

# Digital Citizenship exercises

Andrea Trentini<sup>1</sup> <sup>a</sup>

<sup>1</sup>*Dip.to Informatica, Università degli Studi di Milano, via Celoria 18, Milan, Italy  
andrea.trentini@unimi.it*

Keywords:

Digital Citizenship, Raising Awareness

Abstract:


Many years ago the authors defined a **layered model** that takes into account every aspect of Digital Citizenship. The “*Digital Citizenship and Technocivism Rainbow*” (DCTR) model slices the topic in eight coloured levels (network, services, access, education, transparency, participation, consultation, democracy) that can be used in **teaching** (to organize course materials) and when analysing “situations” (e.g., public participation initiatives/actions) to better comprehend intents with “digital citizenship spectrograms”. This model has been in constant use at the Computer Science department (University of Milan) Digital Citizenship course. An issue in teaching the course and in explaining the topic to common people is the **lack of exercises**. During the 2021-2022 session students were assigned a new type of homework: they had to create exercises to help common people understand Digital Citizenship. The task consisted in proposing and developing complete exercises with details about: intended target, difficulty level, detailed instructions and so on. This paper describes the work they produced, with an analysis w.r.t. the DCTR model. The main idea is to **evaluate the effort** of inventing exercises at various levels. A **significant result** is that “participatory levels” are challenging when trying to design digital citizenship exercises.

## 1 Intro: The DCTR model

The term “Digital Citizenship and Technocivism” was the name of a course adopted in 2010 for the Master in Computer Science at the University of Milan. At the time, when we designed our course, our main concern was to let our (Computer Science) students acquire not only purely technological (e.g., programming) knowledge, but also the ability to make connections with the influences of technologies on everyday life, in particular on “civic aspects”, in the more proper meaning of being citizens, i.e., participating in a socio-political-system: municipality, territory, country/nation or federation. This awareness represents the fundamentals to catch most of the many opportunities offered by technology, transforming these opportunities into social achievements (civic participation, transparency, etc.), and also to mitigate the risks exposed by technology (pervasive monitoring and control, loss of privacy, etc.), moreover we think it could be very useful to steer

(towards success) all the institutional initiatives about digital citizenship and digital transformation. Our society is shaped by information and communication technologies. A continuous interaction between the events of the physical world and those in the digital world require the *homo digitalis* to reconsider and reshape its citizenship to actively interact with this elevated context, where rights and obligations must be adequately declined to satisfy both the opportunities and the risks deriving from digital technologies. These opportunities-and-risks challenge the very idea of citizenship and the rights that derive from it. The concept of citizenship itself is changed through digital technologies, rights and duties are also changed, and we should consider that not only practices are changed, but also democracy models and concepts (Moraes and Andrade, 2015), almost as if Digital Citizenship could be an abbreviation for “Citizenship in the digital Era”. We have mentioned rights and duties, risks and opportunities... Is there an all-encompassing model to frame the digital citizenship and technocivism field and describe it in its structural aspects? An

---

<sup>a</sup>  <https://orcid.org/0000-0002-8629-3056>

architecture, a key to understanding concepts, technologies, news items? A classification system that allows a correct analysis of the topic? A reasoning tool?

In absence of a satisfactory model in literature, we defined the “The Digital Citizenship and Technocivism Rainbow” framework (see appendix A) to model all the aspects of digital citizenship into eight conceptual levels (from L0 to L7). The framework is made up of layers ranging from the infrastructure (networks and services) to the right to be actively involved in the decision-making process. Historically, in “A ladder of citizen participation” (Arnstein, 1969) the ladder metaphor was suggested to represent the path that leads to a comprehensive citizenship (albeit not digital, since that model was designed in 1969). The staircase evokes an uphill path that implies a progressive commitment on behalf of those who undertake it, but also a realization more and more complete with citizenship rights as you go up. It quite correctly models the experience of many people who realize they have to work hard to become citizens in the information society. However, for the purpose of an effective communication and to provide a more analytical vision, we preferred to expand the DCTR model proposed in “The access rainbow: conceptualizing universal access to the information/communications infrastructure” (Clement and Shade, 2000) by refining the levels integrating the work of (Caddy and Vergez, 2001). We looked at other models in recent times but none of them was as all-encompassing as our DCTR. For example, the (Richardson and Milovidov, 2019) covers only partially our levels and mixes different concepts (such as privacy and active participation) in the same set. Another “interesting” example of a model of Digital Citizenship can be found in (Ribble, 2015) where “nine elements of digital citizenship” are mentioned, but the participatory aspects necessary to address the issue of digital citizenship were completely missing. A more recent model (R et al., 2022) proposed by the EU focuses on the general competences of a “digital citizen”, but it **misses important topics** such as (with DCTR levels in parentheses): net neutrality (L0, L1), lock-in (L1), profiling (L0, L1), computing agency (L3), crowdsourcing (L5), petitioning/“participatory contract” (L6), participatory budgeting (L6, L7), voting/elections/democracy systems (L6, L7), etc.

More details of our DCTR model can be found in (De Cindio and Trentini, 2014), (Trentini,

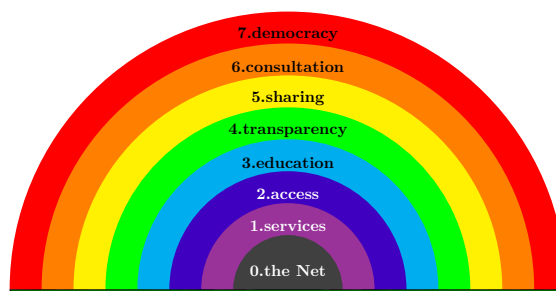


Figure 1: The DCTR

2019) and in the book (Trentini et al., 2020) (in Italian), here we simply list the eight levels (figure 1) associating concepts and macro-categorizing them, they are grouped into “lower” (0-3) and “higher” (4-7) ones (see appendix A). Technocivism, with an emphasis on technology, awareness, network properties, standards, formats, software, services, etc. stands as the foundation for true Digital Citizenship where we talk about participatory platforms, citizens’ consultation and participation, transparency and voting systems.

## 1.1 We need exercises

In 2021-2022 we have introduced an important novelty in the final paper that students must submit to complete the exam. The added requirement is to devise two/three Digital Citizenship exercises on different DCTR levels. First we created a “who does what” matrix to keep track of any collisions (to avoid students with similar proposals), then we tried to broaden the plethora of proposed exercises as much as possible, especially on the less “interesting” (for them) levels. In fact our students tend to prefer lower levels, the more technological ones, this attitude is confirmed by studies such as (Hui and Campbell, 2018). At the end of some lessons we organized “brainstorming” sessions to help students creativity and to refine the set of proposals. The result, still under development given that not all students have yet completed their work, is satisfactory in the sense that more than sixty proposals have been made (the list in this article omits a few that are too generic) covering (albeit with different numbers) all DCTR levels. It has been really pleasant to receive so much interested feedback in line with our expectations, one of them in particular: “actually professor, having to invent an exercise, putting myself in the shoes of the one who will listen to me forced me to think better about theme and I

think I have internalized it better”.

*Why should we need Digital Citizenship exercises?* From a teacher perspective, assigning exercises is a common activity, but creating new models takes the teaching experience to an higher level. The “learning by doing” paradigm could improve teacher knowledge and could make our students better propagators of Digital Citizenship, they may become the mediators between the increasingly complex technology and the masses of citizens who will have to “run to stay in the same place” (Carroll and Tenniel, 1984). The idea is not new of course, see (Constantinides, 2015) and (Aronson, 2011) even if applied to other fields. We need it specifically for Digital Citizenship because it is not always an easy topic (for the masses and for the practitioners too!). We actually found few previous attempts, and in one of them (Suson, 2019) the Digital Citizenship model resembles ours even if not really in semantic and organizational terms, but at least considers the use of exercises in teaching this domain. Even in review studies such as (Öztürk, 2021) no mention of exercises can be found.

Since an exercise should be as “procedural” as possible, we adopted a template inspired by the Unix manual (McIlroy, 1987), defining goals, lessons learned, target, etc. The template is composed of sections (some are optional), and the exercise author should fill out the relevant sections in order to describe a **reproducible** list of actions to reach the desired objective. These are the sections defined in the current version:

- exercise title (should be evocative)
- goal (and some intro/context)
- target audience (and prerequisites)
- estimated duration
- DCTR levels (with motivation), tags/keywords
- estimated difficulty (relative to audience)
- examples (e.g., screenshots, stories, past experiences)
- needed tools: operating systems, software/apps, connections, etc.
- costs
- detailed instructions
- variations hints
- expected results (outputs)
- lessons learned
- see also (other exercises, follow up)
- mitigations (if the exercise is about acknowledging a danger)
- author (of this exercise)
- license (*open*)
- notes (from the exercise author)

During the course we planned some fully dedicated meeting to discuss the proposals. We set up a cross-contaminated environment, a place for students to forge ideas, motivating topics and

challenge implementation and cost issues (raised by the teacher). Of course it was also an opportunity to supervise their projects, addressing open points and correctly associating exercises to DCTR levels. In appendix B we list the emerged proposals grouped by level, the hash (#) character underlines the main association. The complete repository of all exercises can be accessed at <http://gitlab.di.unimi.it/cdt/eserciziario>. Please note that since one exercise may be linked to more than one DCTR level we classify into the most representative one. The exercises with “guide” in the title are intended as a bit more articulated than simple “do this simple experiment” instances, they are a sort of “food for thought”.

## 2 Two full examples

Here follows a sample extracted from the about forty exercises developed up to May 2022 by the students for their final exam. A full exercise is usually accompanied by many example screenshots but since our focus in this article is to describe it, images were replaced by square brackets. The original student text was translated and edited (but keeping the first person if used), some “uninteresting” (for the purpose of this article) text has been omitted (and marked as such) to fit the paper submission size limit. Our plan is to collect the best ones into a full fledged exercises appendix to be included in the second volume of our Digital Citizenship series (estimated publication: end of 2024). All material we publish is openly licensed (e.g., Creative Commons).

### 2.1 “Forging fake Strava activities”

- **goal** (and some intro/context):  
Strava is one of the most used sports apps in the world, where you can share data about your own workouts and compare them with other users’. Given the importance and abundance of data that this application provide, it is also used by many professional athletes and their coaches to monitor training progress. But can you really rely on the data found online? Show how easy it is to tamper with a sports recording in the Strava app. This should make the user generally aware that forging fake digital data is possible and, in some contexts, very easy. The user should therefore ask himself: is the collection of unverifiable but indestructible data (possibly

mentioning the Locard principle) reasonable?

- **target audience** (and prerequisites): every user of the Net, who relies on the data on it, should know that the information found may not represent the truth
  - **estimated duration**: 10 minutes.
  - **DCTR levels**, tags/keywords: L1 (Locard)
  - **estimated difficulty** (relative to audience): medium, no specific knowledge is required, but the number of steps and the precision required in some of them makes me think that the exercise may not be advisable for a completely inexperienced user.
  - **needed tools**: operating systems, software/apps, connections, etc.
- An account on Strava (free version), a computer, an Internet connection, a software to edit a text file.
- **costs**: none
  - **detailed instructions** (e.g., with screenshots) [OMITTED FOR BREVITY]
  - **notes**:

“I wanted to suggest manual changes (not requiring automatic data processing skills) to make the exercise more accessible to everyone. However, I argue that anyone with some programming skills could quickly write a program processing data in a more radical way, for example by lowering all heart rates by a certain percentage (to fake a more trained athlete) or by shortening the time of distance, so as to simulate a higher travel speed. Furthermore, to make the exercise easier, we started from a pre-existing activity, but we could also start from an empty text file and, as long as you respect the same syntax and save the file with the format .gpx, you might well be able to create a syntactically valid but completely forged activity.

There are some cycling teams that monitor the level of their athletes also analysing the uploaded data: what we have just seen should therefore make us consider the risks involved when we blindly rely on the data we read online.

The objective of this exercise is to make the citizen aware about the ease of forging digital information. Furthermore, the transposition of the Locard principle to the digital world states that information placed on the Net always leaves indestructible traces. The citizen who carries out this exercise should therefore ask himself: is the collection of unverifiable, easy-to-forged but indestructible data reasonable?”

## 2.2 “Internet historical memory”

- **goal** (and some intro/context):  
The Wayback Machine is the archive of the Internet Archive organization where a snapshot of a webpage can be saved. These pages can thus be recovered and read even if the original source were deleted or changed over time. The exercise explain how to compare a webpage to an older version. Next the user is suggested to create a snapshot of a webpage that the user considers culturally important. The objective of this exercise is to raise awareness on the importance of the historical memory of the Internet, on the relativity of the network and on the risk of censorship.
- **target audience** (and prerequisites): average web user, high specialization is not required
- **estimated duration**: 15 minutes
- **DCTR levels involved** (with motivation), tags/keywords: L1 - Services with hints at L0 - Network
- **estimated difficulty** (relative to audience): low
- **needed tools**: operating systems, software/apps, connections, etc.  
a browser and an Internet connection. PC recommended
- **costs**: free
- **detailed instructions** (e.g., with screenshots) [OMITTED FOR BREVITY]
- **variations hints** (similar experiments): find a web page that is censored in Italy or that no longer exists and look for it in the Wayback Machine
- **lessons learned**:  
Know and contribute to the building of the information heritage of this huge library of pages. On the Internet, information remains tracked by the service/content providers. With the Internet Archive project, users have the ability to trace snapshots of websites they deem of interest and retrieve old web pages. This type of historical memory has a strong cultural value as it allows you to have a more complete vision of the web world. If we consider the risk of censorship, this project takes an even more important role. Furthermore, the user can broaden the reasoning on the relativity of the network by considering it also in time space. At different times, the same user may see the same web page differently or may not even be able to see it again.

### 3 Contribution

This “didactic experiment” has given satisfactory results primarily because more than sixty proposals for Digital Citizenship exercises have been developed, many of which are practically ready to be published and used in real contexts. Many students reported they gained a greater understanding of the topic just by having to think about how to convey the concepts of the course through exercises for “normal people”, so the usefulness of the experiment is certainly twofold.

The template can be improved, some sections have been rarely used and others have been interpreted quite freely (but for now we have not forced a full adherence to the template in order not to “clip the wings” to students’ creativity).

The spectrogram in figure 2 represents the number of proposals for every level (see appendix B). An interesting aspect to be noted is that the distribution of the exercises shows how the high levels (L6 and L7) and one of the low levels (L2) seem **the most difficult to deal with**. Moreover, the number of tag (“#”) occurrences (here following with associated DCTR levels) show a strong bias towards the lower levels:

- 19 relativity (L0, L1)
- 7 crowdsourcing (L5)
- 6 Locard (L0, L1)
- 3 learn-to-code (L3)
- 3 computing-agency (L3)
- 2 services-digitalization (L1)
- 2 scraping (L4)
- 2 petition (L6)
- 2 digital-identity (L2)
- 2 device-control (L3)
- 1 voting (L7)
- 1 understanding-data (L3)
- 1 personal-data (L1)
- 1 opendata (L4)
- 1 freesoftware (L3)
- 1 formats (L1,L3)
- 1 foia (L4)
- 1 digital-divide (L2)
- 1 delegation (L7)

It is not surprising that computer science students find easier to cope with arguments closer to their technical background, and more difficult to deal with topics more related to socio-political sciences. However, these higher levels in a way “qualify” citizenship and technology permeates all of these levels. I.e., the most effort should be allocated in producing exercises for the “participatory” levels. The challenge is then to make students aware that their professional skill are necessary to achieve a more accomplished digital citizenship.

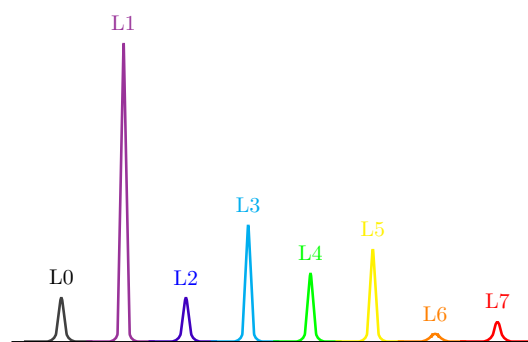


Figure 2: Exercises spectrogram

### Acknowledgements

We would like to thank all the Digital Citizenship & Technocivism students of the academic year 2021-2022 for their work in proposing and developing exercises.

### REFERENCES

- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of planners*, 35(4):216–224.
- Aronson, L. (2011). Twelve tips for teaching reflection at all levels of medical education. *Medical teacher*, 33(3):200–205.
- Caddy, J. and Vergez, C. (2001). *Citizens as partners. Information, consultation and public participation in policymaking*. Number 52159 in Governance Citizens as partners. OECD Publications.
- Carroll, L. and Tenniel, J. (1984). *Alice’s Adventures in Wonderland: & Through the Looking-glass*. Bantam Classics. Bantam Books.
- Clement, A. and Shade, L. R. (2000). The access rainbow: Conceptualizing universal access to the information/communications infrastructure. In *Community informatics: Enabling communities with information and communications technologies*, pages 32–51. IGI Global.
- Clements, K. W., Lan, Y., and Seah, S. P. (2012). The big mac index two decades on: an evaluation of burgeronomics. *International Journal of Finance & Economics*, 17(1):31–60.
- Constantinides, M. (2015). Creating creative teachers. *Creativity in the English language classroom*, 115.
- De Cindio, F. and Trentini, A. (2014). A layered architecture to model digital citizenship rights and opportunities. In *CeDEM14 : International Conference for E-Democracy and Open Government*, pages 403–416. Danube University.
- Hui, B. and Campbell, R. (2018). Discrepancy between learning and practicing digital citizenship. *Journal of Academic Ethics*, 16(2):117–131.

- McIlroy, M. (1987). *A Research UNIX Reader: Annotated Excerpts from the Programmer's Manual, 1971-1986*. Computing science technical report. AT&T Bell Laboratories.
- Moraes, J. A. D. and Andrade, E. B. D. (2015). Who are the citizens of the digital citizenship? *The International Review of Information Ethics*, 23.
- Pariser, E. (2011). *The filter bubble: What the Internet is hiding from you*. Penguin UK.
- R, V., S, K., and Y, P. (2022). Digcomp 2.2: The digital competence framework for citizens - with new examples of knowledge, skills and attitudes. Scientific analysis or review KJ-NA-31006-EN-N (online), KJ-NA-31006-EN-C (print), Luxembourg (Luxembourg).
- Ribble, M. (2015). *Digital Citizenship in Schools: Nine Elements All Students Should Know*. International Society for Tech in Ed.
- Richardson, J. and Milovidov, E. (2019). *Digital citizenship education handbook: Being online, well-being online, and rights online*. Council of Europe.
- Suson, R. L. (2019). Appropriating digital citizenship in the context of basic education. *International Journal of Education, Learning and Development*, 7(4):44–66.
- Trentini, A. (2019). The “Rainbow of Digital Citizenship” revision. In *Book of Abstracts, CUCS Trento 2019 VI Conference*.
- Trentini, A., Biscuolo, G., and Rossi, A. (2020). *Cittadinanza digitale e tecnocivismo. In un mondo digitale la cittadinanza inizia dai bit*. Copy-left Italia. Ledizioni.
- Öztürk, G. (2021). Digital citizenship and its teaching: A literature review. *Journal of Educational Technology and Online Learning*, 4(1):31 – 45.

## A DCTR levels (with topics)

- **Technocivism:** (technical-infrastructure levels)
  - **Level 0 - the network infrastructure:** relativity of the network, non-Euclidean distance, the “best” route, the Internet is broken, the Locard digital principle, bits are immortal, DataGate (<http://www.theguardian.com/us-news/the-nsa-files>), defences.
  - **Level 1 - online, public and private services:** converting to/creating digital services formats & protocols, fallback, scalability, interoperability, security, lock-in, accessibility, “appification”, relativity (again! At the user level), the Locard principle (again! At the user level), “digital event horizon”.
  - **Level 2 - access to citizenship services:** Maslow pyramid, digital needs, public services (no discrimination, dutifulness, continuity, universality, etc.), digital divide, net neutrality,

public service proposals debate (wifi, cloud, digital identity, devices, etc.).

- **Level 3 - education and awareness:** threats (expanding technologies such as Internet of Things, augmented complexity masked by simpler interfaces, laws against freedom, anonymization, cryptography, etc., political incompetence, patents, hard copyright), “code is law” (Lessig), stolen computing agency (Digital “Restriction” Management, proprietary software, Software as a Service, impedance to “rooting” devices), the unaware citizen, cognitive digital divide (DESI indexes - <http://digital-strategy.ec.europa.eu/en/policies/desi>), Dunning-Kruger effect, institutional (top-down) defences: national plans such as Piano Nazionale Scuola Digitale (weak at best, oriented to technology use rather than real and deep knowledge useful for a digital citizen), “grassroots” (bottom-up) defences: learn to code, right to repair, Free Software (and possibly hardware).
- **Digital Citizenship:** (social-participatory levels)
  - **Level 4 transparency:** the “glass house” (Turati), “noscere per deliberare” (you need to know to decide) (Einaudi), “ex-ante” (before) and “ex-post” (after) information, transparency (pride or shame?), opendata, ontologies, objects of transparency, classifications (Berners-Lee and Davies), resistances, “webstacles”, scraping, FOIA, communities, pressure groups, mediators, the science crisis, F.A.I.R. data, civic responsibility (call to arms).
  - **Level 5 - inform each other and collaborate:** technological evolution of the web (from “publication only” to “sharing”, “collaborative editing”) crowdsourcing, “help other citizens” (Wikipedia, Free Software) “bottom-up” participation grassroots movements, social action openstreetmap, waze, join me, fixmystreet, tripadvisor, toiletadvisor (!), trustpilot, book/film review sites, ushahidi
  - Level 6 [consultation] = be heard and consulted electorate crisis, abstention, disillusionment (is “digital” an answer?), citizen involvement, opinion, consultation, sentiment analysis, participatory pact, social contract, feedback, fast life cycle, petitioning (e.g., <http://change.org>), platforms (decidim, EU participatory platform, ideascala, ...).
  - **Level 7 - active involvement in public choices and policy making:** binding “participatory pact”, not everyone is interested in deciding on everything, hence delegation, even “liquid”, budget decisions, participatory budgets, e-voting does not offer all the guarantees of the analogue/paper version (freedoms from influences, secrecy/anonymity, verifiability and recounting, security), but it certainly has some advantages (lower cost, easy calculation, remote accessibility, etc.), examples (de-

cidim, liquidfeedback, the “5 star” party platform).

## B List of proposals

- **Level 0 - the net** \_\_\_\_\_
  1. DNS (using ‘dig’ or ‘nslookup’ tools), same symbolic name with different results in different networks; *#relativity* of the network
  2. ‘nmap’ (scanning tool) different results with and without a VPN (Virtual Private Network); *#relativity* of the network
  3. ‘OONI Probe’ (tool), example use of ‘OONI Probe’ software to show and measure indicators about various network connections; *#relativity*, *#censorship*, *#website-blockage*
  4. “HTTP vs HTTPS”, by using a “sniffer” (a network tool such as ‘wireshark’) show that HTTP is very “observable” (usernames and passwords can be collected easily); *#Locard*
- **Level 1 - services** \_\_\_\_\_
  1. forging activities on Strava, to show how easily a user can create false activities (e.g., to climb rankings) and upload them to the public site; Locard and forging of logs; *#Locard*, *#forging*
  2. VPN and streaming services, to show how video streaming services offer different lists of media to different (geo/network located) users; *#relativity*
  3. Instagram ad hoc ads, to show that ads change depending on the user and or according to recent searches; *#relativity*
  4. using the same search engine from different devices (same user) may sport different results; *#relativity*
  5. comparing various search engines in terms of results; *#relativity*
  6. comparing the same Search Engine (logged, not logged, cookies cleared, etc.) in terms of results; *#relativity*
  7. “aleatory” flight prices, show that the exact same flight sports different prices just depending on the geolocation of the buyer, maybe linking this analysis to the BigMacIndex? (Clements et al., 2012); *#relativity*
  8. “aleatory” Youtube Premium and Strava prices, similar to the previous one; *#relativity*
  9. experimenting *#relativity* using Tor (<http://torproject.org>)
  10. are Amazon prices relative to the user? *#relativity*
  11. do services on the web react differently to different browsers? (yes, of course, and this causes a discrimination of users in accessing those services); *#relativity*, *#accessibility*
  12. playstores (Google, Apple, etc.) *#relativity* (given a keyword, the list of proposed apps is always the same?)
  13. <http://booking.com> price *#relativity* on different users
  14. Google News *#relativity*, using two or more different accounts using the same keywords generates different timelines?
  15. guide on how to submit a personal data deletion request; *#Locard*
  16. <http://raisplay.it> *#relativity*, it works in Italy only
  17. Wayback Machine (<http://archive.org/web/>), various uses of the Internet Archive; *#Locard*, *#censorship*
  18. *#relativity* advertising on social networks
  19. Google vocal recordings and transcriptions; *#Locard*, *#digital-event-horizon*
  20. create an advertising campaign on Facebook to understand what types of targeting are available; *#relativity*
  21. ‘whois’ guide, how to find information about a domain (or website) owner
  22. show examples of the ‘IO app’ (<http://io.italia.it>) services available, with comparison to “traditional” (analog) services to show advantages in using online services; *#services-digitalization*
  23. understand the usefulness of the ‘p7m’ (digitally signed document) format; *#formats*
  24. example uses of the Ufficio Postale (postal office) app (e.g., to reserve a place in queue instead of waiting there); *#services-digitalization*
  25. cookies self-defense; *#Locard*, *#digital-event-horizon*
- **Level 2 - access** \_\_\_\_\_
  1. how to create a SPID (<http://www.spid.gov.it/en>) account highlighting some useful services accessible through this Single-Sign-On; *#digital-identity*
  2. how to create a PEC (certified email) account highlighting uses (e.g., giving a PEC address to a service supplier to receive quicker notifications); *#digital-identity*, *#digital-presence*
  3. how to read the Infratel website/report (<http://bandaultralarga.italia.it>) to check the availability of bandwidth in the country; *#digital-divide*
  4. guide on how to verify online the service penetration of delivery services, to check a sort of “availability divide”
- **Level 3 - education** \_\_\_\_\_
  1. BlackBoxNAND, a black box device that (always?) behaves like a logical port; *#computing-agency*, *#device-control*, *#device-ownership*
  2. guide on how to mitigate the “filter bubble” (Pariser, 2011)
  3. simple guide to explore the functionalities of your home router; *#device-control*, *#device-ownership*
  4. the advantages of F/OSS (Free/Open Source Software) through a very small calculator example; *#freesoftware*, *#learn-to-code*
  5. a VNC (Virtual Network Computing, a remote control suite for PCs) tour to raise awareness on how it is easy to remotely control a computer

(in the case of VNC the controlled computer is asked for permission, in case of malware there is no warning/notification); *#device-control*, *#device-ownership*

6. Mount Orange School (Moodle) Demo, to learn about F/OSS platforms in education, inside the demo any user can experience both the roles of a student and a teacher in a digital environment; *#learn-to-code*, *#teaching*
  7. github/gitlab, show examples of interactions with an opensource project, e.g., creation of issues, correcting small bugs, navigating through code, reading the documentation; *#learn-to-code*, *#freesoftware*, *#code-is-law*  
(an advanced version of this exercise could show the creation of a new project and familiarization with 'git' - version control system - functions)
  8. Android (smartphone operating system) metadata management, permission control, etc. *#computing-agency*, *#device-control*, *#device-ownership*
  9. many small exercises in programming with Scratch (<http://scratch.mit.edu>); *#learn-to-code*, *#freesoftware*  
Quoting the Scratch website: "The ability to code computer programs is an important part of literacy in today's society. When people learn to code in Scratch, they learn important strategies for solving problems, designing projects, and communicating ideas." (Mitch Resnick)
  10. guide to password management (with software tools!), in our era of "data breaches" any digital citizen should know and control who (or what) has access to his/her "delegates" (services, devices, etc.), password managers create strong passwords and can even check if the chosen one is already present in public breached databases; *#computing-agency*
- **Level 4 - transparency** \_\_\_\_\_
    1. show/demonstrate what google knows about you (<http://myaccount.google.com/dashboard> and <http://myactivity.google.com>); *#personal-data*
    2. Google Takeout, download data that Google has on you and try to examine them, while obtaining the data is easy (a simple download), reading and understanding them is trickier since they are in JSON (<http://json.org>) or HTML (<http://html.spec.whatwg.org>) formats; *#understanding-data*
    3. guide on how to submit an Italian FOIA (Freedom Of Information Act) to a Public Administration with or without using <http://foiapop.it>, explaining usefulness and expected results; *#foia*
    4. guide on how to download a dataset from an opendata site (e.g. <http://dati.comune.milano.it>) with an example of a simple computation (e.g., counting or averages); *#opendata*
    5. how to install and use Keepa (Amazon price

tracker, <http://keepa.com>) to show that data (in this case extracted from the Amazon website) can be useful to lower information asymmetry between the seller and the buyer; *#scraping*

6. show the usefulness of <http://idealo.it>, a system capable of scraping data (in the form of images and Comma Separated Values) relating to products on various sellers' sites and finding the lower price; *#scraping*
- **Level 5 - sharing** \_\_\_\_\_
    1. create a new report on <http://www.partecipami.it> or commenting an existing one, PartecipaMI is a city "issues" gatherer (e.g., road damages, illegal parking reporting, crime reporting, etc.); *#crowdsourcing*
    2. how to use Waze (<http://waze.com>) not only to go somewhere (i.e., as a simple navigational tool), but also to contribute to information about traffic, speed cameras, etc. *#crowdsourcing*
    3. how to add information on maps in <http://openstreetmap.org>; *#crowdsourcing*
    4. guide on how to use the <http://municipiumapp.it> app, check that your municipality has activated the app from the list of active municipalities and, if there is one, make a report or a proposal to improve your territory; *#crowdsourcing*, *#participation*
    5. Wikipedia errors or tuning, showing how you can contribute, through your knowledge, to improve Wikipedia, for example by correcting an error that has been identified in an article; *#crowdsourcing*
    6. Google Local Guide: how to upload contributions to improve and add information on Google Maps; *#crowdsourcing*
    7. Stack Exchange (<http://stackexchange.com>), show how to use the famous collaborative platform, remarking user roles and rules (to gain answering and moderation levels); *#crowdsourcing*, *#collaboration*
    8. show how to create a *#petition* through <http://change.org>
  - **Level 6 - consultation** \_\_\_\_\_
    1. show how to create a *#petition* through the European Parliament platform, remarking the steps and requirements and the consequences (*iter*, evaluation of proposals, *#participatory-pact*)
  - **Level 7 - democracy** \_\_\_\_\_
    1. digital/online voting, show/discuss various types of *#delegation* (it is not easy to confine this item in a small exercise)
    2. show the "5 star" party (<http://www.movimento5stelle.eu>) participatory platform, in particular the online *#voting* component "skyvote"