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Postdigital Commons

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Abstract. This article explores transformations of commoning in and for the postdigital age. Starting with definitions and challenges of digital commons, it reveals some important fallacies such as their immateriality and takes a first stab at development of the theory of postdigital commons. Today's postdigital commons need to include human and non-human actors, data and algorithms, biology, information, and society. We need to reach beyond the fallacy of digital immateriality and accept complex entanglements between material and immaterial worlds. We need to avoid technological determinisms and instrumentalisms. Postdigital commons are not just resources; they are also processes, and much more. Theory and practice of the commons now need to include fields such as philosophy of technology, Science and Technology Studies, sociomaterialism, and many others. Importantly, postdigital commons are not a magical stick that will resolve all problems. However, they are an important step towards a reimagining of more traditional forms of commons in and for our postdigital age..

Keywords: Postdigital, Commons, Sociomaterialism, Information, Seed forms, Resource, Process

Introduction

The commons, such as watersheds, pastures, and the similar, are (almost) as old as humankind. In academic literature, the commons have been brought into prominence with the publication of Garrett Hardin's (1968) article 'The Tragedy of the Commons', which argues that common resources used by an infinite number of people will necessarily become depleted. In 2009, Elinor Ostrom won the Nobel Prize in Economics for her work that

> overturned the conventional wisdom of Hardin's tragedy of the commons and the commons as a prisoner's dilemma by showing that tragedy is not inexorable and cannot be generalized. She and her colleagues concluded that the drama of the commons – so called because of evidence of both successful and failed governance – would be a more appropriate narrative. (Araral 2014: 12)

Even the Nobel Prize has not settled the commons debate, as further developments in the so-called 'third generation research agenda on the commons' (Araral 2014: 21) indicate that neither the 'tragedy' nor the 'drama' can adequately capture complexity of the commons.

In a postdigital age (see Jandrić 2023), the commons have undergone significant transformations. Such transformations include, amongst others, the need to preserve natural commons (the environmental challenge), the growing importance of digital commons (the informational challenge), and the change in focus from commons as a resource (watersheds, pastures) to commons as a process (Bollier 2024; Sterling 2021, 2024). This article focuses to what can be found under the name of digital commons (see

Dulong de Rosnay and Stalder 2020; Verdier and Murciano 2016; Kioupkiolis 2022). From this starting point, I take a first stab at the development of a theory of postdigital commons, explore its main challenges, and directions for further research.

Seeds of Change

Michael Bauwens, the founder of the P2P Foundation,[1] argues that commons are new seed forms or 'new patterns that carry a new social logic, that may create subsystems, that may develop into systems, and eventually become new social norms' (Bauwens in Bauwens and Jandrić 2021: 577). What we make of these seed forms today, will shape the world of tomorrow. In the world of technology, the window of opportunity for this shaping is quite narrow.

In the context of academic publishing, for instance, this window of opportunity is now almost closed (see Jandrić 2017: Chap 12 for a detailed analysis). After decades of struggle over access, scholarly books and articles are now generally considered as a commodity that can be sold and bought. Looking at extortionate publishing fees, today's mainstream version of Open Access does not turn scholarly articles into commons. Most Open Access articles still have a price tag; this price is just paid at a different time (before the article is published) and by someone else (the writer or their institution). The struggle for knowledge commons still continues, yet already established systems are difficult to change.

Things are not as bleak as the example of academic publishing may indicate; technological development constantly brings new opportunities for shaping new seed forms. Focusing on AI, Nada R. Sanders argues:

> We are now in 'the inter-AI period' – a brief moment in history in which [u]ses, norms, standards, and values embedded in AI technology are evolving at a dizzying pace and are in flux. … This window of opportunity will be short, after which mathematical principles and decision processes embedded in AI algorithms will harden. Technological evolution will certainly continue thereafter. But the views, norms, practices, and strategies would have been embedded in the technology. (Sanders 2024: 151)

Alongside AI, there are other seed forms emerging from developments in fields including postdigital-biodigital technology, green technology, and so on. The concept of affordance makes an ill fit with postdigital understandings of the commons, yet we do need to understand what the technology is capable of. While this task is far from easy, it starts with a deceptively simple question: What are digital commons?

Definitions and Challenges

In academic literature, digital commons are often defined in juxtaposition to natural commons such as pastures and wells. For starters, let us look at a few definitions:

> Commons are holistic social institutions to govern the (re)production of resources, articulated through interrelated legal, socio-cultural, economic and institutional dimensions. … Digital commons are a subset of the commons, where

[1] See https://p2pfoundation.net/. Accessed 8 May 2024.

> the resources are data, information, culture and knowledge which are created and/or maintained online. (Dulong de Rosnay and Stalder 2020)

> The digital commons concerns new ways of administering an information resource by a community, made possible by information and communications technology. … Economists agree on a classic conception of common goods, designating a rival and non-exclusive resource. Because the digital commons is immaterial, this definition is unsatisfactory. (Verdier and Murciano 2016)

According to these (and arguably similar) definitions, digital commons is 'a subset of the commons' (Dulong de Rosnay and Stalder 2020) focused on 'immaterial' resources (Verdier and Murciano 2016). This definition has some profound consequences explained in the following set of quotes.

> [Digital commons] radically depart from the historical commons of nature highlighted by Ostrom in politically salient ways. The goods that they manufacture and use are not depletable and rivalrous (Bauwens, 2005b; Benkler, 2006). Their consumption by one person does not make them less available for consumption by others (Benkler, 2006). In effect, they are often antirival, that is, their increasingly shared use yields increasing benefits to all users (see Olleros, 2018). (Kioupkiolis 2022)

> Digital Commons are non-depletable and non-rivalrous. The more they are used and shared, the more efficient, cheaper, and transparent they become. They serve as the raw material for ideas, and need to be kept open to allow knowledge to circulate. (da Rimini 2010)

> Digital resources are a non-excludable, non-rival public good (Samuelson, 1954). They can be copied and distributed with a marginal cost near zero. The marginal capital one needs to create digital resources or participate in collaborative online activities is also near zero as the infrastructure is already in place for work or leisure activities. Computing and the internet is a kind of global copy machine where the document economy knows a form of abundance. (Dulong de Rosnay and Le Crosnier 2012)

The alleged immateriality of the digital commons implies that they are non-depletable (cannot be exhausted like natural resources such as oil or gas); non-rivalrous (one person's access to digital resources does not exclude anyone else's access); cheap (the cost of accessing or copying digital materials is next to zero), and abundant (digital commons can grow almost indefinitely large). In comparison, material commons such as oil, pastures, or fisheries are depletable (due to their limited size), rivalrous (one person's access to pastures and fisheries excludes other person's access), expensive (the cost of accessing pastures and fisheries costs energy, time, and money), and scarce (limited in size by the forces of nature).

Most of these definitions understand (material and immaterial) commons as resources. According to Brando et al. (2019: 571), '[t]he particular way in which a good is framed determines to a great extent the normative possibilities in its management, production and provision', and further distinctions can be made between competing and

oft-mentioned concepts including commons, common good, public good and digital public good. While this article is not a place for in-depth concept analysis, 'the commons discourse adopts a conception of power which can be described as *power-with* … [where] power originates from the autonomous cooperation within (and among) communities'.

Building on Brando et al. (2019), Sanders (2024: 151), and of course postdigital theory (see Jandrić and Knox 2022; Jandrić 2023), the commons as much more than resources. The real battlefields are 'norms, standards, and values' around those resources – and in a postdigital context, they are co-created through entanglements between human and non-human actors (see Fawns 2022). In a recent editorial, Bollier (2024: 293) explores some contemporary 'challenges in expanding the commonsverse' and argues for an ontological shift towards 'commons as integrated social organisms'. In that view, commons are entities and processes, human and non-human, relational rather than transactional.

This reflects a deeply postdigital understanding of the commons, where '[t]he question of where the human starts and ends becomes increasingly blurred as techno-human relations become more intimate, pervasive, complex, indiscernible, and frenetic' (Thomas 2024). Back to Bollier (2024: 293): 'The commons, by this reckoning, becomes an inherently subversive discourse and social project because it reframes many basic premises of social, economic, and political life.'

Towards a Theory of Postdigital Commons

The abundance and cheapness of digital commons, which leads to their non- depletability and non-rivalry, is a direct consequence of their alleged immateriality. In this view, digital commons can be infinitely (re)produced without any (significant) material cost (financial, environmental, and so on). However, the immateriality of the digital is a well-known fallacy. Gabriella Coleman (in Coleman and Jandrić 2019: 546) explains that 'for the first 15 years of digital studies, the digital domain was somehow cast as immaterial. The emphasis on infrastructure, all the rage today, was non-existent.' However, as a group of us recently wrote in another paper,

> [w]ith the works of critical scholars such as Mackenzie Wark (2015), cultural studies have started to pay more attention to physical infrastructure. [To this day,] cultural studies, digital humanities, and similar popular fields still struggle with the dynamic between the material and the immaterial (see Hall 2013). (Jandrić et al. 2024)

Digital commons are clearly material (just to mention some of its material components): computers need to be built, purchased, and ran, while the Internet requires wiring, routers, and electricity.

In scholarly discussions, the contrasting presentation of information and communication technology as 'immaterial' vs 'material' has deep consequences for its social role. According to Andreas Roos, Vasilis Kostakis, and Christos Giotitsas,

> [T]o view ICTs as being the cause for ecological destruction and social oppression while at the same time perceiving ICTs as a platform for social progression presents a paradox. How can something be at once oppressive and progressive? This question, we have discovered, is intimately linked to how ICTs are presented as 'immaterial' contra 'material' within different scientific discourses. So far, the

> perception of ICTs as immaterial (e.g. code, software, knowledge) sets one point of departure; whereas the understanding of ICTs as material (e.g. minerals, roads, satellites) sets another point of departure. (Roos et al. 2016: 48)

'Acknowledging that these two points of departure from which we understand ICTs are not necessarily distinct from one another', Roos et al. (2016) co-edited a Special Issue titled 'The Materiality of the Immaterial: ICTs and the Digital Commons', exploring the many faces of the dual material-immaterial nature of (digital) commons.

Over the past decades, relationships between materiality and immateriality have been extensively explored by sociomaterialist theory, critical philosophies of technology, schools of thought such as Science and Technology Studies (STS), and others. These insights have recently been taken up by postdigital theory, which recognizes inseparable entanglements and 'the intersections between biology, information, and society' (Jandrić 2021) and rejects all kinds of determinisms and instrumentalisms (Jandrić and Knox 2022).

In a postdigital view, technology is material and immaterial, does not lead and does not follow human and social development, is a tool but actively shapes what can be thought of and done with that tool. Postdigital theory refuses all binaries (digital-analog, human-technological, and so on) and replaces them with nuanced continua (Jandrić 2023). This complex view is difficult to apply in simplistic policy discourse, and indeed today's most policies still lean towards simplistic binary and determinist approaches (see Jandrić and Knox 2022). Yet simpler is not always better, especially when it just does not adequately represent reality, and we are now witnessing a growing body of postdigital policy research (Peters and Besley 2023; Jandrić et al. 2024).

Based on this theory, I now arrive at a provisional description: postdigital commons are non-binary entities and processes, that reach beyond mainstream dichotomy-based, determinism-based, or instrumentalism-based definitions of digital commons. Let's examine one example and see where this description will take us. An Open-Source book about chess is a clear case of informational commons. An Open-Source record of a person's genome is both informational (because it is written in digital language of zeroes and ones) and biological (because it describes genetic code of a living organism); it is bio-informational. An Open-Source record of a population's genome is informational (because it is written in digital language of zeroes and ones), biological (because it describes genetic code of living organisms), and social (because the geographical spread of genome speaks about nutrition, migrations, and other social categories); it is bio-info-social. Of course, the society needs to arrive at a common agreement about handling the record, which brings us into the realm of politics. This is where our Open-Source record becomes more than an entity or a resource – it triggers, and it becomes, a set of processes (e.g., decision-making about ways of handling the record).

Examples like this can be built almost endlessly. However, the recognition of entanglements between biology information, and society, and the curious existence in a state between entity and process, allows us to use one word, and one concept, that binds them all: the postdigital. This recognition reaches far beyond linguistic replacement of clumsy portmanteaus such as bio-info-social by the word postdigital, as postdigital theory has developed a complex theoretical apparatus for dealing with this kind of complexity. Postdigital theory resolves some problems such as those related to the presentation of the commons as '"immaterial" contra "material" within different scientific discourses'

identified by Roos et al. (2016: 48). At the same time, however, postdigital theory introduces a lot of theoretical complexity, and, as can be seen from examples in fields such as education (see Peters and Besley 2023; Jandrić et al. 2024), this complexity is often difficult to translate into policy and practice.

Data and AI

As of recently, entanglements between information, biology, and society have undergone another important transformation: more often than not, they now need to include various systems based on AIs. Simplistically, all AIs suffer from two main issues (see Jandrić 2019): data bias refers to inaccuracies in used data, and algorithmic bias refers to inaccuracies built into the design of algorithms.

Computing has always depended on the quality of data (hence the old saying, 'garbage in, garbage out'), yet the use of large datasets (sometimes also called the Big Data) has introduced a plethora of new issues. Some of these issues, such as privacy through security, can be addressed through careful design and implementation of dedicated policies. However, accuracy has become problematic at a deeper level; due to the sheer amount of data, it has become very hard to establish. Instead of talking about 'pure' data, therefore, Hayes et al. (2023) argue that it is better to examine the many complexities of *Human Data Interaction, Disadvantage and Skills in the Community*.

Establishing 'correctness' of algorithms is a bit more straightforward: a mathematical equation performs certain operations, and does not perform anything beyond those operations. However, algorithms tend to run in billions of iterations, where each iteration is slightly different than the other, making it impossible to establish whether they really work as intended. This is why, in late-2025, AIs still have a hard time establishing simple concepts such as the number of fingers in human hands (see Chayka 2023). This is also why, recognizing all related problems, *post-hoc* evaluation of AIs is still paramount (Vale et al. 2022).

The question whether data should be considered as commons has been at the centre of one of the greatest 'battles' in the history of the commons: the copyright debate (see Jandrić 2017: Chap 12). These days, the debate is largely settled: copyrighted data now 'happily' coexists with Open Access data, and their relationship undergoes little change. Under the new circumstances, however, this is deeply problematic, as '[i]n today's algorithmic society, access to large-scale datasets is the *sine qua non* for any economic actor to reap the benefits of data-driven innovation (DDI)'. Therefore, that data is subject

> to the ability of several actors to control it, originating from data holders' position of *de facto* control over data ('data ownership'), which is mostly anchored in technological, behavioural, and legal access barriers. This ownership-oriented setting thus stifles data sharing and opportunities for novel reuses of data. (Fia 2020).

The question whether algorithms should be considered as commons has also been at the centre of the copyright debate (see Jandrić 2017: Chap 12). People and organizations such as Richard Stallman and the Free Software Foundation[2] have done a lot for communing of software. These days, even the biggest proponents of software

[2] See https://www.fsf.org/. Accessed 22 September 2025.

copyrights, such as Microsoft, regularly publish their code in places such as GitHub (see Lardinois 2022). Yet a lot of critically important code still remains unpublished, hindering AI development and introducing a plethora of ethical (and other) issues.

These brief sketches merely scratch the surface of relationships between data, AI, and the commons, but they do clearly indicate that the window of opportunity for the shaping of 'the views, norms, practices, and strategies', or 'the inter-AI period' (Sanders 2024: 151), is quite restricted by historical circumstances. Today's debates are based on, and bear strong similarity with, debates of the 1970s, 1980s, and 1990s. The commons, with their important role in those historical debates, need to have an active seat at the table of today's debates. However, this seat should be very different from what it used to be in the past. Some opportunities for change have closed, other opportunities for change have arisen. The commons need (again) a new reinvention, suitable for our postdigital times.

The Future of Postdigital Commons

One possible way of reinventing the commons for contemporary challenges is through the concept of postdigital commons. Today's postdigital commons now need to include human and non-human actors, data and algorithms, biology, information, and society. We need to reach beyond the fallacy of digital immateriality and accept complex entanglements between material and immaterial worlds. We need to avoid technological determinisms and instrumentalisms. . Postdigital commons are not just resources; they are also processes, and much more. Theory and practice of the commons now need to be shaped by fields such as philosophy of technology, Science and Technology Studies, sociomaterialism, and many others.

Our postdigital age is a rupture and continuation in the history of knowledge (see Jandrić 2023), so these theories and approaches pile up on top – rather than replace – earlier theories and approaches. This implies the need for developing postdigital approaches to research, (geo)politics, policy, and practice of the commons; approaches that would result in the making of new seed forms of the commons (Bauwens in Bauwens and Jandrić 2021: 577), suitable for our postdigital society.

As I write these words, some aspects of theory, practice, policy, and politics (such as the copyright debate) are rather fixed. For instance, we all know that Open Access is better for knowledge development than copyrights, but the struggle for opening takes place within a fixed capitalist environment. Other aspects of theory, practice, policy, and politics (such as new AI designs) are definitely much more malleable. New generation AIs, such as Generative AIs and Large Language Models, are currently under technological and legislative development. However, we are not starting exactly from scratch, as this development largely depends on previous technological and legislative solutions.

Postdigital commons are not a magical stick that will resolve all problems. However, they are an important step towards a reimagining of more traditional forms of commons in and for our postdigital age. Making this step will ensure that the commons maintain their important historical place in theory and improve its positioning in politics, policy, and practice.

References

Araral, E. (2014). Ostrom, Hardin and the commons: A critical appreciation and a revisionist view. *Environmental Science & Policy, 36*, 11-23. https://doi.org/10.1016/j.envsci.2013.07.011.

Bauwens, M., & Jandrić, P. (2021). The Seeds of The Commons: Peer-to-Peer Alternatives for Planetary Survival and Justice. *Postdigital Science and Education, 3*(2), 575–591. https://doi.org/10.1007/s42438-021-00218-8.

Bollier, D. (2024). Challenges in Expanding the Commonsverse. *International Journal of the Commons.* https://doi.org/10.5334/ijc.1389.

Brando, N., Boonen, C., Cogolati, S., Hagen, R., Vanstappen, N., & Wouters, J. (2019). Governing as commons or as global public goods: Two tales of power. *International Journal of the Commons*, *13*(1), 553–577. https://doi.org/10.18352/ijc.907.

Chayka, K. (2023). The Uncanny Failures of A.I.-Generated Hands. The New Yorker, 10 March. https://www.newyorker.com/culture/rabbit-holes/the-uncanny-failures-of-ai-generated-hands. Accessed 8 May 2024.

Coleman, G., & Jandrić, P. (2019). Postdigital Anthropology: Hacks, Hackers, and the Human Condition. *Postdigital Science and Education, 1*(2), 525-550. https://doi.org/10.1007/s42438-019-00065-8.

da Rimini, F. (2010). Social Technologies and the Digital Commons. In T. Dumova & R. Fiordo (Eds.), *Handbook of Research on Social Interaction Technologies and Collaboration Software: Concepts and Trends* (pp. 601-611). Hershey, PA: IGI Global. https://doi.org/10.4018/978-1-60566-368-5.ch052.

Dulong de Rosnay, M., & Le Crosnier, H. (2012). An Introduction to the Digital Commons: From Common-Pool Resources to Community Governance. In *Proceedings of Building Institutions for Sustainable Scientific, Cultural and genetic Resources Commons*, *September, Louvain-la-Neuve, Belgium.* https://shs.hal.science/halshs-00736920. Accessed 15 December 2023.

Dulong de Rosnay, M., & Stalder, F. (2020). Digital commons. *Internet Policy Review, 9*(4), https://doi.org/10.14763/2020.4.1530.

Fawns, T. (2022). An entangled pedagogy: Looking beyond the pedagogy – technology dichotomy. *Postdigital Science and Education, 4*(3), 711–728. https://doi.org/10.1007/s42438-022-00302-7.

Fia, T. (2020). An Alternative to Data Ownership: Managing Access to Non-Personal Data through the Commons. *Global Jurist.* http://dx.doi.org/10.2139/ssrn.3698914.

Hardin, G. (1968). The Tragedy of the Commons. *Science, 162*(3859), 1243-1248. https://doi.org/10.1126/science.162.3859.1243.

Hayes, S., Jopling, M., Connor, S., & Johnson, M. (2023). *Human Data Interaction, Disadvantage and Skills in the Community: Enabling Cross-Sector Environments for Postdigital Inclusion.* Cham: Springer. https://doi.org/10.1007/s42438-021-00245-5.

Jandrić, P. (2017). *Learning in the Age of Digital Reason*. Rotterdam: Sense.

Jandrić, P. (2019). The Three Ages of the Digital. In D. R. Ford (Ed.), *Keywords in Radical Philosophy and Education* (pp.161-176). Brill/Sense. 10.1163/978900440467_012.

Jandrić, P. (2021). Biology, Information, Society. *Postdigital Science and Education, 3*(2), 261-265. https://doi.org/10.1007/s42438-021-00220-0.

Jandrić, P. (2023). Postdigital. In P. Jandrić (Ed.), *Encyclopaedia of Postdigital Science and Education*. Cham: Springer. https://doi.org/10.1007/978-3-031-35469-4_23-1.

Jandrić, P., & Knox, J. (2022). The Postdigital Turn: Philosophy, Education, Research. *Policy Futures in Education, 20*(7), 780-795. https://doi.org/10.1177%2F14782103211062713.

Jandrić, P., Peters, M. A., Besley, T., Green, B. J., & Kamenarac, O. (2024). Postdigital Educational Geopolitics. *Postdigital Science and Education.* https://doi.org/10.1007/s42438-024-00472-6.

Kioupkiolis, A. (2022). Digital commons, the political, and social change: Towards an integrated strategy of counter-hegemony furthering the commons. *Ephemera, 22*(2). https://ephemerajournal.org/contribution/digital-commons-political-and-social-change-towards-integrated-strategy-counter. Accessed 15 December 2023.

Lardinois, F. (2022). Four years after being acquired by Microsoft, GitHub keeps doing its thing. TechCrunch, 26 October. https://techcrunch.com/2022/10/26/four-years-after-being-acquired-by-microsoft-github-keeps-doing-its-thing/. Accessed 8 May 2024.

Peters, M. A., & Besley, T. (2024). The geopolitics of postdigital educational development: From territories to networks to rival World Systems. *Postdigital Science and Education*. https://doi.org/10.1007/s42438-024-00454-8.

Peters, M. A., Jackson, L., Papastephanou, M., Jandrić, P., Lazaroiu, G., Evers, C. W., Cope, B., Kalantzis, M., Araya, D., Tesar, M., Mika, C., Chen, L., Wang, C., Sturm, S., Rider, S., & Fuller, S. (2023). AI and the future of humanity: ChatGPT-4, philosophy and education – Critical responses. *Educational Philosophy and Theory.* https://doi.org/10.1080/00131857.2023.2213437.

Peters, M. A., Jandrić, P., & Means, A. J. (Eds.). (2019). *Education and Technological Unemployment*. Singapore: Springer. https://doi.org/10.1007/978-981-13-6225-5.

Roos, A., Kostakis, V., & Giotitsas, C. (2016). Introduction: The Materiality of the Immaterial: ICTs and the Digital Commons. *tripleC, 14*(1), 48–50. https://doi.org/10.31269/triplec.v14i1.738.

Sanders, N. R. (2024). The 'Inter-AI Period:' How management mathematics can help shape an ai-enabled future. *IMA Journal of Management Mathematics*, *35*(2), 151–162. https://doi.org/10.1093/imaman/dpae004.

Sterling, S. (2021). Concern, Conception, and Consequence: Re-thinking the Paradigm of Higher Education in Dangerous Times. *Frontiers in Sustainability, 2.* https://doi.org/10.3389/frsus.2021.743806.

Sterling, S. (2024). *Learning and Sustainability in Dangerous Times: The Stephen Sterling Reader.* Agenda Publishing. https://doi.org/10.2307/jj.13473649.

Thomas. A. (2024). Postdigital Agency. In P. Jandrić (Ed.), *Encyclopaedia of Postdigital Science and Education*. Cham: Springer. https://doi.org/10.1007/978-3-031-35469-4_76-1.

Vale, D., El-Sharif, A., & Ali, M. (2022). Explainable artificial intelligence (XAI) post-hoc explainability methods: risks and limitations in non-discrimination law. *AI Ethics, 2,* 815–826. https://doi.org/10.1007/s43681-022-00142-y.

Verdier, H., & Murciano, C. (2016). The digital commons: a political and economic game-changer. *Les Cahiers de la Chaire, 68*. https://events.chairefdd.org/the-digital-commons-a-political-and-economic-game-changer/ . Accessed 15 December 2023.