# Script towards research 2.0: The influence of digital and online tools in academic research

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**Abstract**

The new Internet technologies have infiltrated in a stunning way the academic environment, both at individual and at institutional level. Therefore, more and more teachers have started educational blogs, librarians are active on Twitter, other educational actors curate web content, students post on Instagram or Flickr, and university departments have Facebook pages and/or YouTube accounts etc.
Today, the use of web technology has become "a legitimate activity in many areas of higher education" (Waycott, 2010) and a considerable shift to digital academic research has gradually occurred. Teachers are encouraging students to take up digital tools for research and writing, thus revealing new ways of using information and communication technologies for academic purposes and not just for socializing.
The main objective of this paper is to investigate the effects of integrating diverse digital, Web 2.0 tools and resources and OERs/MOOCs in research and in the construction of students' academic texts. We aim to stress the increasing influence of digital and online tools in academic research and writing.
Teachers, specialists, and students alike are affected by this process. In order to show how, we explore the following issues: What is Research 2.0? Which digital/online tools have we used to assist our students? What are the challenges for academic research using digital / web 2.0 tools? And how do digital tools shape academic research?


Keywords: digital tools, higher education, MOOC, OER, Web 2.0

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## 1. Introduction

There are numerous definitions of what Research 2.0 represents, but for the purposes of this paper we consider the following to be most suitable. Iorns (2013) claims that: "Just as they have transformed many societal domains, digital tools are having a profound impact on the scientific process". She anticipates "a change in the research landscape as the technology that connects and empowers scientists improves and as research institutions more fully embrace these digital advances."

According to Koltay, Špiranec & Karvalics (2015), Research 2.0 "refers to new approaches in research that promote collaborative knowledge construction, rely on providing online access to raw results, theories and ideas, and focus on the opening up of the research process". "Therefore, research in the open education era revolves around people and communities to a greater extent than ever before."

Sakraida, Spotanski, and Skiba (2010) agree that "in a sense, Web 2.0, as applied to the research study effort, evolves into Research 2.0". As Duval et al. (2010) also observe, Research 2.0 is an approach that "creates conversations between researchers, enables them to discuss their findings and connects them with others". Thus, Research 2.0 can accelerate the diffusion of knowledge, "improve practices and increase participation and collaboration".

We are witnessing an opening up of educational resources and activities that significantly change the way we in which we do research.

## 2. Digital and online tools used towards Research 2.0

We started from the assumption made by Koltay, Špiranec & Karvalics (2015) that, ideally, "everyone should be scientifically literate, even if only a small number of graduate students become researchers". They argue that "scientific literacy comprises methods, approaches, attitudes and skills, related to thinking scientifically and doing research".

Our main aim is to show students how to use certain Web 2.0 and social media tools and apps in their research activities in order to strengthen 21st century students' digital literacy and empower them to be better researchers. Thus, we integrated in our university lectures and seminars several digital tools and applications used by students outside the university, both on their computers and on their mobile devices (Purcell, 2012 and Chen et al. 2015). We also introduced them to open educational resources (OERs) and open educational practices (OEPs) that can be used for conducting research and writing academic papers.

We focused on the following categories of tools and applications suitable for scholarly use (see DIRT and Connected Researchers sites): analyze data, annotate, archive data, capture information, citation, collaborate, comment, communicate, convert files, create, design, find and collect information, dissemination, organize data, program, publish, record audio/video, reference management, share, store data, transcribe audio/video, visualize data, build a website, write etc.

The connection of researchers in order to nurture collaboration and developing digital competencies is one of the key goals of the Research 2.0 concept. To support this goal, we integrated MOOCs, OERs, OEPs and social networking approaches used on commercial Web 2.0 platforms for research purposes. Tools like Scopus, collab, ResearchGATE, Mendeley, Academia.EDU are some examples of supporting tools (Parra & Duval, 2010).

As a result of our teaching experience, we made an inventory of digital tools that can assist both teachers and students in the Research 2.0 process (development and sharing of ideas, cooperative planning, collaborative writing, online publication, sharing results).

We read descriptions and reviews of many Web 2.0/social media tools and considered ways in which they could be used in academic activities. We then decided on the most versatile and user-friendly tools and experimented with them in class. All the tools we tried are free, easy to access and use. Figure 1 reviews the steps we have used with our first year students during the last academic years:
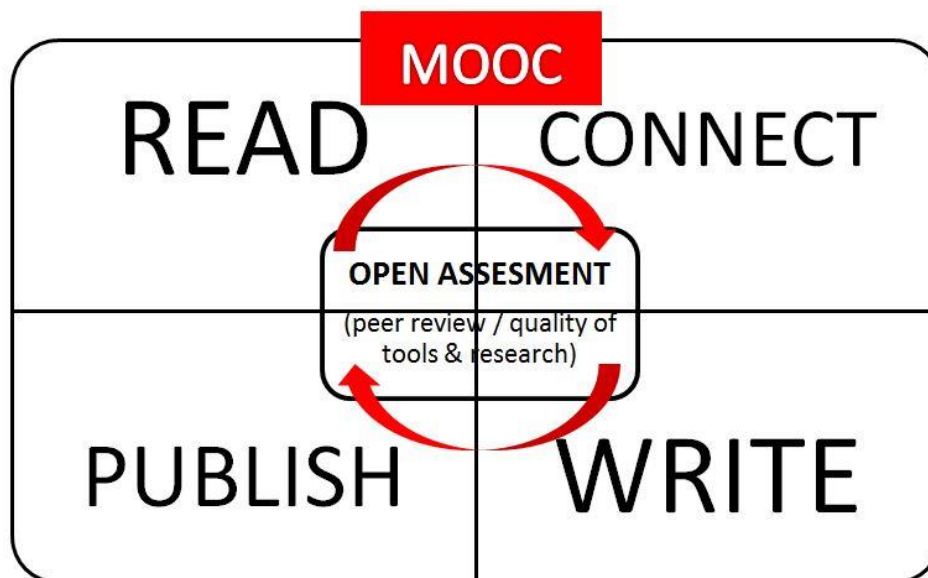


Figure 1. The Research 2.0 Cycle For Academic Writing

In what follows, we will explain each element of the figure and the relationships between them:

I.    **READ** (explore the literature, search, organize and annotate resources):

- **Search engines** (finding the necessary information). Besides the well-known search engines, we also used those dedicated only to academia, such as Google Scholar, Google Books or Microsoft Academic Research. We showed our students how to search specialized data bases (like EBSCO, Proquest, Scopus etc.) for articles in the field of social sciences. We also explained what CC license means (Creative Commons Search, Internet Archive).

- **Curation apps** (staying informed with the literature: Scoop.it, Feedly).

- **Visualization tools** (enhancing reading experience): Pearltrees.

- **Reference management and citation tools:**
    - EndNote = a software tool „for publishing and managing bibliographies, citations and references";
    - Mendeley = a unique platform comprising a social network, reference manager, article visualization tools;
    - Zotero = collect, organize, cite, and share research sources;
    - CiteULike = search, organize, and share scholarly papers;

- **Annotate content and mindmapping apps** (Coggle, Mindmeister, Mindomo etc.) helping students organize their ideas.

II. **CONNECT** with others (experts / researchers) / communicate research to a general public by:

- **shared networking for document building:**
  - Academia.edu (a place to share and follow research and researchers);
  - Research Gate (social network for researchers);
  - Figshare (manage research in the cloud and control whom to share it with or make it publicly available and citable);
- **social networking:** Facebook, LinkedIn (professional networking site for all), Twitter.

III. **WRITE** (work with data - these tools need to be adapted to the needs of the researchers) using:

- **writing apps** (Hicks & Lehman, 2013) suitable for different genres and styles:
  - narrative texts, informational texts, essays, argumentative texts, etc.;
  - digital platforms: blog (Blogger, WordPress), microblog (Tumblr, Penzu, Wattpad), website (About.me, Strikingly, Weebly);
  - digital stories: audio (characters voices, sounds effect), video (documentary techniques), animation (e.g. AudioBoo, StoryBird, Photopeach, PowToons);
  - online surveys/questionnaires (Kahoot, Mentimeter, Polleverywhere);
- **online tools to graph and share data** (Plotly), to create live and interactive charts in browsers (GoogleCharts);
- **data analysis tools** via the Web (StatCrunch);
- **collaborative writing tools:** Google Docs, Padlet; Wikipedia (provides feedback on writing using data from the Google Books database).

IV. **PUBLISH** (things to consider in the publication stage: open access platforms, paper repositories, journal reviews and advisers):

- **Social writing apps** such as Slideshare, Scribd or Issuu can act as communities for sharing documents, presentations and other professional content;
- **Journal Guides** (find the best journal for research);
- **Journal Analysis** (a service for academics run by academic authors for reviewing experiences with academic journals).

According to Thompson (2011), MOOC brings a new „model for delivering learning content online to virtually any person - and as many of them - who wants to take the course" having as central characteristics the learner-centered, open access and scalability approach (e.g. Coursera, edX, FutureLearn etc.). We recommended to our students to register in different MOOCs as an additional resource suitable for all the stages of the Research 2.0 for Academic Writing Cycle. Moreover, this type of courses allows them to acquire new competencies for professional and personal development, unattainable in the traditional classroom.

Our ultimate goal is the overall quality of the research. Hence, all of these stages are continuously monitored by the teachers. As part of this e-assessment process, we pay equal attention to the way in which the students use the online learning environment, the digital tools and apps, the content they produce as well as how they create it.

## 3. Challenges for academic research using digital and Web 2.0 tools

According to Duval et al. (2010) there are four challenges: *availability of data* (and as a consequence data management, data curation, Big Data), (sustainable) *practices*, impact for research results (in terms of *authority, quality and trust*), *openness* (Open Data, Open Access, Open Science) or *privacy* (ethical considerations confidentiality).

Despite the positive aspects of Research 2.0, such as openness, accessibility, visibility, collaboration, Koltay, Špiranec & Karvalics (2015) identify two other major factors that have prevented researchers from adopting it wholeheartedly: *recognition* (social media cannot replace scholarly journals; citation indicators) and *trust* (reluctance to share professional information with an uncontrolled audience; skepticism about the source's trustworthiness which raises issues of credibility and reliability of information). Thus, in their opinion, Research 2.0 is still an "unstable environment (…) not acceptable in science". Another potential 'trust' issue was signaled by Parra & Duval (2010) as being "the problem of keeping and sharing with others several electronic identities" (researcher's digital footprints) in cyberspace.

A year later, Koltay (2016) ask himself if Research 2.0 really brings a change in paradigm. He underlines that research skills and abilities remain challenging in terms of novel and adaptive thinking, sense making, social intelligence, cross-cultural competency, networking skills (virtual collaboration), time management skills, need for transdisciplinarity, self-regulation, etc.

Paradoxically, in our work we noticed that, despite the fact that students use all kinds of devices and apps on a daily basis, they still lack *digital literacy* (knowledge, skills, and behaviors used in a broad range of digital devices such as smartphones, tablets, laptops and desktop PCs, all of which are seen as network rather than computing devices). Moreover, there exists confusion between digital literacy and basic ICT competencies (technical abilities to use a computer/other devices, different platforms for learning, etc.). Therefore, our biggest challenge was to prepare our students to take the step from using these digital tools with ease to using them *well*.

What does it mean to use them well? Briefly, it means having ICT competencies as a prerequisite for developing digital literacy. Secondly, students need to work with different photo, audio and video devices and applications. Thirdly, it is about communication and collaboration in different public and/or private contexts, by means of texts and/or images. It is equally important to know how to select the information and, consequently, the appropriate digital tools. Last but not least, students must be capable to cope with different risk situations in the online world (cyberbullying, plagiarism, cheating, illegal software download, etc.).

## 4. How do digital tools shape academic research?

In our experience, not only do digital tools support learning, but integrating them in research can also motivate students, "connect with their interests and experiences", enhance key components of effective writing instruction, such as idea development and writing for authentic purposes and audiences (Anderson & Mimms, 2014). As a result we managed to achieve:

- a switch from informal style to formal writing assignments;
- making students more aware about issues such as plagiarism and fair use (CC licenses and Turnitin);
- opening their work up to a wider and more varied audience;
- transforming their work into OERs;

- working collaboratively with their peers;
- co-teaching and reverse teaching (feedback from students based on the courses and new information brought by the students themselves).

Last, the integration of MOOCs exposes students to high quality materials created with top educational technologies. Such courses enable collaboration in global learning communities and offer a broader range of experiences than those to which they might otherwise have access. MOOCs provide challenging opportunities for improving their knowledge in their own area of expertise as well as enhance competencies and skills for adopting new models of open educational practices.

## 5. Final remarks

After using these digital and online tools and apps in research activities with our students, we would like to underline the fact that, although our students are often called "digital natives", many of them lack digital literacy. Therefore, it is important to start from what our students already *know* about the various existing digital environments, and build academic research competencies. In other words, we are determined to show them how to properly use Web 2.0, social media, OERs and MOOCs when conducting research: *read -> connect ->write -> publish.*

Beyond the above mentioned steps, we explained that the research process should not end with publication. They can evaluate their research in at least two ways: technical (learning analytics) and content (peer review). Moreover, they can take their research further by applying for research grants (e.g. GrantForward) or joining communities of researchers (e.g. creating a digital identifier).

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