Postdigital Art in Design Education

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With this research we explore how an educational approach could be devised that encourages both a critical and creative engagement with the postdigital condition. While those art practices seem omnipresent in cultural institutions, there is surprisingly little work done at the university level. Yet, practicing artists exhibit a particularly pragmatic, yet critical attitude when it comes to appropriating technologies and often generously share their own insights and experiences in making art with digital tools. We devised a course format during which advanced second and third-year students of communication and interface design engaged with postdigital theory and practice. Our aims were to lower thresholds to tools and technologies, encourage the engagement with the ethical and aesthetic aspects of digitization, and convene a temporary community of students that freely share and collaborate. We report on the results of the course and reflect on our observations.

1. Introduction

Over the past few years, postdigital perspectives have become more and more prevalent within the creative and cultural field. We understand the postdigital condition as the sobering recognition that the digital cannot be considered new anymore, but has become an increasingly naturalized backdrop to all activities and experiences we engage in (e.g., Cramer, 2015). The tools that artists, designers, and educators are using range from online platforms and social media to mobile apps and generative algorithms. While these technologies have become integral to communicating, exchanging, and formulating ideas, and eventually presenting art works, they are also object of critical reflection and resistance within the arts (c.f. , Ackermann et al., 2019; Berry & Dieter, 2015). Mass surveillance is being challenged, yet still used in the artistic hacking of networked cameras (Depoorter, 2015). The filter bubble is being questioned by artists writing browser extensions which encrypt status updates and search queries (e.g., Eckert, 2016). The rise of digital assistants is countered by programming ironic, feminist, and disobedient assistants (McCarthy, 2017). The primacy of productivity in the postdigital age can be undermined by a website that makes the computer run slow and hot (Lavigne, 2016).

Arguably, all these examples can be considered postdigital art. Characteristic of this art practice is the reflection of both established and emerging technologies like networked communication, the internet and its markets, surveillance structures, artificial intelligence, and the like, using the very technologies they refer to. More broadly, the postdigital refers to the contemporary condition we live in (Berry & Dieter, 2015). The postdigital describes our modern technologized and hyperconnected world and society as a whole: how we collect information and knowledge at the same location where we share it, where we network, where we communicate, where we work, shop, love, or fight; where we consume art and culture, display and distribute it, and acquire the skills and means for production. The postdigital is a state in which the digital is not seen as something new anymore opening up an altered perspective on the difference between analog and digital media (Conrads & Morlok, 2014).

In this paper, we concentrate on the question of how we can integrate postdigital strategies into new educational formats in order to sensitize students to the powers and perils of networked technologies. How can we incorporate current digital technologies in design education to encourage critical reflection on our current conditions, as well as to teach the relevant practical skills? Often the postdigital is being observed in its role within contemporary art production and popular culture, with this research we investigate the potential that the postdigital perspective affords in the context of design education.

The aim of this paper is to explore how postdigital arts can be taught at the university level. Particularly the discrepancy between a theoretical

approach—as common in traditional higher/academic art education in the form of readings and seminar discussions—and a generative mode—acquiring technical and aesthetic skills in a typical studio course—is a challenge. *How can a course format be devised that encourages both a critical and creative engagement with the postdigital condition?*

2. Background

Our work relates to recent efforts in art, design and cultural education that engage with digital technology and practices in media art that follow a didactic approach. Teaching media technologies is often approached as the transfer of knowledge of a specific program, software, or environment which stands for itself. This might make sense for some software applications (like Adobe CS, or 3D modeling software), but for other 'hard' skills like coding algorithms for networked infrastructures, artificial intelligence or machine learning, the 'technical framework' is much more embedded in—and deeply influenced by—the dynamically changing networked ecosystem of our modern digitized world. The same applies to the art aspect of postdigital education—also here tool, material and sometimes even output are not always clearly marked-off and often condition each other:

> ❝It is as if postdigital over-determinates the sociopolitical landscape; without anyone's 'permission' it entered the classrooms in both student's and teacher's pockets (via their mobile devices), immersed into the pedagogical process, and broke the boundaries of formal and informal teaching and learning: unreflexive certainties turned into reflexive uncertainties❞ (Jandrić et al., 2018).

The postdigital perspective advances the observation that technologies permeate everyday life resulting in the dissolution of long-standing distinctions such as work vs. leisure and online vs. offline. Even though they do not talk particularly about education, Berry and Dieter describe the postdigital phenomena in a similar way:

> ❝Computation becomes experiential, spatial and materialized in its implementation, embedded within the environment and embodied, part of the texture of life itself but also upon and even within the body. Computation becomes something which operates while one walks around, is touched and touch-able, manipulated and manipulable and interactive and operable through a number of entry-points, surfaces and veneers.❞ (Berry & Dieter, 2015)

A crucial point why the 'postdigital'—be it art or just its quotidian and ubiquitous condition—has such a potential to engage people, is the immediacy which gets created by integrating the user through interactive elements as entry points into an aesthetic experience. Particularly these entry points

promise an important factor in education, which we observe in more detail: the varied ways of interaction in order to enter via touching a screen, pressing a button, speaking into a microphone, or shaking devices of different kinds. In an art context, often only after this interaction, the whole content and narration will be unsealed; interaction is the glue between story, object, and technology. These integrations happen constantly and often unconsciously as a component of our daily life and the interactions with our accompanying devices and services. Jandrić relates to this hereness and nowness: "the contemporary use of the term 'postdigital' does describe human relationships to technologies that we experience, individually and collectively, in the moment here and now." (Jandrić et al., 2018).

Looking at the other side of postdigital art, the producing artists, we can also see efforts of integrating the user. Many artists and creative technologists working in the field also teach the specific tools needed in workshops on- and offline (e.g., Kogan, Lavigne), share the source code to a project, or produce video tutorials. Often an open source 'how-to' vision drives this approach. The artist Gene Kogan for example shares screen recordings of all of his classes, as well as demos and code on his website. He teaches classes like Neural Aesthetic or Machine Learning for Artists at NYU's Interactive Telecommunication Program (ITP), or the School of Ma in Berlin. The fact that he publishes class material online for free, for which enrolled students pay up to several hundred dollars a session, illustrates the points above.

The tendency of broadening access through postdigital education we can also see in the transformations taking place in cultural institutions such as museums offering educational formats for children and teenagers alongside their exhibition program. For example, in 2018 Martin Gropius Bau in Berlin offered a series of hands-on workshops accompanying Ed Atkins' solo show 'Old Food'. While the exhibition featured big-scale computer-generated video installations of highly artificially looking worlds, the workshops shared practical insights into the digital tools Atkin employs for video editing, 3D modeling, etc. (Gropius Bau, 2018). Also ZKM Karlsruhe (Center for Art and Media Karlsruhe) offers a range of workshops on topics such as video editing, digital radio production, programming of computer games, hacking single-board microcontrollers such as Arduinos, and running open coding sessions. The center integrated a huge, free to access lab area on the ground floor of their building, where visitors can familiarize themselves with emerging technologies and tools—independently or with instructions (ZKM Center for Art and Media Karlsruhe, undated).

Another example of expanded access are educational guides, apps, or games accompanying specific exhibitions or events. The National Museum Singapore initiated the DigiMuse programme launched in 2018. Over an open call the programme invited artists, technologists, and cultural professionals to develop multimedia and immersive reality applications. This effort is intended to engage the audience on a new level and provide background

information on history and art through technologies such as augmented reality and artificial intelligence (The National Museum Singapore, 2018). In initiatives like this, visitors may not learn advanced skills like programming or video editing, but have the chance of participation through the use of accessible interfaces and events. Often in these applications the visitors are asked to provide input, like gathered information about an art piece or the history of a building, and are therefore encouraged to engage with a given topic. Therefore the visitor is not only a passive consumer anymore, but turns into an active participant.

The development that more artists and cultural institutions provide accompanying workshops with a focus on new media and the used technologies seems like a logical consequence to the postdigital condition. Therefore this art form is—already by its nature of operating with the same medium for criticism and subject of criticism—deeply entangled with the socio-political environment of its time. Not only by reflecting on it, but also by giving the possibilities to directly interact and change set-ups and therefore contribute to a comment or perspective on a (current) topic. With the shifting and blurring of lines between creator and audience, we see not only "an increased level of interactivity through the internet as a medium but also an increasingly fraught level of a politicized driven denial of the central and authoritative voice of the author" (Contreraskoterbay & Mirocha, 2016). The shifting roles are a central component in postdigital art practices, for example, in Adam Harvey's project CV Dazzle, in which a special make-up and hairstyle make the wearer undetectable for face recognition software therefore changing their role from an observer to a user, to an unidentifiable subject (Harvey, 2010).

Summing up different voices about the postdigital, a central, but often implicit assumption of postdigital art is that an increased level of involvement of the audience has the potential to lead to a strengthened awareness about socio-technical constellations. In contrast to a seemingly passive reception of art, the viewers' active participation in an aesthetic experience can be considered the main characteristic of postdigital art practices. In our experience, particularly the created empathy and interest for a subject, which comes through those points of interaction and involvement could lead to an increased level of politicization. The promise of expanding access, participation, and reflection underlines the societal importance and political weight of postdigital art practices for cultural education.

3. Approach

As discussed above the postdigital condition has already been reflected in its role within contemporary art production and popular culture. With this research, we focus on the potential that the postdigital perspective affords in the context of design education. Particularly at this stage of professional

and academic formation, critical and creative engagement with digital technologies—as both subject matter and design material—is crucial.

While most writing on the postdigital condition takes a rather theoretical perspective, many artists whose work can be considered to be 'postdigital' demonstrate a didactic attitude, in that they freely share material, give hands-on workshops, and openly convey their experiences in working with and about digital technologies. Despite this pedagogic undercurrent in the art practice itself, there has been limited interest in the opportunities of the postdigital for formal education at the university (Conrads & Morlok. 2014). Arguably, there is a discrepancy between a theoretical approach as we know it from classic art education—readings, discussions, etc.—and the practical appropriation of mostly technical skills—drawing styles, materials, etc. With this research we intend to explore how postdigital art can be taught in a university-level studio course at a design department.

We want to point out a difference between the teaching of pure technology, like a software that can be taught isolated in a room without reference to the broader socio-technical reality, and technologies which should not only be taught by their technical specifications and application, but also being perceived and evaluated in their importance within the broader societal and political context of our times. Here we see the sweet spot—as well as the challenge—for postdigital education. Within the realm of education,the specific topic of postdigital structures, and how we could deal with it on an aesthetic, technological, and ethical level has not really been tackled yet: the potentially empowering aspect of postdigital art. Corporate and governmental surveillance has become a naturalized, yet suppressed characteristic of a hyperconnected world in which privacy appears at odds with convenience. However, we are convinced that the awareness and encouragement to critically reflect on socio-technical developments need to go hand in hand with an aesthetic response, which should be prioritized within our educational agenda in arts and design.

With this research we aim to devise a course format that encourages both a critical and creative engagement with the postdigital condition in the context of design education. To pursue this aspiration, we postulate three principles for design education:

1. Low thresholds: Foster creative participation with ready accessible tools and technologies.
2. Aesthetics in politics: Encourage ethical and artistic engagement with the postdigital condition.
3. Temporary community: Cultivate a community spirit among students that freely share and collaborate.

4. A course on Postdigital Art

We conceptualized a practical, yet research-oriented design seminar/studio course introducing students of communication and interface design to digital and interactive art practices. The authors co-taught the course over a period of three months during the summer semester 2018 at the design department of the University of Applied Sciences. The course was structured into a short warm-up phase of 4 weeks followed by three assignments spread over 10 weeks.

Warm-Up

The purpose of the first part of the course, was to familiarize students with the notion of the postdigital and the art practices that refer to it. Along theoretical texts (e.g., Benjamin, 1936; Berry & Dieter, 2015) and the introduction to different artists and work examples, the 'postdigital' as an art form and the role of digital culture within our contemporary society were subject of discussions among students and instructors. Parallel to this theoretical approach the students were introduced to a range of technologies employed such as virtual and augmented reality, 360° video, creative coding, non-linear and sensor-driven storytelling, physical computing, and machine learning. In addition to the introductions prepared by the instructors and guest lecturers-artists, each student participant gave a 'tech input' following a peer-to-peer learning system, in which students teach each other skills they either have already, or hold a lecture about a new technique which they would like to appropriate. Inputs include a coding workshop in JavaScript, a presentation about 3D scanning, an overview of different design workflows and programs, and a live demo in a projection mapping software.

Assignments

Three project assignments invited students to acquire practical skills by resorting to the different tech inputs. Each assignment was a small project, during which students were encouraged to reflect postdigital conditions. The students were encouraged to see postdigital arts in a close connection to the networked and hyper technologized society they are living in. According to this mindset art should not be seen as a stand-alone discipline that can be watched in a museum. Instead, postdigital art and design is and can be everywhere. On a phone, on a digital map, on a computer screen, as an immersive experience, in an urban space, in the park, in the subway, as a participatory installation, in the virtual, in the tangible, in the mixed reality.

The three assignments refer to the classic art forms of portrait, readymade, and collage. By choosing these already known formats, the students are encouraged to rethink established art forms in light of the postdigital condition[1]. This means not only how contemporary technologies transform production and presentation of art, but also what a contemporary

1. These assignments are in part inspired by courses of the similar name taught at the Interactive Telecommunication Program (ITP), New York University, which the first author attended 2014-2016.

portrait, readymade, or collage could mean. How would the Mona Lisa look if Leonardo Da Vinci lived in 2019? How can we draw an arc from Marcel Duchamp's Fountain to today's interactive readymades? Which layers of data, emotion, or critique can be added and how do technologies alter the art piece and its experience? And what are the benefits of remixing through digital technologies; how does the collage of the 21st century, look, feel, speak, and interact like? Open-ended questions along these lines defined the three assignments. During the pitches of initial ideas and the presentation of the final outcomes, students were requested to share their comments, questions, and suggestions in addition to the feedback by the instructors.

Assignment 1/ Algorithmic Portraiture: What is a portraiture in the algorithmic age? Why do we want to portray someone—or something? And which story we would like to tell about ourselves or about each other? The task for the students is to create any kind of portraiture that considers the *algorithmic.* Be it by using code, face recognition, 3D scanning, or other contemporary technologies. Subject of the portraiture can be a person, as well as a place, a thing, a location, et cetera. This task can also be executed in an analog fashion where algorithmic strategies are seen through the postdigital lens: computational decision making, clustering, or neural networks get transferred into analog processes, systems, models or strategies. Students had two weeks to finish this first assignment, while they had four weeks for each of the following ones.

Assignment 2/ Digital Readymade: The understanding of readymades as an artform changed over time. Duchamp's fountain does not shock anymore as it did when introduced more than 100 years ago, but the concept of using something found and alter its meaning by placing it in a new context or actual adding more to it stays as relevant as ever. Students are encouraged to find a subject of their interest and develop a digital and/or interactive readymade. For this assignment it is particularly important that object, interaction, and other additional layers work holistically together. Objects are loaded with meaning and narration. The postdigital ecosystem of our time turns this assignment into a comprehensive and challenging exercise. For example, when working with material encountered on the web, data that has to be sourced, edited, reassembled, and attributed. The piece will be probably later being fed back to the internet by showing it somewhere and therefore becomes again a part of the endless data stream, a point in the constellation.

Assignment 3/ Urban Collage: The existence of urban and public space is an integral part of functioning democracies. How can we utilize this space through the help of technology? In this third and last assignment the students were asked to use urban data sets as well as tools such as projection and video mapping, data visualization, and geolocation-based apps (Google Maps, Instagram, Tinder, Deliveroo, etc.) in order to conceive urban collages. Be it through the content and data the tool addresses or uses, or its spatial properties. The goal for this assignment was to add an extra

layer of storytelling to the urban map. In our daily life we tend to accept the directions given by the map and rarely question what happens with the personal data that we feed those apps with. These technical developments lead to profound questions regarding privacy and control. We asked our students to challenge the data-driven outgrowths of our constant need of 'making our lives easier' and to artistically respond or intervene. On another level the students were confronted with the political aspects of space and infrastructure, accessibility and the role location data-based technologies play by providing their services.

5. Findings

For us most outstanding is the commitment and enthusiasm the students brought to the seminar. It was clear to see that the postdigital is so embedded in all areas of our everyday lives that it seemed that it was almost overdue for the students to reflect on it and work with it in the classroom.

Results

The following are selected student projects:

One student developed for the first assignment 'Algorithmic Portraiture' an abstract self-portrait: he was diagnosed with a brain tumor the year before (which fortunately could be cured). *Ghost of Mine* is a video generated out of MRT material (videos, gifs, layered models) of the students own brain and head. Text—excerpts of his medical reports, as well as his own thoughts and fears—goes along with the rhythm of the distinctive sound of the MRT tube. For the same assignment another student portrayed with the project *The Iron Soul* her cousin who works at the nuclear power plant of her home-town. The cousin talks about his daily working routines at the plant. These stories and routines are transferred into a sound installation that plays the audio material over and over again in an algorithmic fashion based on the rhythm of how he executes different tasks in the plant throughout the year.

Fig. 1. Algorithmic Portraiture *Ghost of Mine.*

BLOOD RUNNING DOWN MY NECK AGAIN.

In *Amazon Border*, developed for the 'Digital Readymade' assignment, the found object is a roll of military 'Nato barb wire' which can be purchased on Amazon. The students were shocked about the description and reviews on the online shopping center. The qualities of the product are advertised as amazing in order to keep unwanted people out, the blades are 'sharp and effective'. ("The razor sharp blades of the locking wire got a strong deterrent effect and a hindering function for trespassing.") The students ordered a roll of this barbed wire for an interactive installation: once a person, an audience, approaches the wire (measured with a proximity sensor) sound recordings from its actual environment, the European mainland border, start to play. As part of the installation print-outs of Amazon reviews for the product, as well as the bill, were hanging on the wall.

For *Everyone's a Printer, Only I'm a Maker* the students worked with found digital 3D models. By combining several of the same models in a 3D software, they created new objects with an ironic function such as a 'leg prothesis' or an 'artificial lung'. In a VR installation the user found themselves in the inside of a 3D-printer surrounded by the created artefacts staged like in a museum. The message is a clear and smart hint on the culture around 3D printing: even though the technology offers promising applications like cheap custom-made prothesis or local DIY-fabrication; it mostly gets used for plastic gadgetry that stresses our environment.
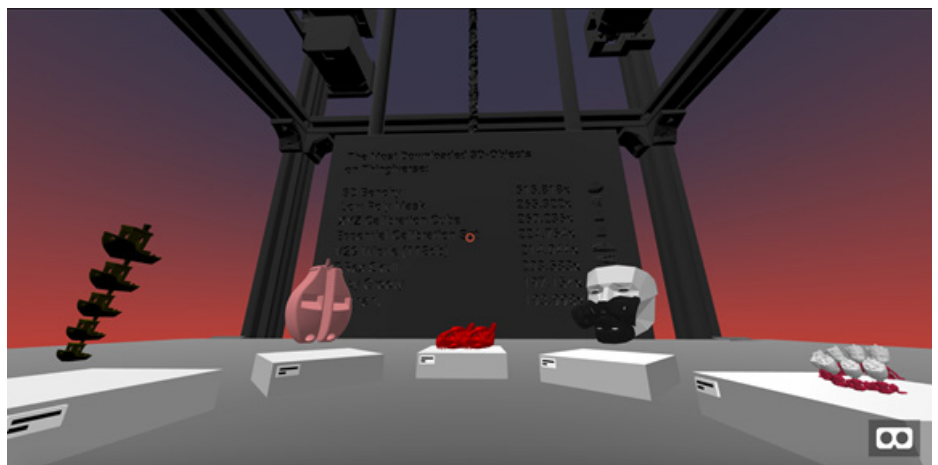
For the third assignment 'Urban Collage' the students were asked to take a step back and look at our world from a more global and spatial perspective. *Transit Nations* is also a highly political project which deals with 4K resolution satellite images of refugee camps recorded from Google Earth. These images from above show the difficult and determined condition of camps: rampant infrastructures between no man's land and city. Also *El Pan* is based on maps material and investigates unfinished infrastructures on the Spanish mainland: the student portrays an economic boom that ended in a massive absurdity of dead ends and unsold properties where villas and swimming pools will always stay just a capitalist vision. Both students used Google Mapping Software in order to determine aesthetically distinctive

features which stand for structural political failure. These projects are highly political in their narratives as well as the choses aesthetic which is the content itself. Through this hybrid position they are very representative for postdigital arts as a whole and particularly the course we have taught.

Observations

The results of the three assignments were interesting and showed similarities: the projects were predominantly personally or politically driven. Often in a hybrid form in between, 'stitched together' through an aesthetic approach.

On the one hand those overlaps amongst the students' projects arose because all of them were reading the same texts in class and saw the same work examples. We talked about how much we are already reference points to each other and the rest of the connected world, akin to stars or planets in a "postdigital constellation" (Berry & Dieter, 2015). And therefore how much the system 'changes' when we move within it. This awareness that if I hack, design, or dialogue within these structures, my own action might also have consequences to others or even the system itself, maybe even change the condition, was striving. To receive this feedback was a very important and eye-opening aspect of the whole subject and motivating for the students. The awareness to be part of a hyper-networked condition could be seen in the students' projects.

On the other hand the similarities among the projects are rooted in the congruency some of the tools have with the everyday postdigital experiences. Here we want to refer again to the 'nowness', to the level of involvement the students bring to the table. In the results, as well as the group dynamics within the class we could recognize evidence for our postulated principles for design education (see Section 3):

1. The postdigital condition as something omnipresent and therefore per sonal led to a likewise personal approach amongst the students, together with the availability of tools and technologies the whole subject presented itself to be quite low threshold.

2. In their assignment-based projects, the students engaged with the aesthetics in politics, as well as politics in aesthetics. The students largely succeeded in transferring political topics into aesthetic expressions.

3. The shared observation that the postdigital condition affects everyone in the class, created a strong sense of temporary community. We could witness a great interest in sharing inspirations, as well as ideas, thoughts, and feedback. The students researched additional material and met for exhibitions and events around the subject.

6. Conclusion

While the notion of the postdigital may evoke the impression that digitization is finished, we have argued and shown that it rather refers to the sobering realization that networked technologies now permeate and—to a growing degree—shape our lives. Postdigital art attempts to reckon with a lived experience that is increasingly shaped by algorithms, which may not only offer convenience, but also surveillance, patronization, and discrimation. With this work it was our ambition to devise an educational format in which design students could familiarize them with art theory and practice in an integrated manner. We have proposed the principles of low thresholds, aesthetics in politics, and temporary community to open up a space in which students can grapple with these socio-technical tensions in critical-generative ways. The results of the course exhibit a deep intellectual and aesthetic engagement with the topic. It is particularly noteworthy how the students' projects demonstrate not only a technological sophistication, but often personal connections as well as politically charged treatments of the postdigital.

The biggest challenge of the course was to combine the high level of technology, theory, and discussion in class. Even though the seminar had a relatively long time window of 4.5 hours every week, often there was not enough time to go through everything planned. Overall, the course schedule was relatively dense—from showing and discussing art projects, over teaching the accompanying technologies and debating about their societal impact, to talking about the ethical consequences of the postdigital condition and what that means for our own being in this world. The postdigital is everywhere, hard to delimit, and even harder to keep out. It was particularly this realization that made the discussions in the course so stimulating and the overall topic all the more relevant to both students and instructors. We could all feel a kind of 'digital hangover', which made the subject so personal, immediate, and urgent. The class felt like a resonance room, in which the students finally realized where they were and what consequences our postdigital reality has on every individual's here and now. The students were eager to experiment in order to see in which ways they can confront the postdigital condition in the form of artistic expressions.

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