



Public Money for Privately-Owned Knowledge

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Abstract

- This article gives an overview of the public/private division of tasks that drives the scientific knowledge production -as in Anatomy- and presents an experimental solution.
- The governmental budget for education and research does not produce publicly accessible knowledge; the distribution of articles and the production of educational books, videos, apps and softwares remains monopolized by private companies.
- The Searchers spend more time writing scholarship applications than doing research.
- Governmental administrations and services depend on private companies for nearly all the tools that they use (softwares, etc.).
- Public money is invested to fund R and D programs of the private companies, leading -in the best cases- to private patents in the sole objective to improve their competitiveness.
- Copyrights and fees keep entire populations away from knowledge.

How did we get to this situation and how can we fix it?

Keywords: Public Domain; Knowledge; Open Source; Access; Interoperability; Blender

Abbreviations

TA2: Terminologia Anatomica-2nd Edition; FIPAT: Federative International Programme for Anatomical Terminology; IFAA: International Federation of Associations of Anatomists; IT: Information Technologies; SIG: Structural Informatics Group of the University of Washington; FMA: Foundational Model of Anatomy; DAWG: Data Access Working Group; RDF: Resource Description Framework Format (as SPARQL, OWL, ...); SPL: Surgical Planning Laboratory-Dptmt of Radiology- Brigham and Women's Hospital

Introduction

Human anatomy is studied by millions of students and professionals around the world with few variations in space (and time).

500 years after the works of Leonardo da Vinci (1510) and Andreas Vesalius (1538), and despite a constant public investment and an intensive activity of both the public and private sectors in the field, very few books and drawings fell in the public domain and the major achievement of digitization is the transformation of the sale of knowledge into a renting of knowledge through temporary subscriptions.

In 2019, the FIPAT of the IFAA shares the TA2 in English and Latin as locked .pdf, which makes it impossible to use in a database (it can be printed), and nobody seems to be willing to translate it.

Each teacher seems responsible to find or produce his/her own educational material -that the student often has to copy manual-

ly-, usually using proprietary softwares (PowerPoint, Word, Excel, Photoshop, etc.) that the students are also asked to use to share their works (even if they have to crack them).

IT have literally exploded over the last 30 years, and yet the acquisition of knowledge remains subordinate to a subscription to a university; the classes are limited in time and space; the radios and televisions seem to exist in a parallel universe from the one of universities and everybody accepts the situation as a matter of course.

Political representatives usually ignore what 'open source' means; the universities protect their learning materials to compete with other universities -as private companies-; and the private companies producing the learning material spend most of their efforts copying existing material, and finding a way to sell it.

Interestingly, while the open-source licenses are usually linked to technologies that do not receive any private or public economical support, they became omnipresent: The hidden porosity between the open source and the private companies leads every developer to copy-paste most of his/her code bits from and to Github, an online collaborative platform for coders. The private companies are therefore both dependent on open-source material and contributing to it without any legal coherence.

In the particular field of Anatomy, a major resource has been available for the past ten years without any usable application proposed by the specialized academic groups: The models from 'BodyParts3D' are made of hundreds of 3d objects that form a human male body with most of its anatomical structures represented.

-The SIG tried for about ten years to integrate the open-source model from 'BodyParts3D' into a 'Foundational Model of Anatomy', using an RDF query language, without delivering any usable viewer, because these languages are too sectarian.

-The 'Open Anatomy Project' of the SPL created a TA1- and TA2-viewers to navigate in the lexicon of anatomical terms, but no computer-readable document.

Materials and Methods

This analysis led the author to use his skills, time and unemployment subsidy to gather these open-source anatomical models, an open-source software of 3D modelling (Blender) and the TA2, to create an open-source atlas of anatomy that can be used, modified

and shared for free. It can be downloaded under CC-BY-SA license on '<https://www.z-anatomy.com/>'.

The software (Blender) has been modified through a python script that adds several functions to use the software as an atlas of anatomy; the content has also been converted into a mobile app and a web viewer by a Spanish student -in his spare time-. The website is designed to facilitate the collaboration and invites all the contributors to get involved.

Results and Discussion

The project meets an undeniable interest from the scientific community and the public and two Youtubers of the Blender community provided a greater audience

- <https://www.youtube.com/watch?v=8eVPwzmgzWg>
- https://www.youtube.com/watch?v=912Hpbe_Itl

The University of Leiden received a grant to correct the anatomical content of 'Z-Anatomy' and constitutes a good example of the academic production process

- In order to get the grant, the model has intentionally been shown in grayscale (to fund the addition of colors) and no mention has been made of the web viewer provided by 'Z-anatomy' under CC-BY-SA license (to fund the creation of a web viewer).
- As it is not part of the scholarship application, the translation of the TA2 is considered useless; the teachers in charge also refuse to share the translations that they gathered of the TA1 (to avoid offending foreign anatomists) while the creation of a redundant web viewer is maintained (to match the scholarship application).
- A precarious contract of three months is proposed to the open-source founders to transfer the know-how to the beneficiaries of the grant.

This ineffective process should still guarantee the future completion and accuracy of the anatomical content, in exchange of a six-figure bill and a lazy 2 years-plan [1,2].

Conclusion

The knowledge production/distribution setup reveals the absurdity of the competitive approach in the field of knowledge,

whose evolution is intrinsically linked to the possibility to share, contribute to and/or modify somebody else's contribution.

Public money meant to support the research and development would be better invested in existing promising open source softwares instead of promoting endless disconnected scholarship application writings with about 10% of success rate.

The direct investment in open source softwares would be the occasion to create free and effective tools and to re-think the economic system of immaterial goods.

The case 'United States vs. Swartz' (2011) shows a government persecuting the emergence of public knowledge -leading to the tragic death of a central figure of the internet- and the more recent persecution of Alexandra Elbakyan -who created the open platform for scientific articles 'Sci-Hub'- by the company 'Elsevier' (2015) reveal the power of the interests linked with the business of knowledge.

Why do these articles arrive on privately-owned platforms in the first place?

Who has interest in changing the situation?

- University teachers need full amphitheatres, not to be replaced by learning softwares.
- Searchers do not challenge the proprietary platforms and scientific journals because their careers depend on them.
- Political representatives need to satisfy the teachers and the private companies.
- Private companies and workers want to make business.
- The public usually ignores everything about these matters.

The alienation of all these actors -who no longer try to meet a societal need but only to make a living- is harmful for the whole society because knowledge is the seed of innovation and evolution in all the human disciplines.

This situation is more likely to change organically, with the progressive replacement of existing proprietary solutions by more competitive open-source alternatives -as 'Z-Anatomy'- than through a political struggle.

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Conflict of Interest

The author has no conflict of interest.

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