tech industry. However, one of the significant qualities of art education is to develop critical thinking and to aid in students' comprehension of the current world. Art education offers a unique combination of experience and abstract thinking: Experience through making and experiencing art, abstract thinking in formulating those experiences and joining theories into practice.

In my research I looked at three things within post-digitality:

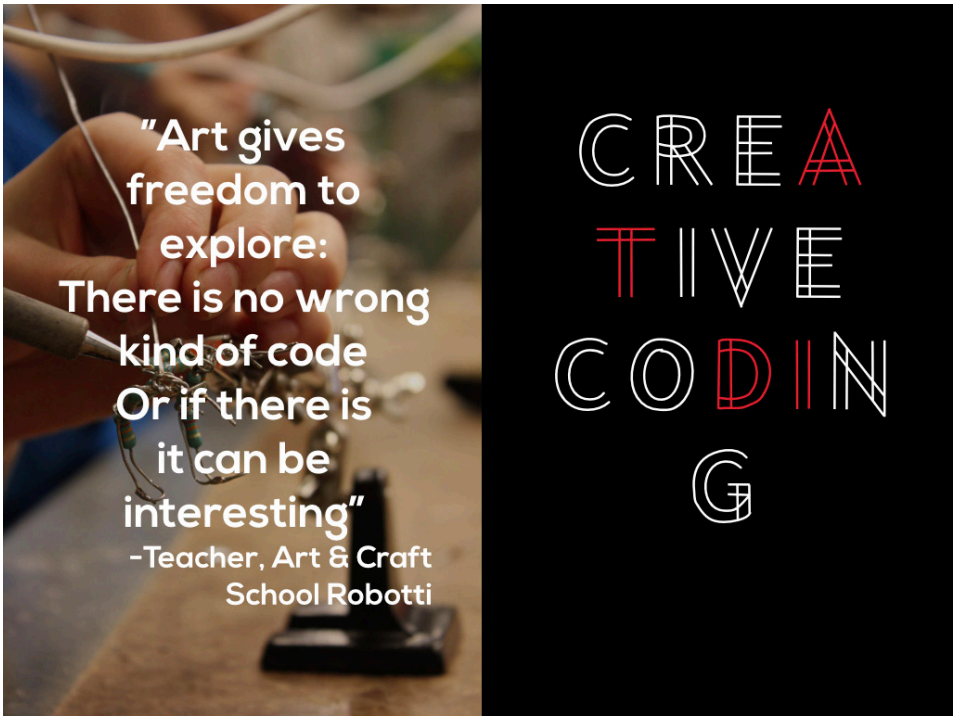
First, the multiple meanings of code. Second, the embodied digitality, meaning the world where digital is coiled with the physical world. And last, creative coding, an artistic method of using digital technologies in education.

The first, named as metaphors of code, mostly dealt in this dissertation first article, aims to broaden the comprehension of teaching programming with the use of paradigms and metaphors. Code, as well as teaching coding, is not only a technical skill to be mastered, but a diverse field of multiple understandings and forces. Metaphors aid as different glasses one can put on and observe the emerging world through them.

Looking at the code and the post-digital world also reveals that digitality is not only inside the devices, but surrounds and affects us in the physical world. And from a different perspective: our physical actions create and form the digital world as well. The post-digital world is a world of embodied digitality,

where processes of communication, knowledge, and sense-making happen through, or in the mesh of digital and physical.

One of the problems of the embodied digitality is the comprehension of that world: How is one to perceive and understand the digital embodied processes, when they happen in the invisible level of abstract code, that can be anything and altered anytime? What kind of knowledge is then required of the digital world?



My research contributes to this discussion of post-digital and post-human in offering a concept of digi-grasping as a way of describing the sense-making in a post-digital world. Digi-grasping alludes to phenomenological research and in particular to Merleau-Ponty's notion of grasping. Meaning our embodied ability to understand and make sense of a world even before an intellectual understanding of it. The world is something we can grasp by being in the world, or in the words of Merleau-Ponty: "the body is our general medium for having a world".

Digi-grasping is thus an activity that aims to grasp a world that is at the same time digital and physical. It concentrates on such properties that go beyond, or do not require mastering the technical knowledge or skills of the digital, such as electronics, programming skills or software skills. Instead, digi-grasping focuses on the broader comprehension of the digital, for instance, the grasp

of knowing, or not knowing how to fix an issue with the digital device, or the stress of instant message streams, or the caring for the digital rights.

The third contribution in this dissertation is the use of creative coding as an art educational method to research and explore the post-digital world.

Creative coding is often described as programming where expression is more important than function, in other words, creative coding transforms coding into an artistic tool or medium, that can even be perceived as fluid as drawing.

Moreover, creative coding often describes an activity that plays with the whole domain of the digital technology. This means that it is not "just" programming of the computer, but the building of digital devices, artworks and even complex systems that make use of deep learning algorithms.

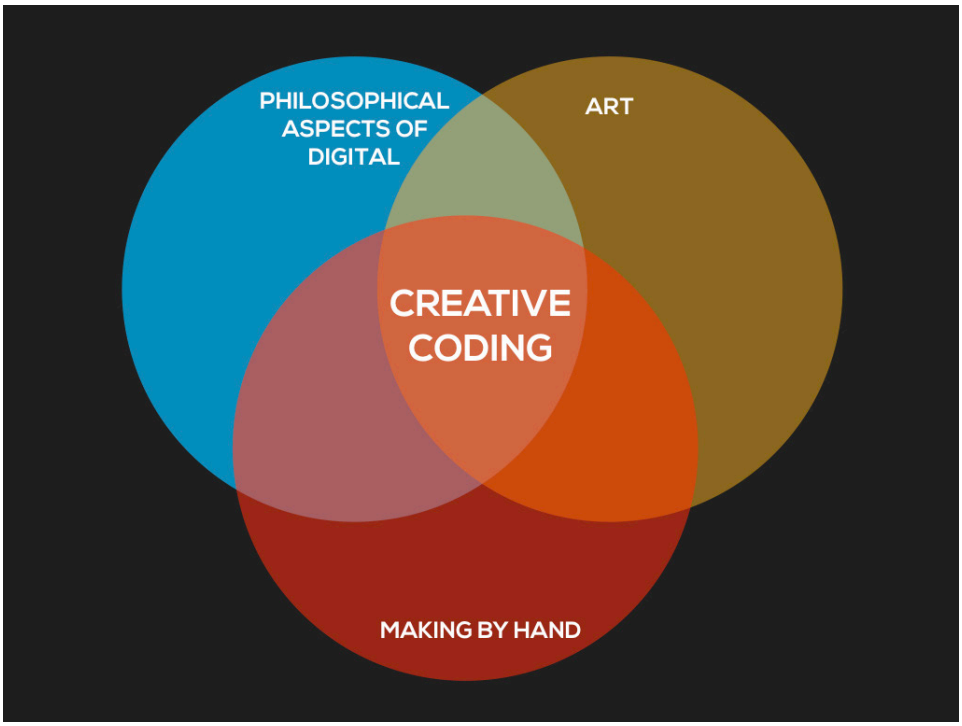
In my research, I have broadened the concept of creative coding into experiential activity and knowledge making, through which we can comprehend our position in the post-digital world. Creative coding combines the act of programming and electronics into the abstract theoretical frameworks of digitality as well as to the phenomenological frameworks of embodiment and making by hand. Furthermore, because of the art educational context, creative coding is not tied into formalities of teaching programming, but instead becomes an exploration of the digital world. As such, creative coding as a method may give us an understanding of the post-digital that would be hard to come by otherwise.

For instance, when we paint, we choose our brush, paint, colour, the way to apply the paint, the pressure, direction, the feeling of how to move the brush: These things can in part be learned, and they are in part dependent on the skills we have acquired: knowledge of the material, of the paint, skills in painting and so forth. However, painting is not the sum of the knowledge and skills, but rather something more indescribable, a sort of comprehension of both the moment and the intention, that could be described, for instance, as the artistic flow, tacit knowledge, or intuition. It is, as Alva Noë could perhaps call, the organisational activity of how we see where we are, how we are, and reorganisational activity of describing new ways to understand.

Similarly, Creative coding in my thesis describes such activity that can be seen to further the comprehension of the world that is at the same time digital and real.

Because of being an art educational method, creative coding allows more freedom to approach digital technologies and for the student the possibility of forming a personal relation to the digital technology. The personal experience and expression go over standardised formal ways of using and writing code. Similarly, as any art technique, after the basic comprehension of the material, one has the possibility to use and misuse the medium, make mistakes and find new paths.

The whole dissertation can be comprehended through the use of creative coding, which joins together digital technology, art and art education and making by hand.



The post-digital world is a world where a single technology affects and is responsible for a significant portion of the experiences and environments in one's life. It is my opinion then that such world demands a broader introspection and these issues are far too important to be ignored by art education or education in general.