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## **Making visible the invisible: Exploring McLuhan's figure/ground in digital citizenship education**

### **Abstract**

Figure and ground are analytical concepts used to discuss how some elements of a lived situation dominate perception while others remain in the background. This applies not least to media and research from the medium theoretical tradition as well as later scholarship on media infrastructures which have been keen to explore the taken for granted or invisible aspects of the media landscape. In media education, however, there is still a tendency to focus on the *figure* of digital media by treating media technologies as tools or focusing on the critical evaluation of media content. This article draws on McLuhan co-authored textbook *City as Classroom* to suggest a pedagogical turn towards the *ground* of the internet. Based on concrete examples from middle school digital citizenship education, the article shows how a focus on the ground of digitalization actualizes topics such as environmental concerns, global inequalities and data privacy. These topics are conceptualized and discussed through the environmental/spatial metaphors *clouds*, *exhaust* and *architecture*.

Keywords: digital citizenship education, infrastructure literacy, media environments, McLuhan, figure/ground, visualization

### **Introduction: Figure and ground in media education**

A central concept in Marshall McLuhan's work is that of *figure* and *ground* (e.g. McLuhan 1964; McLuhan et al. 1977; McLuhan & McLuhan 1988). Originating from the field of Gestalt psychology, the terms are used to describe the structuring of human perception. Although a situation consists of many separate elements, all elements are not given equal attention. To make sense of the world the human brain instead tends to simplify and focus on one aspect of the scene, the figure, while ignoring the context or ground. In Gestalt theory, this phenomenon of *perceptual organization* (Wagenmans et al. 2012) is often illustrated through optical illusions, such as the drawing of two facial profiles facing each other creating a space in the shape of a vase in-between them. Depending on how perception is organized, the figure can be either the faces or the vase, demonstrating a continuous switch between figure and ground.

For McLuhan, studying the ground was a way to understand how society and culture are shaped through dominating media technologies. To understand any figure of the media, whether a technology, practice or product, he suggests an initial examination of the ground or environment of this phenomena (McLuhan & McLuhan 1988: 5). Only after that is it possible to say anything about the figure, and more importantly, in what ways that figure affects the ground. The point is thus not to shift attention to the ground permanently, but to eventually be able to perceive figure and ground together *as a whole* to understand the relationship between media and cultural change (McLuhan et al. 1977: 10). As media historian John Durham Peters (2015a, 2015b) has noted, this call to make environments visible is echoed in contemporary media infrastructure studies, focusing not least on the processes through which categories and standards become invisible and the work needed to keep them functioning in the background (cf. Bowker and Star 1999; Jackson 2014).

The centrality of the concept figure/ground in McLuhan's work has been discussed elsewhere (e.g. Stalder 1998; Logan 2011), as has his contributions to media pedagogy (e.g. Marchessault 2008; Meyrowitz 1996; Ong 1981). However, this article will focus mainly on the pedagogical implications of these concepts, based on how they are introduced in the 1977 media education textbook *The City as Classroom: Understanding Language and Media* (CaC), co-written by Marshall McLuhan, his son Eric McLuhan and one former student, Kathryn Hutchon. The textbook consists of short introductory texts and exercises, explaining and illustrating McLuhan's main ideas on the relationship between environments and media technologies. While it was aimed to be used in formal education in secondary school, the authors emphasize (as evident in the title) the importance of recognizing the learning that takes place outside the classroom or through media. This argument reasons with contemporary discussions such as those about informal learning in a digitized world (e.g. Drotner 1998; Erstad & Sefton-Green 2013; Mihailidis 2019).

At the same time, CaC contains aspects that are often missing from contemporary media education, such as a historicizing perspective and a focus on media forms and have recently been rediscovered and discussed as a starting point for expanding the current focus in media literacy education on content analysis (Kuskis 2015; Mason 2016) and towards creating active and ethically engaged publics (Dowd 2017). Norm Friesen and Theo Hug (2011) have also highlighted the method used in CaC, a "training of the senses" where the legacy of Gestalt theory becomes apparent (see also Strate 2019). After a short introductory chapter, a

set of optical experiments (resembling the face/vase image described above) are introduced to exercise the ability to shift focus between figure and background. Through this training of perception, the authors believe that it is possible to develop the ability to understand how something becomes a background because it has become so everyday that we no longer think about it. Students are thus encouraged to think about the systems and technologies that have become invisible to them in their own classroom:

Try applying what you have learned by considering the hidden *ground* in your own classroom. How many aspects of its hidden *ground* can you discover? Discuss them with your class. For a start, you may have to take air conditioning into account, since it completely changed architectural spaces by lowering ceilings and closing windows (McLuhan et al. 1977: 19-20).

Since CaC was written in 1977, the difference between the classroom and the surrounding media landscape have begun to dissolve. Learning management systems and e-services connect homes and schools, and online resources or social media platforms are used in all subjects as tools for school work and communication. The hidden ground of the classroom is no longer limited to air conditioning and architecture, but many times overlap with that of the digital media landscape. At the same time, the fact that media makes their way into the classroom and that many answers can be found through the media, does not mean that schools are no longer relevant. Suggesting that the idea of the “City as classroom” can be inverted to the “Classroom as city”, the authors of CaC put forth the classroom in compulsory education as an important node of knowledge production and citizen participation:

Since the advent of electronic media such as computers, enormous amounts of information are now available in the classroom. We have already noted that in an age when answers are being discovered outside the classroom, questions belong inside the classroom; similarly, when an “information explosion” is occurring outside the classroom, the study of structures of information or “pattern recognition” can go on inside the classroom (McLuhan et al. 1977: 165).

From this point of departure, this article wants to add to the body of work discussing the pedagogical approach in CaC as well as on literature discussing the importance of infrastructure literacy (Ciccone 2018; Forsler 2020; Gray et al. 2018) and environmental

perspectives (López 2020; Pöttsch 2016; Redmond 2019) in digital literacy education by focusing on *how the concept figure/ground can be used to explore the hidden grounds of the internet in the classroom*. Based on pedagogical examples from digital citizenship education in a US middle school, the article suggests that such an “infrastructural inversion” (Bowker & Star 1999) might be what separates digital citizenship education from more user-oriented and skill-based approaches to digital literacy.

### **Digital citizenship education**

As the internet continues to permeate everyday life and education, schools have been increasingly tasked with teaching the skills and behaviors that enable young people to participate as users of digital technologies. “Digital citizenship” is a term often used to describe these formal and informal educational efforts. Mike Ribble (n.d.), an early leader in the field, describes digital citizenship as “the continuously developing norms of appropriate, responsible, and empowered technology use” (Ribble, np.). The International Society for Technology in Education (ISTE) describes the “digital citizen” as someone who recognizes “the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical” (ISTE Standards for Students, np.).

There is great diversity within the field in how to understand, for instance, what “responsibilities” users have, what “rights” they might exercise, and what “ethical” behavior might look like. Moonsun Choi (2016) traces a tension within conceptions of “citizenship” itself — between traditional approaches that see citizenship as granted by a nation-state and exercised in predetermined ways (voting being the prototypical example) and critical conceptions that see citizenship as global and justice-oriented, actively engaged in challenging the status quo — and finds evidence of this tension within digital citizenship initiatives as well. Choi further notes that studies in digital citizenship education “often fail to identify the types of knowledge and skills that help teachers and students think critically and act responsibly beyond general discussions of effective use of the Internet and technology” (Choi 2016: 570).

The digital citizenship education explored in this article adopts and adapts CaC’s pedagogy of inverting what is commonly experienced as figure or ground in the digital realm. This is in keeping with Jason Ohler’s (2010) assertion that part of the job of digital citizenship is “to help students not only use technology but also to question it” (p. 19). And, as CaC asserts, in

order to question something you must be able to see it anew. Though much of the digital is experienced as invisible and positioned as new, Akwugo Emejulu and Callum McGregor (2019) note that the digital is in actuality built on “old oppressive relations” (p. 134). In fact, “radical digital citizenship” must begin, they argue, with an understanding of the “materiality” of the digital, which includes violence and civil war in the Democratic Republic of Congo associated with the extraction of the natural resources used to manufacture digital technologies, exploitative labor practices in technology manufacturing plants in China, the displacement and destruction of neighborhoods via “tech-based gentrification” in the San Francisco Bay Area, and exclusionary normative power dynamics at play in digital activist movements. Emejulu and McGregor argue that radical digital citizens “must act to make these seemingly invisible racist, patriarchal, enslaving and capitalist power relations visible” (p. 135). In other words, move what is experienced as invisible ground in the digital realm to the visible position of figure in order to better interrogate the digital environment and its impact.

### **Studying the ground of the internet**

One problem about studying hidden grounds is precisely that they are hidden, or at least escape our attention. The ground, as Felix Stalder (1998) points out, is basically “that which is ignored”. Peters describes the related concept of *infrastructures* in a similar manner, as consisting of “whatever enabling conditions are backgrounded from perception”. “Infrastructure”, he continues, “in most cases is demur and hides from the spotlight. Withdrawal is its modus operandi” (Peters 2015a: 43). But how is it even possible to focus on something that is invisible? And how can we create pedagogical situations that enable this?

To begin with, the terms visibility and invisibility must be considered. As McLuhan has shown, metaphors such as “gaining perspective” and “to see for ourselves” reveals a bias towards vision in our culture (McLuhan & Fiore, 1967, pp. 68, 177). This bias is a residue from the shift from oral to scribal culture that prioritize linearity, sight and individual reading practices over collective practices and other senses like hearing (McLuhan 1967; McLuhan, Marshall & McLuhan 1988). McLuhan's well-known idea that electronic media like television means a shift back to an oral and collective culture is not immediately reflected in language, and visibility should be understood here precisely as a metaphor for knowing or noticing, not as something necessarily connected to sight. McLuhan's take on media

education can rather be understood as a “cultivation of alternative sensual orientations” often through artistic and experimental approaches (Friesen & Hug 2011, np.).

McLuhan (1964) put forth art as a method for studying the ground because he believed that artists, as experts on “changes in sense perception” (p. 20), were not only likely to notice changes in the environment caused by the introduction of new media technologies but also able to make these changes intelligible for others by creating so called “anti-environments” that makes the ground visible by putting it in a new context (p. 68). The creation of such anti-environments is however not limited to the field of fine art. On the contrary, McLuhan emphasizes that to function as anti-environments, art should be considered a means of training perception rather than a consumer commodity (Forsler 2020: 228). From a pedagogical perspective this means that also children and young people “can do top-level research work” by exploring for example the effect of different media on his or her life and on society at large (McLuhan 1964: 10).

Framing media education as a training of perception also opens up for new approaches to study things that we cannot actually see, such as large-scale infrastructures. “The Internet itself is more multisensory than the sounds and images it summons to our devices,” declares infrastructure scholar Shannon Mattern (2013, np.), and calls for other modes of investigation, through sound, smell and even taste. What Mattern suggests is a *synchronic* approach to the study of media, where the visual is not singled out and studied independently of their ground but understood as dynamic and multisensory environments (Marshall & McLuhan 1988: 112). Although this perspective on media is used and discussed by McLuhan in all his work, it is most clearly described as a pedagogical method in CaC, which is filled with examples of where to look for the ground of certain media and how.

Following McLuhan's (1964) broad definition of media as “extensions of man”, CaC is structured in short chapters on different media, from motor cars, light bulbs and money to more conventional mass media such as radio and television. Other examples include “ancient media” (Peter 2015b: 19) such as clocks, discussed by Mumford (1934) as the basis of many other kinds of media and media practices, and satellites which have been thoroughly studied by infrastructure scholar Lisa Parks (2013) as making up the ground of most contemporary media practices. Not only do satellites underpin the use of other media such as money or television, they are also among the most invisible media around, both because of their remote location and because they are kept invisible in processes of marketization and militarization.

From this point of departure, Parks argues for the need of public consciousness and awareness around space technologies:

Whether citizens are viewing TV news reports, drawing cash from an ATM machine, driving through city streets using Google Earth, they are participating in a world historical process that is shaped by satellite technologies. Since so many signals, transactions, images and events either take shape within or pass through orbital space, it is in the public interest to know how this space is organized, who controls it and how it has been contested (Parks 2013: 62).

In CaC, this is done by initially discussing the metaphors surrounding satellite technologies. Sputnik, as the first satellite that went into orbit, was introduced to the public as a “small man-made moon” that “completely changed some people’s notion of the nature and the status of Earth” (McLuhan et al. 1977: 116). By using natural metaphors, new technologies are introduced as part of the environment thereby escaping attention and critical scrutiny. We might understand this as part of a larger pattern of technology infrastructures being positioned as a “natural” resource. Parks (2010) further writes of cell towers disguised as trees, part of “concealment strategies” used to hide the technology infrastructures all around us. In a similar way, the internet is made a hidden ground through the use of metaphors like “the cloud”, concealing both materiality and the environmental impact of this technology. And, just as Parks argues that it is in the public interest to gain understanding of satellite technologies, we suggest that examining the hidden ground of the internet enables more active and conscious participation in a digitally mediated world.

### **Figure and ground in digital citizenship classroom practice**

This article explores the way in which the figure/ground concept was used within a digital citizenship curriculum implemented in a middle school classroom by one of the coauthors. Examples explored here derive from classroom practice spanning the course of three and a half academic years, from fall 2015 to winter 2019, with nearly 400 8th grade students (generally 13-14 year olds). The school is located in the metrowest suburbs of Boston, US, and serves a community growing in its demographic diversity, the student body including 40% students of color, over 10% speaking a first language other than English, nearly 40% classified as “high needs”, and nearly 25% classified as a student with a disability (2017-18 school year data from the Massachusetts Department of Elementary and Secondary Education School and District Profiles).



The pedagogy explored here was implemented in a trimester-long, stand-alone course that met twice a week for a total of 22 classes each trimester, on average. The 2016 Massachusetts Digital Literacy and Computer Science standards served as a guiding framework document for the course curriculum, but the coauthor had significant flexibility in what content was covered and which digital competencies were developed via coursework. The curriculum that the coauthor developed and implemented centered on the study of “the internet”, as both a physical resource as well as an intangible space: what it is, how it works and its impact on society, culture and human development. “Wired people should know something about wires”, wrote game designer and author Neal Stephenson; this sentiment is repeated and echoed throughout the curriculum. Through hands-on activities and by considering various controversial current events as case studies, students explored the biases and assumptions built into the physical, digital and conceptual infrastructure of the internet, in other words the internet as *ground*.

### *Visualizing “the cloud”*

“The cloud”, a phrase invoking ephemerality and ineffability, contributes to making the internet a particularly elusive infrastructure to pin down and focus our attention on. The genesis of this phrase is unclear, but early developers in the field agree that from the start “the cloud” and the related “cloud computing” were terms that served marketing purposes (Regalado 2011). Though, perhaps ineffectually: as one software company CEO said in 2011, “I didn’t think the term [the cloud] helped explain anything to people who didn’t already know what it is” (ibid., np.).

McLuhan et al (1977) write in *CaC* that when one reverses the figure/ground relationship, “even the most hidden grounds and relationships will come to light” (p. 20). In the case of “the cloud”, one simple way to get started is to ask students to draw a picture of the internet. Asking students to grapple with this question of “What does the internet look like?” forces a resource experienced as ground to be examined as a figure. In the US classroom highlighted here, when presented with this prompt, students are at first a bit dumbfounded. Some students with a degree of technical background knowledge will draw a flowchart with arrows tracing the journey of digital content from server to router to end user. Some students will fill up a page with 0s and 1s, not fully able to identify this as binary code or to articulate the relationship between binary code and the internet, but understanding that these 0s and 1s are in the background somewhere. Still other students will use other visual metaphors to depict

the internet, evoking mind control or a spider's web. But for a majority of students, to them the internet is best represented, as evidenced by the pictures they draw of it, as a collection of app icons, memes and the ever-present Google logo. In other words, the internet is what they use it for; it is what the end user sees and does with it.

<FIGURE 1>

Figure 1: Student work, *What does the Internet look like?*, 2015-2019. Pencil/marker on white paper. Drawings done on legal size paper (8.5 x 14 inches). Massachusetts, US. Courtesy of N.N.

This visualization activity is an effective lead-in to a sustained reversal of figure and ground of the internet. Although the question “What does the internet *look* like?” has a distinct bias towards the visual, the task of materializing these visions also contains a tactical dimension. In addition, some representations forward the multisensory aspects of digital media, such as in the image of a person literally eating a cookie or being pumped with information and impressions with their eyes closed. Moving “the cloud” from unseeable ground to material figure is not a visualization exercise per se but an invitation to “defamiliarize” the internet. Originally a concept developed by art theoreticians, defamiliarization has been suggested as potentially useful in digital literacy education:

By presenting something common or ordinary in an unfamiliar or strange way, people's perception of the familiar is altered, reframed and enhanced. Defamiliarization can be a kind of wake-up call that may disrupt the routine and automatic processing of information (Hobbs 2020: 11).

Digital and data literacies scholar Luci Pangrazio (2016) writes of visualization itself as a method for defamiliarization, a “cognitive tool” to be used for the purpose of seeing the digital context more clearly in order to develop a different relationship to the internet. “As a practice, visualisation could also help to unpack and understand the metaphors which organise our interaction with digital media and networks” (Pangrazio 2016: 171). Employing the metaphor of “the cloud” as a stand in for a very physical internet infrastructure certainly affects the way in which we interact with and use the internet. We argue that it is easier for the uses and impacts of the internet (a focus of digital citizenship education broadly) to disappear into a ground that is “the cloud”, but harder when that cloud is deliberately made concrete. Because of this, problematizing the ineffability of “the cloud” through

defamiliarization activities and experiences is an important aspect of this digital citizenship pedagogy.

### *Slowing down the user experience*

Although the metaphor of the cloud is problematic because it puts forth digital technologies as clean and almost immaterial, it also points to the impact of digital technologies on natural systems and to a blurring of the nature-culture divide. As put by Peters (2015a: 46), “[d]igital superabundance in the ‘cloud’ and carbon overload in the atmosphere are two facts that might have something deep to do with each other”. To make visible the material ground of the internet, as described above, is one way to address this relation. Another one is to supplement the discourse with new environmental metaphors, as suggested by Anonio López (2020), who argues that “re-imagining media as ecological in nature and critically understanding metaphor usage in our own practice as media educators is the most important step we can take” (np.).

In the US classroom highlighted here, students explored the concept of “data exhaust”, a term used to describe the excess data points that users generate as they navigate the internet. The term, developed in the mid 2000s with the rise of smartphone use, draws on popular understandings of exhaust emitted from a car. “Data exhaust” is the waste, the data that is collected that serves no clear useful purpose. The metaphor de-neutralizes “the cloud”; it is the cloud’s dirty cousin, or “big data’s evil twin brother” (Noyes 2016, np.). Though the information included in “data exhaust” is not core to the functioning of the technology itself or the company’s business model, there is incentive for technology companies to hold on to that information, as it may prove useful in the future in ways that are currently unpredictable. So this invisible trail of data follows users as they travel the internet.

The concept of data exhaust offers a different perspective on internet-related practices that can be helpful to develop what Pangrazio (2016) refer to as a “critical disposition” that would “prevent digital practices and tools from appearing as a series of ‘natural’, inevitable processes which become uncritically inscribed into daily life” (p. 170). This critical disposition can be nurtured by reframing our interactions with the object or infrastructure in question. CaC offers an example that aims to highlight the hidden grounds of nineteenth-century France and twentieth-century North America by placing a Toulouse-Lautrec poster from the first period beside the highway and drive by, first at 10 km/h and then a second time at 80 km/h. Such an exercise, suggest the authors, makes visible how motorization makes up a

hidden ground for advertising and visual communication. Billboard advertising becomes an infrastructure in the practice of driving at a certain speed, and in relation to urban planning relying on the access and use of private cars (McLuhan et al. 1977: 19).

Altering default user behavior (like slowing down the “normal” speed you might drive through a city in a car) can begin to develop a critical relationship to that which is otherwise positioned as “natural” or taken for granted. We can slow down user activity on the internet as a way to develop a critical relationship to digital technologies. To explore this idea, the students highlighted here do an activity where they “talk back” to a Google advertisement, pointing to places within the advertisement where “data exhaust” is hidden. Students choose a 90 second advertisement for one of the Google applications, such as Search, Maps and Photos, and using a website called VideoAnt (<https://ant.umn.edu/>) embed annotations, which appear beside the advertisement, to identify hidden sources of data exhaust.

<FIGURE 2>

Figure 2: Student work, *VideoAnt: Google Ads Data Exhaust*, 2016. Screenshot. Full desktop screen screenshot. Screenshot taken from VideoAnt (<https://ant.umn.edu/>). Courtesy of N.N.

McLuhan et al (1977) write in *CaC* that “a ground may be ‘hidden’, because it has become so familiar to us that we have stopped paying it any conscious attention” (p. 19). By utilizing new framing metaphors and slowing down the user experience, this digital citizenship pedagogy builds conscious attention to that which is hidden as ground (in this case the production, collection and use of personal user data) when using internet technologies.

Students are also able to slow down the very experience of “getting online” within the classroom by considering, “When I am sitting in this classroom, how am I able to connect to the internet?” Many students are not sure where to begin to look. Students search the classroom, open the door to the hallway, and even look out the window, hesitantly pointing outside to the power lines running down the street. Pausing to answer this basic question takes students by surprise. Through classroom discussion, students eventually are able to identify the wireless access point (WAP) devices mounted on the ceiling, some in classrooms and others in the hallway, that connect their classroom to the school Wi-Fi network. Students identify where in the school building the Wi-Fi signal is weak, and are able to identify why this might be, either due to distance from the nearest WAP or the presence of concrete walls interfering with the signal strength. Students then wonder how they are able to connect their

smartphones to cellular networks while in the school building, and examine interactive maps like CellMapper.net to identify where the nearest cell towers are located. As a result of this consideration of connectivity itself, students newly notice once overlooked bits and pieces of their environment, and are able to make a connection between their physical built environment and their ability to access the internet (or not).

Returning once more to the playful use of speed of movement as a newly examined hidden ground in CaC, in the classroom highlighted here speed of internet connectivity itself is made an object of study. Students first predict where in the US would have the fastest and slowest internet speeds available, and identify what background knowledge they are drawing on to make these predictions. Then students examine a 2013 heat map of internet download speeds across the US (Fischer-Baum 2013) to compare their predictions with the data presented in this infographic. Class discussion surfaces possible relationships between internet speeds and urban versus rural geographies, population densities, and median household income in a region. Students then examine internet speeds around the world, which can be tracked using websites such as <https://www.speedtest.net/global-index>. By examining speed itself and discussing the ways in which the experience of using internet technologies might be impacted by speed of connectivity, it becomes clear that “getting online” is not experienced by all users of the internet in the same way. Questions of fairness and equity inevitably arise, as it becomes clear that speed and access is related to geography, resource allocation, and priorities set by national and local decision makers. Slowing down to closely examine the user experience allows students to consider what affordances and limitations have previously been taken for granted.

### *Making concrete the ideological architecture of the ground*

Reversing figure and ground can help develop greater understanding of the complexities of internet technologies, and specifically the trade-offs and impacts hidden within those complexities. As media literacy scholar Renee Hobbs writes,

When users search online, they may not be aware of how personal information is used to filter search results. The results presented to them become the “reality” they experience. Pedagogies that disrupt the various types of unreal realities that are presented online can help people distinguish between the dimensions of personalization

that seem innovative and useful and those which may be unfair and discriminatory (Hobbs 2020: 10).

CaC offers many examples of how to make these abstracted and seemingly natural “realities” and their impacts concrete. Towards the end of the book, after readers have considered various properties of media and their effects, the authors describe a role-playing activity where students “put on trial the inventors or developers of specific media, as symbolically responsible for the particular social effects of products they invented or promoted” (p. 145). Students represent the perspective of various stakeholders, preparing testimony from the point of view of those who were impacted by the technology whose inventor is being put on trial. The authors provide the example of putting Henry Ford on trial for the invention of the automobile. They recommend hearing testimony from those who build cars in Ford factories and the company’s public relations team, those who work in related industries such as gas-station attendants and used-car dealers, town planners, law enforcement and doctors who deal with the impact of accidents, and regulators from the government.

The classroom highlighted here unravels the complexities of the “net neutrality” regulation in the United States by playing a role playing game reminiscent of the media trial outlined in CaC. Net neutrality is “the idea that internet service providers [ISPs] like Comcast and Verizon should treat all content flowing through their cables and cell towers equally” (Finley 2020, np.). Without net neutrality regulations in place, ISPs are free to develop technical and business-model mechanisms for slowing down or speeding up access to certain internet content as a way of managing internet traffic. Students had heard of net neutrality through popular memes and the pro-net neutrality advocacy of various YouTube stars. But by and large students do not understand what net neutrality really entails, or the impact of the regulation.

To address this gap in understanding, this classroom role playing activity asks students to represent one of four relevant perspectives: CEO of Comcast, CEO of Netflix, the founder of a fictitious start-up video streaming service dubbed Vidz4U and an internet user/customer. Specific components of net neutrality regulation are offered one by one, and, embodying the perspective they are representing, students discuss with their group mates what the “character” they are playing thinks about each regulatory component.

These sorts of dissociative role-playing activities can create critical distance and bring attention to what Pangrazio (2016) calls “the ideological ‘architecture’ of the digital” (p. 169). In the case of the activity highlighted here, role-playing the perspective of Vidz4U helps students understand how net neutrality regulation affects the viability of a small, startup internet company with limited resources, and in so doing identifies which perspectives and priorities are privileged by a regulatory environment with or without net neutrality. In other words, by experiencing net neutrality through role play, the regulation’s ideological architecture becomes apparent.

It is perhaps somewhat paradoxical that we can get to the abstracted ideological architecture hidden in the internet’s ground by focusing our attention on the very concrete details of a regulatory framework. As another example, an important building block in the curriculum highlighted here is something as simple as the internet “cookie”, which students remember agreeing to install countless times but do not really understand what they are, what they do or what they are agreeing to. By spending time unpacking this ubiquitous bit of code which allows web browsers and applications to track the movements of users and collect and store information about user preferences, students are then able to consider how the very architecture of an internet browser enables or prohibits true access to and exercise of privacy — privacy being a hugely central talking point in digital citizenship education. By focusing attention on the internet cookie, students can debate the trade-offs between privacy and convenience, personalization and autonomy. As discussed in CaC,

It doesn’t matter that some people may say, for instance, ‘TV doesn’t affect me. I never watch it.’ When any device invades a society to the point of creating a ground, it affects everyone’s way of life, whether or not a particular individual makes use of it (McLuhan et al. 1977: 121).

The internet has almost certainly invaded society “to the point of creating a ground”, and so the way in which privacy is or is not made possible by the internet’s infrastructure has far reaching implications for the internet and society. But only by getting concrete can students consider the hidden ideological architecture of that ground.

In another sort of role-play activity, students are faced with difficult moral and ethical dilemmas generated by automated decision-making systems. Using the Moral Machine (<https://www.moralmachine.net/>), a platform built by former students at the MIT Media Lab,

students are presented with various scenarios where an autonomous self-driving vehicle must make a split-second decision between two bad choices. There will be casualties, and students must decide which option is the more moral one. For instance, should the self-driving car spare the pregnant woman or spare the doctor? Spare the elderly man or spare the young child? Spare the pedestrian or spare the owner of the vehicle? Once students go through each scenario, they are presented with a summary screen that reveals the patterns (in terms of age, ability, gender, occupation, and other demographic details) in who and what they decided to protect, and how the student's decisions compare to the decisions made by other users of the Moral Machine platform. It may appear, and users may be told, that these automated decision-making systems make the "best" choice, but the Moral Machine reveals that what is considered the "best" choice is highly contested. Though the life-or-death scenarios presented by the Moral Machine may represent an extreme example, this activity lays bare the reality that "automation" in actuality hides significant trade-offs.

Slowing down to examine the ideological ground of the internet can inspire strong emotions. The way in which users are tracked and surveilled online can feel "creepy", inequality in access to the internet can feel unfair, and the moral dilemmas buried in automated decision-making systems can be upsetting. But these newly-surfaced emotions can serve as a catalyst for students to consider what they want the internet and their digitally mediated environments to be like instead. In the classroom highlighted here, the short film *Hyper-Reality* by Keiichi Matsuda (<http://hyper-reality.co/>) serves as a useful conversation starter. The film is set in the not-too-distant future and follows a woman named Juliana who is struggling to find purpose and a sense of identity in a world where personalized augmented reality drives many everyday interactions and experiences. Students are quite affected by this film, disturbed by the prospect of this colorful, interactive, and noisy world being their reality, doubting that the ubiquitous AR system would add value to their everyday life. Through classroom discussion, a sort of Tetradic analysis surfaces, where students consider what *Hyper-Reality's* vision for an AR-dominated future enables and enhances about the human experience, and what we might lose as a result of moving to this extreme. Perhaps surprisingly, many students argue for limitations to be put on technology-embedded everyday experiences, arguing that moving through the world quietly and simply brings significant value that would be a tragedy to lose. Once the many hidden trade-offs are made clear and truly felt through this digital citizenship pedagogy, students are eager to negotiate and debate what is best for humanity in a digitally mediated world.



### *Reimagining “the cloud”*

Near the end of the trimester, after continued study of the internet by removing it from metaphor and considering its literalness, students are asked to depict the internet visually once again, but this time in the style of Henri Matisse’s paper cutouts. This project is in collaboration with the school’s art and design teacher and represents a melding of the visual arts, art history and digital studies. Each student selects a vocabulary word that represents a “piece” of the internet (e.g. copper wire, fiber optic cable, server, router, cookie, algorithm, firewall) and then visually represents that piece using cut paper, a technique developed by Matisse near the end of his career in the 1940s. Students also used Joseph Albers’ basic color theory to select their colored paper so that aesthetically strategic elements of their images pop to the foreground and other elements recede into the background. Each student’s completed cutout piece was placed side-by-side on the wall of a school hallway, in an installation titled “Reimagining the Cloud”. Colorful fiber optic cables connecting a house to the clouds in the sky overhead, fish swimming amongst undersea wires, chocolate chip “cookies” implanted in a user’s brain: students’ finished products once again reverse the figure/ground relationship in this study of the internet, demonstrating increased familiarity with these material pieces by artfully placing them back into abstracted metaphor. Comparing these final projects to those initial drawings of the internet reveal a deeper understanding of not just the properties but also the effects of the internet.

<FIGURE 3>

Figure 3: Student work, *Reimagining the Cloud*, 2016-2018. Colored paper. Individual student pieces on letter sized paper (8.5 x 11 inches), four individual pieces to each panel. Massachusetts. Courtesy of N.N.

### **Concluding discussion: Addressing media as environments through spatial metaphors**

As illustrated in this last example, the point of these exercises is not to shift focus permanently to the ground but to eventually develop the ability to “perceive *figure* and *ground together*” (McLuhan et al. 1977: 10). For the authors of CaC, this double vision points to a profoundly structural understanding of media and media education since “all figures at once mean NO figures - just outlines and interfaces, just structure” (ibid.), but also to a reciprocal relationship between figure and ground where environments are “recursively

constructed by the life forms they enable” (Peters 2015a: 47). The pedagogical consequences of the concepts figure and ground are summed up in the introductory chapter as follows:

Some curious aspects of figure/ground relationships can be seen here. First, note that the outline of one image is also the outline of the other. This is always true of structural relations: is it just as true to the drawing as figure as to the page as ground. Secondly, because of the shared outline, figure and ground create and define each other. All structural relationships have this feature: the parts are reciprocal. Thirdly, contrary to a common misconception, both figures can be simultaneously held in the visual field. This simultaneous perception is, at first, easier for some people than others, because it requires a certain amount of “un-learning”. (Most of our training is directed toward keeping clear the distinction between figure and ground.) (McLuhan et al. 1977: 10)

In the case of digital citizenship education, this means to understand both the environmental and infrastructural aspects of the internet, but also how these aspects are related to more common concerns within media literacy education, such as representation, news evaluation or user privacy. This approach differs from the rhetorics surrounding school digitalization, where user-friendliness and efficiency are prioritized, demanding what is referred to above as “un-learning”. It further means recognizing how an invisible ground such as the collection of user data does not only structure the visible aspects, or figures, of the internet but also how our practices of searching, clicking and sharing are part of constituting this ground and thus, that a more continuous media use (or non-use) is one step toward fairer and more transparent digital infrastructures. These ambitions are presented in this paper through three spatial/environmental metaphors, namely *clouds*, *exhaust* and *architecture*.

The *cloud* is a natural metaphor, chosen because it is widely used and needs to be unpacked but also because it stimulates a discussion both of the more ubiquitous and mundane aspects of digital media as well as its effect on the natural environment (cf. Lopez 2020). The image of the cloud is addressed here through defamiliarization, a method similar to McLuhan's anti-environments where the visualization of something familiar and taken for granted can help us look at it from a new perspective. The materialization of the cloud into tangible images also opens up for discussion the materiality of the internet, such as its dependence on natural resources to produce digital devices as well as to store and process digital data. Language is central for understanding the world around us, and in order to understand media as

environments we need to address the metaphors that are used to talk about media technologies, but also supplement these with new conceptualizations, not least within education

*Data exhaust* is one example of such a new concept. Like clouds it is an environmental metaphor that at the same time points to the invisibility of digital technologies. While clouds evoke positive associations to natural environments, exhaust is connected to human impact and the damage our way of living has caused this environment and by extension the health and life quality of its inhabitants. The prefix data, as in *data exhaust*, thus focuses on how the invisible traits of data that users emit on the internet reinforces the spread of misinformation, simplified reasoning and stereotypes and allows companies to track consumers' online behaviour and personalised advertising. These toxic environments are harmful for the users. While it might seem convenient to be served customised content, this poses a risk when it comes to news consumption because it means constantly having your world view confirmed rather than challenged by competing ideas and ideologies. The personalised content and suggestions offered by companies are in turn based on extensive surveillance where vast amounts of data end up at private companies, risking the integrity and privacy of users.

The environment that enables such surveillance is discussed here through the term *architecture*, to emphasise how the internet as a man made environment is far from neutral but, in the same way as a building or an urban space, prioritizes certain behaviours and prevents others. While the concept of exhaust is useful to discuss the behaviour and responsibilities among internet users, architecture is a way to bring up questions around legislation and technology, such as net neutrality or how cookies work. Digital citizenship education aims to teach students to make “appropriate, responsible and empowered” choices when using digital technologies (Ribble n.d.), yet so much of the digital realm can feel natural and inevitable and therefore without choices. It would therefore serve digital citizenship pedagogy and curriculum to highlight for students the hidden choices that have been made along the way in building the digital infrastructure within which users are making their choices. Once the student has examined the once-hidden pieces of the internet as figure, the student comes to understand where and how they might act. The digital citizenship pedagogy explored here moves the student-user into a position of active participant in actually reimagining and reshaping the internet as an empowered digital citizen.

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