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IGNITION TALK: What do we talk about when we talk about "Open"? On Education, Science, Research, and Open Scholarship

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ABSTRACT

Keywords

Open Education, Open Science, Open ecosystem, entanglement

> An excellent candidate for sloganizing is the word 'open'. Immediately one uses it, the options polarize. To be open … is to be not closed, restricted, prejudiced or clogged; but free, candid, generous, above board, mentally flexible, future-oriented, etc. The opposite [sic] does not bear thinking about, and there can be no third alternative. 'Open' is yum. (Hill, 1975)

Today, and more than ever, "Open" is *en vogue* and *yum!* – a generously-applied denominator used as a modifier of existing paradigms both outside and within academia to signal something, new, improved, and better than the status quo – or is it?

With a focus on the scholarly realm, the variety of Open 'fields' such as Open Data, Open Access, Open Source and Open Education are usually seen as a response to the still-prevailing neoliberalism governing higher education (see e.g. Kansa, 2014; Lawson, 2019), and corresponding privatization and lock-in of knowledge in all its forms by corporate stakeholders – a response that for many promise the realization of a Knowledge Commons (Benkler, 2006; Ferrari, Scardaci, & Andreozzi, 2018; Manola et al., 2019; Ostrom, 2006; Suber, 2007).

Hence, the promise of a convergence of open practices in research and, more rarely, education, that is implicit in approaches to Open Research, Open Science, and Open Scholarship is gaining prominence in scholarly discourse. For high-level stakeholders such as the European Commission, the "movement" of Open Science is even attributed the status of a "revolution" which has gained further momentum in the last years through massive allocation of funding for and subsequent work on Open Science-related projects in the Horizon2020 funding line and beyond, with pan-European networks such as OpenAIRE, and the inception of a European Open Science Cloud (EOSC) pushing the Open Science agenda further.

Similarly, national research funders such as Research England (UK), the Wellcome Trust (UK), the German Research Foundation (DFG), and the Agence Nationale de la Recherche (ANR, France) are moving towards an integration of Open Access and Open Science principles as a

prerequisite in their lines of funding. And national governments are increasingly acknowledging the transformative nature of Open Access, Open Science and Open Education by similarly including these aspects in their agendas (see e.g. National Plan of Open Science in France).

Next to these top-down impulses, there exist a variety of grassroots movements comprising those working in academia who are lobbying towards a more systemic cultural change of the academic system towards a more inclusive, equitable and participatory understanding and practice of all academic fields of occupation, including science, research, education and scholarly communication.

As Peters and Roberts have pointed out, "the social processes and policies that foster openness [are understood] as an overriding educational and scientific value, evidenced in the growth of open source, open access, open education, and their convergences that characterize global knowledge communities" (Peters & Roberts, 2010, p. 4)

But still… while there are common denominators inherent in all of the Open movements, the sub-disciplines of Open are increasingly beginning to keep to their own echo chambers, slowly forgetting their underlying ideas, principles, and values – and all of this leads to an increasing fragmentation towards these sub-disciplines turning into "open silos" (Campbell, 2015). One major case in point might be that of the parallel, but mostly mutually ignored co-existence of Open Science and Open Education. Over the last two decades, both fields have developed into considerable global movements, but the synergetic benefits that could be achieved through an alignment of interests with respect to shared infrastructure and practices that are, in the end, addressing the same target group – the researcher/educator – are still to be tapped.

With my introductory talk at the "Open Practices in Education" research symposium, I want to extend an invitation to join me on a short journey through this fragmented Open landscape. Differentiating the variety of ways that "Open" is conceptualized in the sub-movements of Openness in academia, let us take a closer look at the histories informing each of the movements involved. Following this, we will then consider the entanglements and convergences that are existent to some extent in the larger 'meta concepts' of Open Science and Open Education, and their relationship to Open Scholarship. As a conclusion, we will further scrutinize the cross-sectoral threads and lines of inquiry that might help us understand to see in what ways these open silos might benefit from each other to bring about truly inclusive and equitable Open Scholarship that extends to all fields of activity in the life of those working in and with academia, hopefully making possible a true Knowledge Commons.

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Using Open Educational Resources in Constructing Students' Individual Learning Trajectories

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ABSTRACT

Keywords

open education resources, individual learning trajectory, Humanities and Social Studies majors

Purpose of this paper

The present study aims to describe the procedure of constructing individual learning trajectories (ILTs) on the basis of open educational resources (OER) by the Humanities and Social Studies majors in Mariupol State University (Ukraine).

Mariupol State University (MSU), Ukraine, aims to ensure flexible education for its students; therefore the online study portal is designed to provide students and teachers with access to distance learning resources: teaching materials and courses taught in the university. The materials can be used both for organizing students' self-study work and as support for their full-time study. Besides, there is the Electronic Institutional Repository of Mariupol State University **(**the eIR of MSU**)** that is included in the *OpenDOAR global directory* of academic open access repositories. The eIR of MSU is intended for accumulation, arrangement and storage in electronic media of the university staff intellectual property: conference and workshop papers, theses and dissertations, books, chapters and sections, etc (The Electronic Institutional Repository of Mariupol State University [the eIR of MSU], n.d.). However, understanding open education philosophy and experience of its implementation is relatively little in MSU and, thus, it still needs to be adopted and promoted in both pre-service and in-service training processes. It is essential in this regard to raise students' awareness of open education opportunities, in particular, using open educational resources (OER), for instance, in designing their own learning trajectories.

A recent review of the literature on this topic shows that scholars mainly consider a broader concept of an *educational trajectory*. In their introduction to *Governance of Educational Trajectories in Europe* M. Cuconato, R. Dale, M. Parreira and A. Walther describe it in a wider sense as institutionally expected *progression* in education and as the subjective *experience* that the individuals make of it (Walther et al., 2016). Other authors state that students' educational trajectories are the *result* of complex interactions between societal institutions and individual-subjective action (Tikkanen, Biggart & Pohl, 2016). In a narrower sense, as applied to the learning

process, a learning trajectory is seen as a way through the constantly expanding maze of knowledge to information transmission, dissemination and acquisition, at individual and collective levels (UNESCO, 2015). L. D. Gitelman and A. P. Isaev consider an individualised learning trajectory as a *process* of self-learning and professional growth (Gitelman & Isaev, 2015). Other authors have a similar understanding of the concept under consideration. M. Tanner and F. Sahlström point out that a learning trajectory reflects a process of establishing relations of cohesion and change between current and previous occasions (Tanner & Sahlström, 2018). Other authors duly note that a learning trajectory not only describes a student's cognitive process, but also what things students can or cannot do, students' reasoning and conceptualization, a cognitive obstacle, and mental processes for progressing to higher levels (Anwar & Rofiki, 2018). Besides, a teacher's role in students' learning trajectories cannot be underestimated, i.e. "teachers formatively assess students over time, attend to student thinking, provide appropriate differentiation, design and modify tasks, choose appropriate learning goals, and relate lesson goals to broader curriculum goals" (Wickstrom & Langrall, 2018).

In an attempt to integrate the existing definitions of a trajectory concept and highlighting its processual and resultant states, we define *the individual learning trajectory* (ILT) as a student's strategy for acquiring knowledge, improving relevant skills and fostering motivation. As a result of strategy implementation in the learning process students make their own ways to self-education and self-development by creating new original learning products. The role of the teacher consists of algorithmization of students' individual activity, the selection of criteria for analysis of work, peer review, evaluation, etc. Thus, it is recommended that ILT realization is carried out at certain stages and implies using OER. The latter are defined by the OER Paris Declaration 2012 as any "teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the existing framework of intellectual property rights as defined by relevant international conventions and respects the authorship of the work" (UNESCO, 2012).

The purpose of the research is to describe the peculiarities of constructing ILTs by Humanities and Social Sciences Majors and the expected effect of raising students' awareness of open education opportunities, fostering their motivation and developing respective skills to use OER in their individual learning practice as well as academic knowledge acquisition.

Design/methodology/approach

A group of 7 students of various academic majors (Culture Studies, History, Journalism, Law, Philology, Primary Education and Psychology) were involved in the process of ILT constructing.

Each participant's individual research was based on OER and suggested understanding the nature of leadership and raising awareness of it as part of students' future professional activity.

Pedagogical modeling as a "method of scientific and pedagogical research, means of creation of pedagogical innovations and pedagogical constructs, technologies and techniques, forms and other pedagogically conditioned structures, determination of functions and pedagogical conditions, trends and constraints, and other constituents of scientific research in modern pedagogy" (Konovalov & Kozyreva, 2017) was used for developing an algorithm of ILT constructing at such stages as *Introduction, Motivation, Planning, Implementation, Presentation, Assessment and Reflection ones.* The experiment lasted for 7 weeks. The implementation of the ILT was based on providing the following pedagogical conditions: fostering students' motivation to use OER and avoid plagiarism in their learning process; expanding students' knowledge about open education alongside with acquiring academic knowledge; developing students' skills on the basis of the acquired knowledge to effectively use OER in their individual research work.

Participatory action research (PAR) which includes inquiring into motivations and assumptions and implies that participants conduct individual experiments and collaboratively reflect on these experiences (Vanasupa et al., 2016), design and reflect on experiments as both researchers and subjects of their own research (Mills et al., 2006) was employed for evaluating and encouraging students' motivation for using OER. In the course of the *Implementation* stage the students-participants met with the teacher-coordinator to share their experience of working on ILT. Such discussions enabled us to make the *SWOT analysis* for each student, thus identifying internal (Strengths, Weaknesses) and external (Opportunities, Threats) factors that promote or impede students' research process based on OER.

Concept testing was used to assess completeness of students' knowledge, i.e. determine whether the participants understand and identify the key concepts, e.g. Open Education, Open Access, OER, Open Licensing, etc. The degree of knowledge completeness was measured by the formula (1)

$$C_{KC} = \qquad (1)$$

where C_{KC} is the coefficient of knowledge completeness,

N_1 is the number of students who answered all test questions correctly and completely,

N_0 is the number of students who answered test questions.

Method of Expert Evaluation was applied for assessing students' skills to effectively use OER in their individual research work. In general, the above-mentioned skills reflect students' ability to find open content for their research, use it and share with their peers. In particular, the skills were divided into five groups according to the 5R activities, i.e. retain, reuse, revise, remix and redistribute. The group of experts consisting of university instructors determined the level of skills development by filling in the Expert Evaluation Form (Fig.1).

EXPERT EVALUATION FORM

Student's Name _____

Criterion	Indicators	Grades		
		3 Advanced	2 Intermediate	1 Elementary
Skills to effectively use OER in individual research work	**retain** – selecting, storing and managing the relevant content; **reuse** – using the content for carrying out an individual research and presenting the results in class; **revise** – adjusting and modifying the content (rendering the content into a native language); **remix** - combining the content with other material to create something new; **redistribute** – sharing copies of the original content, its revisions or its remixes with others			

Expert _____

Fig. 1. Expert Evaluation Form Sample.

For analysis, a three-point scale was used. The elementary level indicated that there were no obvious changes; the intermediate level – some changes occurred and student's skills were partly developed but a student was potentially capable of achieving higher results; the advanced level – student's skills were developed and he/she maximized his/her results.

The average grade for skills development was defined as the arithmetic mean of each student's individual grade by the formula (2).

$C_{SD} =$ (2)

where C_{SD} is the coefficient of skills development,

G_1 is an indicator of the skills development level,

Σ_n is the total number of students.

Findings

The *Introduction* stage of ILT constructing (Week 1) was aimed at actualizing the key concepts of open education and accordingly the respective students' knowledge. A special training session "Introduction to Open Education" was conducted for the participants to develop their understanding of its opportunities and teach them how to search for and identify appropriate open resources. The training session covered the following issues: *What is Open Education and Open*

Knowledge, OER and Open Licenses. Then the students were offered to construct their own ILTs on a common topic "Leadership" using OER, in particular, OER Commons, a digital library that provides accessible content for finding relevant materials. First of all the students were shown photos of some famous world leaders and asked to collect information about them in the form of brief encyclopaedic entries. After that the students gave their own examples of famous leaders and told about their achievements and what qualities and abilities the leader has (or had). The activity was followed by the whole class discussion of the following questions: *Do the above-mentioned leaders have any common characteristics? Are leaders born or made?* Also the students explained what resources of OER Commons they used for their micro-research. The trainees were encouraged to continue their research project in their respective fields.

The *Motivation* stage (Week 2) was aimed at further developing students' awareness of open education benefits and its effect on their learning process. For this purpose the idea to set up an open textbook display (Yano, 2017) was used. The participants selected necessary open textbooks and monographs on the topic under consideration and then "advertised" them to their fellow students. Therefore having students engage their peers can be a more effective approach to introduce and demonstrate the quality of OER (Yano, 2017). It contributed to provision of the first pedagogical condition – *fostering students' motivation to use OER and avoid plagiarism in their learning process.* At this stage it was also important to develop trainees' personal attitude to leadership as their future professional activity. The participants defined their professional contexts and brainstormed on how leadership can help them improve these contexts. The trainees filled in the Venn diagram with professional and leadership skills in order to represent similarities and differences between them (Fig. 2).

At the *Planning* stage (Week 3) each student acted as the organizer of his/her own learning process by setting a goal, assuming his/her final learning product and forms of its presentation, making a work plan, selecting means and methods of achieving the goal, creating self-monitoring and self-evaluation system. Thus, at this stage, individual learning programmes were composed by the students for the designated period.

The *Implementation* stage (Weeks 3, 4, 5) was meant for carrying out students' individual learning programmes. The provision of the second pedagogical condition – *expanding students' knowledge about open education alongside with acquiring academic knowledge* – was achieved by students' own contribution into enriching the existing learning material. The trainees synthesized knowledge on leadership from the Humanities and Social Sciences, supplemented the learning material with topics related to leadership; designed microlibraries for conducting dissemination events on leadership issues and preparing reports for science research conferences. OER Commons Library served as a knowledge base for students' research.

Fig.2. The Venn Diagram to Compare Philologist' Professional Qualities of and Leadership Ones.

Ensuring the third condition – *developing students' skills on the basis of the acquired knowledge to effectively use OER in their individual research work* – was due to forming peer groups of mutual support for exchanging knowledge and experience on its acquiring. The students in dyads enacted the "Support partners" role play which implied assisting each other while implementing their individual learning programmes, joint information search, etc. Besides, the students were divided into triads for the "Counselling" technique. The triad members performed the roles of an observer, a consultant and a student who asked for advice. The participants exchanged roles, so that everyone could perform all team roles and learn from the experience. The consultant helped the student find a necessary solution, and the observer watched counsellor's actions and made conclusions as to their efficiency.

The *Presentation* stage (Week 6) consisted of demonstration of individual learning products and their collective discussion. After completing the ILTs the students presented their results to a peer group and a group of experts. Each student demonstrated his/her advancement in the chosen field

of study. The end product and its presentation depended on the student's academic major (Table 1).

Table 1. Outputs of Students' Individual Learning Trajectories

Academic Major (Humanities and Social Sciences)	Output Example
Culture Studies	Designing a guide-book on cultural differences between countries, their attitudes towards leadership and cross-cultural leadership.
Journalism	Writing a documentary script, e.g. "Dangers of Charismatic Leadership. Evil Geniuses in History".
History	Presenting a lively leader's story in the form of a conference report based on historical research, transferring the evidence and events of the past to the present context, e.g. "Napoleons of Our Days. Who Are They?"
Law	Making an open statement as an attorney for defence for "A Leader Under Trial" role play.
Philology	Compiling a brief dictionary (monolingual/bilingual, lexical/ encyclopaedic, etc.) of terms and concepts of leadership
Primary Education	Writing a brief manual for parents devoted to child's upbringing as a future leader
Psychology	Writing an article for a scientific journal, e.g. "Leadership Psychotypes".

The *Assessment and Reflection* stage (Week 7) was the final one. The results of the SWOT analysis helped identify the following *Strengths* that promoted students' research process based on OER: students' willingness to use and create OER, and relevant level of digital literacy for this. Among *Weaknesses* the Humanities and Social Sciences majors admitted the lack of foreign language knowledge since the majority of OER were in English; however, the students are required to do most assignments and coursepapers in their native language. As far as *Opportunities* are concerned, the participants emphasised the following: open and free access to a wide range of learning materials, saving time and money for educational resources. All that increased their academic performance and helped to make the learning process more flexible and

creative. As *Threats* the students mentioned low open education awareness on the institutional level, i.e. need for more support from instructors and librarians' side.

The results of the concept testing were satisfactory at the end of the experiment (with the coefficient of knowledge completeness equal to 0,85). The average grade for students' skills development constituted 2,45 points. Alongside with experts' evaluation the students determined their own achievement levels and whether they succeeded in achieving their general and individual goals. Each trainee concluded whether his/her self-assessment coincided with the expert group assessment and planned his/her further individual learning trajectory.

Research limitations/implications

The study presents the findings from a particular university and a small number of students involved in the research project. A broader academic environment is needed to measure effectiveness of the designed methodology.

Practical implications

The obtained results will enable to adapt the designed methodology to the needs of students of other academic majors and sufficiently deal with the problem of plagiarism. Besides, the research revealed the necessity to engage a wider audience including librarians and teaching staff into using and creating OER as well as the need for reconsideration and modernization of the existing university strategy of foreign language teaching, in particular English for Specific and Academic Purposes, in order to help students more efficiently access the OER.

What is original/value of paper

The phased implementation of the individual learning trajectory as a student's strategy for acquiring knowledge, improving relevant skills and fostering motivation has been presented in the paper. It has been described how ensuring a complex of respective pedagogical conditions was possible due to a variety of activities for the participants at each stage of ILT constructing using OER.

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Bordering Brussels

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ABSTRACT

Keywords

citizen science, Brussels, history, borders

Purpose of this paper

BORDERING BRUSSELS is an innovative response to the need to provide non-elite knowledge on bordering practices within and beyond Brussels in past and present. Working with a mix of disciplines – (A) history, (B) border studies, (C) political sciences, (D) citizen science and in a dialogue with (E) art and technology – and using our open science methods, the project aims to advance our knowledge about, and unravel, where people in Brussels place(d) borders and why that mattered/s to them. The project has several aims:

A. It is time to write the **history** of the birth and growth of the Brussels-Capital Region no longer primarily from the perspective of institutions, as 'changes in perceptions of the other are generally a bottom-up rather than a top-down process and are brought about by increased interaction and movement of borderlanders' (Newman, 17).

B. It is time to write Brussels into the global field of **border studies**. The field's multimodal ways of interpretation can help us to move beyond the – still dominant in the public sphere –binary interpretations of a border as a line dividing territory (Amilhat-Szary & Giraut (eds.); Müller; Rajaram & Grundy-Warr (eds.); Weier a.o.).

C. After **deliberative democracy** ('the capability of transforming citizens' opinions and attitudes by means of deliberation') was introduced in Brussels by means of inter-group settings (Caluwaerts & Reuchamps), this project uses crowdsourcing experiments with a deliberative technique with the aim to generate new research questions on experiences and perceptions that matter to people.

D. We are moving towards a peer-to-peer society. **Citizen science** is booming in the natural sciences but remains underrepresented in the humanities (Wildschut; Oswald & Smolarski (eds.)).

BORDERING BRUSSELS serves to offer new knowledge and develop a new method in order to enhance opportunities for citizens to co-create future science agendas (Macnaghten).

E. The urgency of finding hybrid innovative solutions on the nexus of **Science–Technology–Art** has been recognized: 'Today we no longer have the right to pretend that we command a unique position from which we can view the truth about the world. We must learn not to judge different areas of knowledge, culture, or art, but to combine them and to establish new ways of coexistence with those who enable us to meet the unique demands of our time.' (Ilya Prigogine & Isabelle Stengers). BORDERING BRUSSELS facilitates the search for synergies beyond disciplines and sectors in exchange with citizens and artists.

Design/methodology/approach

The starting point of BORDERING BRUSSELS is the online open database of oral sources of Bruxelles nous appartient / Brussel behoort ons toe, an organization gathering, developing and supporting participatory sound art with city dwellers in order to display the diverse identities of the city, containing 2,856 entries about Brussels (both full interviews and interview fragments) (Janssen). These will be approached in three ways:

- an interdisciplinary literature study and a narrative analysis of these sources will be conducted in order to situate the collection within the historical context of bordering processes in Brussels. A TED talk will be recorded situating the scientific value of the collection in Dutch, French and English.

- a selection will be made of the most popular fragments giving information about practices related to bordering Brussels starting from 1970. These are transcribed, made available in three languages and posted on an online platform.

- an Artist is invited to offer an acoustic artistic input inspired by the fragments and, together with the Researcher, build the BORDERING BRUSSELS BOX (BBB) synergizing the TED talk, the online platform (touch screen and reference to App) and the artistic input.

BBB will meet citizens during its journey at festivals and in various public spaces. BBB invites citizens to the platform, where a joint inquiry is organized through crowdsourcing in three steps: crowd community sense-making, co-creation of clusters through crowd validation and the generation of new research questions.

Findings/expected Findings

The last step of the research project will take place during an MA course taught by the Researcher with student-citizens, as well as during a workshop with researchers of the Centre for Information, Documentation and Research on Brussels (scholars). With the help of a software programme, citizens and scholars are asked to include the clusters into an open knowledge path, thereby enabling them to be situated within existing knowledge and gaps to be detected, which potentially include new research questions.

What is original/value of paper

This project gives voice to city dwellers in order to come to a multifaceted understanding of the meaning(s) of bordering processes within Brussels and beyond. It guides the data gathered by citizens by means of peer-to-peer research with citizens to new research questions about how city dwellers create(d) borders for themselves and others.

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(Re)Building Trust. Will visible Open Science Practices foster perceived integrity of journal articles?

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ABSTRACT

Keywords

Open Science Practices; Badges; Trustworthiness; Epistemic Beliefs

Purpose of this paper

The Replication Crisis diminishes trust in empirical sciences and with it the perceived value of science (Lupia, 2018). Open Science Practices (i.e. open data, open analysis script, open materials) are an increasingly popular approach to deal with challenges in replication and to rebuilt trust (Geukes, Schönbrodt, Utesch, Geukes, & Back, 2016). Trusting the integrity of researchers is particularly significant within professions that include reflections on evidence-based actions, like in teaching (Cochran-Smith, 2009). First investigations could, however, deliver no evidence toward the effects of Open Science Practices (OSP) on trustworthiness (Wingen, Berkessel, & Englich, 2019). The study investigated the effect on a discipline level (psychology) with an abstract description of OSP. Within the ongoing discussion about incentives for OSP (e.g. badges), we want to shift the focus from discipline level to concrete individual journal articles and consider epistemic beliefs of readers to play a moderating role (Merk & Rosman, 2018): Will visible OSP (vs. not visible vs. visibly non-OSP) foster perceived trustworthiness when reading journal articles of empirical studies? Will multiplistic epistemic beliefs moderate the relationship between OSP and trustworthiness?

Confirmatory, H1: Visible OSP (vs. not visible vs. visibly non-OSP) influence the perceived trustworthiness (subscale integrity) in the empirical study. Our assumption: The more openness, the more trustworthy with small to moderate effects: $\mu 1 < \mu 2 < \mu 3$

Confirmatory, H2: The higher the (topic specific) multiplistic epistemic beliefs, the lower the perceived trustworthiness (subscale integrity). Negative correlation.

Exploratory, H3: (Topic specific) multiplistic epistemic beliefs moderate the effect of OSP on perceived trustworthiness (subscale integrity).

Exploratory, H4: Visible OSP (vs. not visible vs. visibly non-OSP) have a negative effect on topic specific multiplism.

Design/methodology/approach

The design will include three conditions: visible Open Science Practices (visOSP), Practices not visible (nonvis) and visible non-Open Science Practices (nonOSP). Two of the three conditions are randomized within person. Realizing all three conditions within person would highlight the variation between conditions as too obvious and thus undermine blinding of subjects.

visOSP condition: Subjects receive a title page of an empirical study (Title, Abstract, Keywords, Introduction, ...) together with three Open Science badges. The badges are explained using hints in style of speech bubbles and indicate that the authors engaged in the OSP open data, open analysis script and open materials.

nonvis condition: Subjects receive a title page of an empirical study (Title, Abstract, Keywords, Introduction, ...) with no further information on Open Science, reflecting a "standard" journal article. For comparability purposes speech bubbles are used as well, giving information on keywords, volume/ issue and abstract.

nonOSP condition: Subjects receive a title page of an empirical study (Title, Abstract, Keywords, Introduction, ...) together with three Open Science badges. The badges are explained using hints in style of speech bubbles and indicate that the authors did not engage in the OSP open data, open analysis script and open materials.

As participants are exposed to more than one condition, we create all three conditions for two different empirical studies (topics). This way we avoid participants to see one study topic twice under different treatment conditions, which would undermine the blinding (see title pages here: gitlab.com/j_5chneider/re-building-trust/tree/master/3_design).

Measured variables are *perceived trustworthiness*: We apply the Muenster Epistemic Trustworthiness Inventory (Hendriks, Kienhues, & Bromme, 2015) with all three subscales. However, as dependent variable we will only employ the subscale integrity. The other two subscales are used for further exploratory analyses. *Topic specific multiplistic epistemic beliefs*:

We apply the subscale of topic specific multiplism from Merk et al. (2017). *Topic-specific consistency*: We apply the three item-measure from Merk et al. (2017). *Treatment check*: We created five items to test the perceived openness/ transparency of the empirical study. A sample Likert item (four-point scale "disagree" to "agree") is "It is transparent which performance tests and data underlie the study." A second treatment check with three Likert items (four-point scale "disagree" to "agree") investigates the perception of the speech bubbles explaining the badges. Sample item: "On the title pages I read all the additional annotations (grey boxes)." Additional small set of *demographic variables* (age, sex, location of teacher education program) will be assessed.

We conducted Bayes Factor Design Analyses: osf.io/gu58n/. As conditions are rotated (participants receive 2 out of 3 conditions), we conducted BFDA for two t-tests. Required sample size for small to medium effect, stopping rule of Bayes Factor of 10 (1/10 respectively) and 80% Power are N= 220. We thus aim for a N_{max}=250 with optional stopping at BF 10 or 1/10 respectively. Due to expected variations in the BF with low n, we begin observing the data at n=150. As argued above, perceived trustworthiness of empirical evidence appears particularly significant within the teacher profession and teacher preparation programs. Data will thus be collected from the population of pre-service teachers using monetary incentives for participation.

Findings/expected Findings

For the data analyses, we plan to use an Informative Hypotheses Approach based on our abovementioned assumptions. Data analysis scripts including the `bain` package (Gu, Hoijtink, Mulder, & Lissa, 2019) are available on https://osf.io/32duk.

OSF-Project: osf.io/vgbrs/
GitLab: gitlab.com/j_5chneider/re-building-trust.git
Preregistration (14.06.): osf.io/2zypf

Research limitations/implications

Our sample will be gathered from the population of pre-service teachers. Further research would thus need to include other populations (e.g. in-service teachers, medicine students) to ensure external validity. Moreover, the title pages with the badges are tested for two specific topics within teacher education. More data on a broader range of topics would be desirable. We also didn't plan to inform our subjects on the Replication Crisis. Future research could investigate effects of diminished trust through the crisis with subsequent effects of visible OSP in journal articles.

Practical implications

The study investigates the effects of badges (visible OPS) in journal articles.

Social implications

The study investigates lay peoples trust and thus value of scientific research.

What is original/value of paper

The paper allows insights into the effectiveness of the visibility of OSP through a robust research design.

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Building an interactive OER Tutorial for Early Career Researchers: Challenges at a micro Level

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ABSTRACT

Keywords

Case study, OER practice, CC licenses, Interactive learning materials, Academic Career Kit

Purpose of this paper

This paper discusses the challenges and barriers in offering an interactive OER tutorial; among others – finding a non-proprietary platform that supports the creation of an *interactive* OER tutorial and the re-use of materials that are themselves under various different CC licenses.

(1) Introduction

Difficulties with questions concerning copyright and ownership of online materials, and the fear of copyright infringement are among the main problems when it comes to offering and using OER in higher education (Harold & Rolfe, 2019; Hirsch, Baumann-Gibbon, & Rupprecht, 2016; Yawan & Ying, 2013). EconBiz (https://www.econbiz.de/) is a free search portal in economics and business studies. One of the aims of the portal is to foster research skills among students and early career researchers (ECR). When we started to provide online materials as OER we experienced these kinds of problems, especially at the micro level. Trying to offer our existing learning materials for students as OER – we met barriers and limitations in the fields of technical environments as well as on questions of re-using online materials. Thus we had some lessons learned, which we could use when building new projects, like the Academic Career Kit for ECR (https://www.econbiz.de/eb/en/research-skills/academic-career-kit/).

(2) OER Project / Best Practice

The aim was to build an *interactive* online tutorial that could be seamlessly integrated into third party online environments and which is *fully adaptable*. The tutorial in question addresses topics like:

- Publishing a first paper: Finding the right journal, considering open access, knowing your copyright as an author, and recognizing predatory journals,
- Metrics and Networking: Using social media in research to enhance your visibility and impact, measuring research impact with metrics and altmetrics, and
- Finding and sharing research data: benefits of sharing FAIR data, developing a data management plan, storing data in a data repository, CC licenses, etc.

To inspire learning, we considered it essential that the materials allow interaction; we wanted to offer elements of gamification and comic relief. In order to inspire re-use, we were well aware that not only the licenses, but also the technical environment must meet our requirements for easy re-use and adaption without the necessity of having a programmer at hand.

(3) Discussion

In our talk we want to discuss challenges of the development of interactive OER and present the questions, struggles, limitations, and answers that arose, when we developed the EconBiz Academic Career Kit. Among them are questions of re-use for special document types, like screenshots, logos, images, or videos, and the combination of materials with different licenses in one project, but also technical limitations and limitations to the findability and sharing of OER, that especially pertain to *interactive* OER materials.

Design/methodology/approach

Practice report / Case study.

Findings/expected Findings

Discussion of a best practice for the creation of an interactive OER tutorial

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Adoption of Open Educational Resources (OER) in Higher Education in Germany: An Explorative Analysis

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ABSTRACT

Keywords

Open Educational Resources, Open Education, Attitudes, Intention-Behaviour Gap

Purpose of this paper

Although the idea of openness has gained momentum in the educational discourse, the situation of the adoption of Open Educational Resources (OER) in education is still in a developmental stage (Bozkurt, Koseoglu, & Singh, 2019). Germany, in this regard, can be categorised as a laggard. This status is confirmed by the latest UNESCO report on understanding the impact of OER:

> In Germany, OER adoption is also low, particularly outside the community of German OER experts in all sectors of education and training. For example, in higher education, there are no guidelines/recommendations or national portals for knowledge/OER exchange. OER are still considered as 'not invented here' by most educators. (UNESCO IITE, 2019, S. 27).

In addition to the lack of legal regulation and policy support (Neumann, Orr, & Muuß-Merholz, 2018; UNESCO IITE, 2019), another significant obstacle is that OER are not firmly entrenched in current educational practices. While the creation of OER repositories in higher education institutions is sprouting, there are hardly suitable and sustainable incentives for practitioners to adopt OER and use it in everyday teaching.

An initial step to spur the adoption of OER in Germany was the recent BMBF funding line OERinfo that funded 25 projects all over Germany (Surmann & Echterhoff, 2018). As one pivotal achievement OERinfo was established which, for the first time, serves as a central contact point for OER in Germany. OERinfo aims to bundle and disseminate information on the subject in order to reach new target groups from all areas of education. Twenty-two projects aimed to qualify multipliers from the dominant educational sectors to create and use OER. The projects primarily intended to inform those who work in key positions in their respective educational fields and thus are able to convey the importance of the OER.

Notwithstanding the achievement of OERinfo to render the potentials of OER for a broader audience in education, the wider adoption and diffusion of OER in education is still limited. Form

a research perspective, particularly empirical research for the case of Germany has been weak so far.

The follow-up project of OERinfo (2018-2020) aims to narrow this research gap between theoretical assumptions and empirical findings. The research approach is based on the observed tension between the broad availability of OER (repositories) and its limited use in teaching.

Design/methodology/approach

Using a survey-based approach, it is planned to collect data about the status and barriers of OER across educational fields in Germany.

The underlying approach is twofold. First, it is intended to measure the attitudes of participants towards the practice of sharing and cooperation in general. Second, the specific attitudes towards OER are evaluated, and barriers to OER use are identified. Attitudes are conceptualised as describing a positive or negative evaluation of a person towards an object or event (Eagly & Chaiken, 1993). A definition widely accepted in the literature is that attitudes are objects comprising "anything a person may hold in mind, ranging from the mundane to the abstract, including things, people, groups, and ideas" (Bohner & Dickel, 2010, S. 392). Regarding the attitudes' structure of a person, Rosenberg and Hovland (1960) have identified a taxonomy of responses which contains a cognitive (knowledge), an affective (feeling and emotions) and a behavioural (action) component.

The survey is distributed over two main channels. A broader audience is contacted using the communication channels of OERinfo and the four transfer partners (school, higher education, further education, vocational education). A more community-based approach is pursued by using specific events related to OER (OERcamp, conferences, workshops and training).

Findings/expected Findings

Although this is ongoing research, our preliminary sample suggests a paradox between a positive affective component towards OER but little practical usage (behavioural) which can best be explained by a classical intention-behaviour gap (Sheeran & Webb, 2016). Whereas the attitudes of the majority of practitioners towards sharing in general and OER, in particular, are positive, the behavioural component reveals that OER are seldom actively used in educational practice.

As factors that could potentially explain the intention-behaviour gap, we plan to examine broader contextual factors that aggravate the adoption of OER, such as lack of time, legal uncertainties and institutional barriers etc. To determine these broader contextual influences, we use expert interviews and empirical data from the first funding periods of OERinfo.

Practical implications

Once we reconcile our results from the survey with the broader contextual factors, we expect to be able to render findings on how to lower the intention-behaviour gap. As our research is based on a design-based approach (Kerres & de Witt, 2011), we aim to develop concrete design recommendations from our findings of how to spur the adoption of OER in higher education.

What is original/value of paper

An empirical investigation of status and diffusion of OER in higher education. Develop concrete design recommendations on how to spur the adoption of OER.

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Embedding Openness in the Design Process of Web-based Learning Arrangements

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ABSTRACT

Keywords

Open Education, Open Educational Practices, Open Educational Resources, Socio-technical Systems

Purpose of this paper

Despite digital media and tools being omnipresent and the abundance of information on the web we have to face the fact that the idea of Open Education has not yet succeeded worldwide. It seems thus legitimate to approach the problem from a different angle. In this contribution to the symposium an overview of the research intention and approach is given to define and initially embed openness in the design process of web-based learning arrangements.

Open Education means providing access to information and education for everybody so that they can participate in society and be creators of their lives (UNESCO, 2012). With a closer look at the digital landscape these days many implementations of the open education idea appear to be open washing (Weller, 2014) as several studies show: Great numbers of participants in MOOCs can be attributed to the long tail effect and high drop out rates point to the fact that not everybody is made for self-organized online learning (Schulmeister, 2014). Insights into the profiles of MOOC participants show that most of them already have an academic education (Christensen et al., 2013; Emanuel, 2013). Increasing commercialization of platforms and usage of participants data for recruiting put some supposedly open initiatives in a bad light. Finally, the World Bank Report comes to the conclusion that the internet has not yet reached those who could benefit from its potential (World Bank, 2016, p. 147). Everything open but in the end not won anything for a fairer world?

Accordingly, there are many indications that Silicon Valley's "solutionism" (Morozov, 2013) alone will not improve education in the world. Hence, putting information online with low access barriers is a necessary but not a sufficient condition. This criticism also Open Educational Resources (OER) have to put up with as long as OER practices are not fully implementing Wiley's complete set of "5Rs" and take a halt at "just" creating and distributing OER (Wiley, n.d.). There is a need for practices that move on from a technical perspective over to the social, organizational

and cultural aspects of education in an online world and understand an online learning environment as a socio-technical system the way Herrmann (2003) does it referring to Luhmann (1990, 2008).

Within such a system, questions like the following arise: What roles exist in such a system? How important is the individual? How is the design of learning arrangements influenced by the individuals' dispositions, values and attitudes? And how can "staff" be trained to be open in the sense of Open Education? If openness does not only mean access, which can be easily produced with technical solutions, what else does it mean? How can openness be considered and embedded in the process of planning online learning arrangements? And how can the various actors that are playing roles in the design process of learning arrangements become aware of the potential of openness?

The study within this dissertation project dealing with these questions takes a look at various examples of experimental online learning arrangements and practices from recent years that can be called open. The analysis of interviews with initiators and educators in these cases is interwoven with a profound analysis of fundamental literature in the discourses Open Source, Open Education, Open Educational Resources and Open Educational Practices.

The aim of this analysis is to provide guidelines for embedding openness in socio-technical systems for online learning along with the process of their design and sensitize actors involved for the idea of Open Education.

Design/methodology/approach

Literature analysis, expert interviews, qualitative content analysis

Findings/expected Findings

From the analysis of literature and interviews diverse factors could be found that altogether add up to a complex model of openness. These factors point to a cognitive and experience-based approach to learn what openness means and embed it in the design process of web-based learning arrangements.

What is original/value of paper

The research approach introduced with this paper brings up an aspect in the current debate about openness in education that has not been shed enough light on yet: Open for whom? And how for everybody?

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Promoting Open Science Through Collaborative Learning. The MOOC "Science 2.0 and Open Research Methods"

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ABSTRACT

Keywords

Open Science, MOOC, Higher Education, Open Research

Purpose of this paper

This paper examines the MOVING MOOC "Science 2.0 and open research methods", an online course for open science developed and conducted at the Media Centre at TU Dresden. The MOOC (massive open online course) is intended to fill a current gap in the scientific methods training for young scholars in institutions of higher education. Digitization and the international and interdisciplinary opening of science in the 21st century require a new set of meta-competencies for young researchers to thrive in this environment. Scientific Communication and collaboration are depending more and more on digital tools and online environments. The term Science 2.0 refers to the targeted use of social media, participative web technologies and online communities in scientific practice. Science 2.0 is closely linked to the concept of Open Science, which aims to remove barriers that restrict access to scientific data and knowledge.

In the MOOC, young scientists get an introduction to open research methods and learn to use social web technologies and online communities as research tools: to build networks, discuss findings and collaborate with scientists across disciplinary, cultural and geographical boundaries. Open Science means the opening of scientific research processes facilitated by digitization and the proliferation of social web technologies. It is an umbrella term that encompasses technological, pragmatic and normative dimensions (Fecher & Friesike 2014). New research

infrastructures like the European Open Science Cloud[1] or the Open Science Framework[2] are being created to support researchers in information discovery, scientific collaboration and communication and in sharing their research outputs early and openly. Making science more open and collaborative has far reaching implications for the whole research cycle: from generating ideas, collecting data and collaborating in research teams to publishing research papers or other research products like code, data and methods. Social technologies such as blogs, wikis and social bookmarking services in combination with movements such as Creative Commons offer completely new opportunities to publish, share, discuss and reproduce scientific findings and data. And movements such as Open Data, Open Access or Open Educational Resources regard free access to knowledge as a normative prerequisite for the development of humanity and question the institutional power of profit-oriented publishers for scientific journals and data, which often keep research results behind a paywall.

However, despite the many advantages that digital technologies and open research workflows provide for researchers (see McKiernan et al. 2016) scholars are hesitant to share their research and data early and open their workflows to others. The reason for this reluctance is usually not a general rejection of the concept of open science, but a sense of ambiguity about what exactly open research means and also a lack of skills and competences to effectively use digital tools and collaborative methods. Therefore, training researchers in open research methods and open science workflows is key for the proliferation of open science practices.

Design/methodology/approach

The MOVING MOOC "Science 2.0 and open research methods" is designed as a four-week crash course to give learners a broad overview on open collaborative science[3]. In the context of the MOOC, both didactic elements of cMOOCs and xMOOCs were used. In xMOOCs, knowledge is conveyed in the classical sense with the help of clearly structured learning content such as videos, quizzes and PDF documents within individual learning sequences, which are in the tradition of cognitive learning theories. In this form of MOOCs, the course takes place over a period of several weeks according to a previously defined course plan. At the end of an xMOOC, a formative assessment is usually carried out, e.g. in the form of an online test. If the assessment is successfully passed, the xMOOC participants receive a certificate of achievement (see

[1] European Open Science Cloud (EOSC). https://ec.europa.eu/research/openscience/index.cfm?pg=open-science-cloud

[2] OSF Open Science Framework. https://osf.io/

[3] https://moving.mz.tu-dresden.de/mooc

Schulmeister 2005). The cMOOCs ("connectivist" MOOCs), on the other hand, focus on collaborative learning. According to the learning theory of connectivism coined by George Siemens and Stephen Downes (Downes 2012), learning takes place in networks and self-organized by the participants. Teachers take on the role of moderators, facilitate various learning paths and provide corresponding learning content. What and how they learn is decided by the learners in a collaborative exchange (Haug & Wedekind 2013). The MOOC participants in cMOOCs learn in the group through collaboration and exchange with other participants, for example by writing and commenting on blog posts or jointly creating content. Learning becomes a collaborative experience, learners and digital artefacts remain connected in a network (Staubitz et. al. 2015).

For the MOOC "Science 2.0 and open research methods", elements of both cMOOCs and xMOOCs were used. The MOOC topics, open science and open research methods, already imply the great importance of networking and community building. In this respect, connectivist MOOC elements that promote communication and collaboration play a special role. In the sense of an "open science practice", the participants should actively test the use of digital tools for communication and collaboration and exchange their experiences with other participants and reflect on their use of these tools. In the MOOC this is achieved via moderated forums and the use of social media. At the same time, xMOOC elements, i.e. videos, infographics or literature, are used to convey basic knowledge about Open Science as well as attitudes and competencies associated with it. Participants do not have to follow a uniformly defined learning path, but can decide for themselves which of the resources they want to use and which thematic focuses they want to set.

Findings/expected Findings

In already three live runs the MOOC “Science 2.0 and open research methods” attracted more than 500 learners from different academic disciplines and professional backgrounds. Each week is covering one of four main topics: (1) What is open science, what are the main aspects and why should scholars care; (2) how have digital tools and platforms changed the information landscape and the way to do research; (3) how has open science changed scholarly communication and collaboration; and (4) how can scientists make their own research more open? The MOOC is addressing young scholars (PhDs and PostDocs) who were already working in an academic environment, so we designed the course in a way that their everyday work experience as researchers was integrated in the learning approach.

Each week there are six to eleven activities that the students engage with in the course. The course material is provided in a variety of media formats (texts, blogs, videos, audio, infographics, etc.) and is based on reused, re-compiled and self-produced Open Educational Resources (OER).
The activities in the MOOC differ in duration, activation level, format and learning objective. Learning materials are provided in different formats: Videos are used to give an overview of a topic, give testimonials or show transfer possibilities for what has been learnt into one's own practice. Infographics help to give an overview of a topic or explain complex procedures and concrete workflows. Texts, like journal articles and handbook chapters, served the deepening of knowledge. Blogs and podcasts illuminate the weekly topics from a more personal perspective of scholars and other practitioners. In small weekly assignments, learners are encouraged to try out open scientific practices such as crowdsourcing academic tasks via social networks like Twitter[4] and Reddit[5], using open repositories (Zenodo[6], Figshare[7], OSF, etc.) to share their research, using open licenses like Creative Commons, or creating a personal ORCID[8]. Part of each live run of the MOOC was also a webinar in which learners had the chance to ask questions and discuss challenges and benefits of Open Science with invited experts on the topic and the course moderators.

Practical implications

Evaluations showed that for many learners the MOOC "Science 2.0 and open research methods" was the first time they systematically engaged with open science topics and for many of them this experience was transformative in the way the planned to approach openness in academic workflows in the future. Many of them enjoyed the collaborative format, the diversity of learning materials and media formats and they actively engaged with their peers in the forums. The advantage of MOOCs as a learning format is that they – other that face-to-face training or workshops - facilitate a large number of learners at once. The online format makes it possible that learners can participate in the course from anywhere they are – from their workplace, from home or their universities. With the exception of the live webinar, the course is asynchronous so that learners can decide when to engage with the learning materials, when to take part in the forum discussions and complete their assignments. This flexibility was highly appreciated by the participants because it allowed them to engage in the course on their own pace and e.g. use spare time during their work day or off-time for learning. At the same time, learners enjoy the social

4 https://twitter.com/
5 https://www.reddit.com/r/askscience/
6 https://zenodo.org/
7 https://figshare.com/
8 https://orcid.org/

learning aspects of the MOOC. Other than in self-paced online courses, learner felt to be part of a larger community by actively engaging with their peers and learning from the exchange among each other. The MOOC is designed as roadmap course of Open Science to give learners a broad overview of major aspects of open research in a limited amount of time. Keeping the course relatively short had the benefit of having lower drop-out rates, but it also meant that subjects often could not be dealt with in depth. Some learners were interested in additional modules (discipline specific or topical) and asked for more specialized open science training.

Feedback also shows that many of the participants planned to integrate open research methods in their work routines or even started open science initiatives in their work environment and at home institutions after the course was finished - an outcome that the creators of the MOOC had intended and hoped for.

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Questionable Research Practices and Open Science in Undergraduate Empirical Projects: Results from a Nationwide Survey amongst German Psychology Students

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ABSTRACT

Keywords

questionable research practices, psychology students, research methods, open research practices

Purpose of this paper

In recent years, a substantial body of research has established that questionable research practices (QRPs) and p-hacking amongst researchers are alarmingly widespread (Banks, Rogelberg, Woznyj, Landis, & Rupp, 2016; Fiedler & Schwarz, 2016; John, Loewenstein, & Prelec, 2012). But so far, little is known about their prevalence in the student population, or coverage throughout undergraduate education. As the researchers of the future, today's students will substantially shape the scientific field of tomorrow, and therefore should be educated about sound research

practices early on. However, regardless of their preferred future occupation, students have a vital interest in ensuring their education is based on reliable and open research, since such research results lay the foundation for their future professional activities (Konferenzrat der Psychologie-Fachschaften-Konferenz, 2018). Therefore, as members of the Students' Open Science Initiative of the German "Psychologie-Fachschaften-Konferenz" (SOSIP), we conducted a nationwide survey to assess the current state of teaching practices in psychology regarding QRPs and open science.

Design/methodology/approach

The final sample consisted of 1,398 psychology students and recent graduates (78% female, 20% male and 0.2% diverse, $M_{age} = 22.93$, $SD_{age} = 3.94$ years) from 47 universities. 64% were enrolled in a bachelor's and 33% in a master's program, while the remaining 3% graduated within the last three years. Participants were asked to provide data on their use of nine QRPs and two positive research practices (preregistration and power analysis) in empirical research projects throughout their studies. They further provided information on teaching coverage of specific QRPs and the general topics of the replication crisis and open science. Finally, we asked participants about their attitudes (perceived importance, interest and felt informedness) towards the topic area.

Findings

The key results indicate that the use of QRPs in students' empirical projects is prevalent, on average, in up to one third of observed projects, but appears to decrease over time: While two thirds of all participants used at least one QRPs in their first-year projects, this percentage lowers to around 50% in their bachelor's and one third in their master's theses. "No sample-planning" and "selective reporting of dependent variables" emerged as the most prevalent QRPs in 34% and 23% of observed projects, respectively. Regarding the positive research practices, power analysis was covered in 34% of observed projects, and 23% of all projects were preregistered, e.g., using an online tool or by handing in a proposal to the lecturer directly.

Even though 75% of participants report having heard about the replication crisis and QRPs in their courses, teaching coverage was heterogeneous across universities and subject areas. These topics were mainly covered in methodology and statistics courses, where 55% of participants got in contact with them. By contrast, coverage in applied psychology courses varied between 28 % in social psychology and 4.4 % in developmental psychology.

Perceived importance of the topic area of open science and the replication was notably high, with 94% indicating high or very high importance. By contrast, participants' ratings of felt informedness on the topic were mixed: While 34% indicated a high or very high level of felt informedness, another 34% reported the opposite.

Research limitations/implications

As our survey followed a cross-sectional design, causal mechanisms underlying the usage of QRPs cannot be directly inferred from our data. The necessarily retrospective estimation of QRP usage throughout an entire study period poses a complex memory task. Therefore, it cannot be ruled out that memory effects or biases affected the participants' accounts. Likewise, some participants may have misunderstood the given definitions of QRPs, leading to inaccurate self-reports (e.g. reporting non-questionable practices as questionable and vice versa). To alleviate this problem, illustrative examples of the QRPs were provided.

Importantly, the role of QRP item phrasing should be taken into account. As noted by Fiedler & Schwarz (2016), research employing a broad QRP definition may result in higher number of reported QRPs, while a more narrow and specific definition may decrease this estimation. Since we provided, in part, specific examples alongside our QRP descriptions, this effect may have affected our results and should be considered in comparisons with other studies which used differently worded QRP items.

Practical implications

In conclusion, our results show that QRPs seem to be prevalent already in the earliest stages of academic education. To address this problem, we believe that comprehensive coverage of the replication crisis and its causes in methodology and statistics courses is necessary. Besides that, the topic area should be integrated more strongly in applied subjects, such as social or clinical psychology. A stronger focus on open practices and a critical reflection of QRPs within the curriculum are not only preferable from a methodological point of view, but also in accordance with students' interests. Therefore, we encourage universities to establish these topics as a mandatory part of their curricula.

This can be achieved, for example, through the development of a methodological core curriculum for empirical projects (see Schönbrodt et al. 2018, p. 42) as well as methodological minimum standards for final theses. Other notable course concepts focusing on raising students' awareness of QRPs and developing skills for open and reproducible research have already been implemented, e.g., in psychology programs at the Universities of Amsterdam (Sarafoglou, Hoogeveen, Matzke, & Wagenmakers, 2019) and Glasgow (Barr et al., 2019).

What is original/value of paper

To the best of our knowledge, the present study is amongst the first to assess the prevalence of QRPs in a large sample of psychology students across various study stages and project types. With this study, we aim to establish an empirical basis for further work to improve teaching practices in psychology and neighboring fields. By shedding light on students' perspectives on

the open science discussion, we hope to underline the vital importance of including sound and open research practices in tertiary education.

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Monitoring Researchers' Open Science Practices in Education

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ABSTRACT

Keywords

measuring open science, questionnaire, attitudes

Purpose of this paper

Open Science is a movement permeating disciplinary boundaries with the goal of improving scientific conduct by sharing processes with a wider audience (cf. Fecher & Friesike, 2014). For example, van der Zee and Reich (2018) describe for the case of education science, that open science addresses replicability problems, like costs of accessing research articles, the selective reporting of studies with statistically significant results, or the so called *researchers degree of freedom* in conducting studies in a way that they have desired results. Against this background, Open Science seems to be a desirable goal to move to.

To be able to study how researchers can be motivated to actually do open science, it is necessary to quantify their endorsement of open science. A quantitative conceptualization of the adoption of open science practices allows to compare causes for open science, makes it possible to show how the adoption of open science practices develops over time, and allows to study open science practices as predictor for further outcomes, for example for successful grant proposals.

The goal of the current project is to monitor the use of open scientific practices in education science in Germany. Therefore, we developed a theoretically derived questionnaire with the goal to assess the degree to which a broad range of open scientific practices are done, which we refer to as *scientific openness*. This questionnaire will be used in a large sample of educational researchers in Germany. We will relate individuals' scientific openness to disciplinary backgrounds, scientific approaches, as well as attitudes towards scientific norms and open science. The project aims to answer three questions: (a) How *open* is education science in Germany, (b) which constructs are associated with scientific openness on the individual level, and (c) which constructs are associated with scientific openness on the contextual level?

The development of the questionnaire is based on contemporary definitions of open science. These are summarized by Bosman and Cramer (2017). Definitions share some core aspects, but

diverge in other aspects. As a working definition, we refer to *open science* as a facet of the broader concept of o*pen knowledge* (which further summarizes *open educational ressources*, *open source software* and *open hardware*). Open science are scientific behaviors and practices that make science more (a) open to participation to the broad scientific community and the public, as well as (b) open to use, check, modify, re-use and redistribute scientific products like data, code, notes, or research reports.

Design/methodology/approach

Based on this definition, we derived a core set of eleven open scientific practices. These scientific practices are based on research cycles as presented by Open Science and Research Initiative (2014), Bosman & Cramer (2016), or the Center for Open Science (n.d.). This core set included for example practices like *sharing data*, *publishing open access papers*, *sharing research notes*, or *disseminating research results for the public via social media*. To quantify the degree of scientific openness, we chose a response scale that resulted in a higher scientific openness when practices were made open to a larger audience (cf. Fecher, Friesike, & Helbing, 2015). For example, sharing data freely with the public would result in a numerically higher score in scientific openness than sharing data (exclusively) with colleagues in the same institution.

To understand reasons for scientific openness, we included a number of potential predictors in the questionnaire based on previous research (Kim & Stanton, 2016; Fecher, Friesike, Helbing, & Linek, 2017). These include academic disciplines, disciplinary attitudes and attitudes towards open science. Because of the conceptual similarity to scientific openness, the endorsement of Mertonian norms is also considered (Anderson, 2010).

To evaluate the applicability of the questionnaire, we will first check the questionnaire in a qualitative pretest. We will use a small sample of educational researchers with diverse disciplinary and methodological backgrounds. The sample will work on the questionnaire and thereby produce think-aloud protocols. Following, they will be interviewed for their understanding of the questionnaire. Based on results of this procedure, the questionnaire will be iteratively adapted.

In the main part of the project, the questionnaire will be used in a large sample of educational researchers throughout Germany. We will aim for a sample that is as large as possible. To achieve a high number of participants, we will contact disciplinary associations and use their mailing lists. Furthermore, participants are offered an individual openness profile as feedback.

Expected Findings

The main result will be an estimate of the level of open science for the German educational sciences. Furthermore associations between scientific openness and attitudes toward science and open sciences provide potential explanations for researchers' engagement in open science.

Limitations

Due to the quantitative nature of the investigations, open science practices will be investigated in a closed format. This approach makes it necessary to limit open science practices to a specific set and also to limit response options to a specific set. The selection of practices and response options may not adequately represents all ways in which researchers engage in open science. A similar limitation is true for attitudes toward science and open science, where researchers need to stick to possible answering options.

Furthermore, the study will be cross-sectional. This design precludes the interpretation of the employed predictors as explanations for scientific openness without further assumptions.

Practical implications

Results provide a first orientation of how open the education science in Germany is. This evaluation can serve as a source for information regarding the development and demands for scientific infrastructures as well as policy considerations.

What is original/value of the paper

A central contribution of the project is to provide a questionnaire to assess scientific openness. This measure can be adopted by a wide range of social sciences with similar methodologies as education science. Quantifying scientific openness makes it possible to study its predictors, consequences, and development over time. Furthermore, the questionnaire allows investigations on both the individual as well as on a disciplinary level.

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Open Science Practices – a theoretical reflection

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ABSTRACT

Keywords

Open Science, Practices, Crisis of Science, Disciplinary Cultures

Purpose of this paper

More and more articles discussing a "crisis of science" (Saltelli & Funtowicz, 2017). The crisis is identified by seven symptoms: First, the replication crisis, which means that published studies cannot be replicated by other researchers or lead to different results (Open Science Collaboration, 2015). Second, the deficit in statistical training and good statistical designs/models(Young, 2018) which for example leads to not useful research in medicine (Ioannidis, 2016). Third, the manipulation of p-values (or 'p-hacking') is identified as a problem. For example, (Simmons et al., 2011) state: "In many cases, a researcher is more likely to falsely find evidence that an effect exists than to correctly find evidence that it does not." Since only positive and significant results are published results in the creation of a bias in scientific literature (Bruner & Holman, 2019). Fourth, "journal-based metrics, such as journal impact factors, should not be taken as a surrogate measure for the quality of research, and, above all, should not be used in hiring, promotion, or funding decisions." (Ioannidis, 2014) At the same time, especially early career scientists must comply to the metric system if they want to survive in academia (Fanelli, 2009). Fifth, complying with the metric system implies publishing in peer reviewed journals, which according to Frey (2003) is tantamount to prostitution: "Authors only get their papers accepted if they intellectually prostitute themselves by slavishly following the demands made by anonymous referees who have no property rights to the journals they advise." Sixth, the metric system motivates scientists to producing as many articles as possible, which leads to the "publish or perish" effect of splitting research into as small parts as possible (Saltelli & Funtowicz, 2017). Seventh, Fanelli (2009) refers to a poll in which 2/3 of the interviewed scientists "admitted having recurred to 'questionable' research practices" because of the publish or perish culture. In sum, these symptoms contribute to science being under increasing pressure as the "public trust in the evidence produced by science and its institutions" decreases (Saltelli & Funtowicz, 2017).

Taking a step back, the described problems do not account for a crisis of science as such but are (systemic) bad practices of scientists. The bad practices reflect very much the counter-norms of science (Mitroff, 1974). Open science can be seen as a counter-movement to the bad practices

and also aims for a system change. Open Science is a movement (Allen & Mehler, 2019) "that advocates for more public and accessible science, and has progressively encompassed new researchers' practices and identities that go beyond the idea of digital science towards open and social activities"(Raffaghelli & Manca, 2019). The first goal of Open Science is to change the practices of scientists so that they design their research process as open as possible from the initial idea to the archiving of data (Steinhardt, 2019), by using open methodology, open access, open data and open peer review. The second goal is to create the necessary political and infrastructural conditions to support open practices.

So far, little has changed in the practices of scientists, even though politics exerts pressure, for example by linking funding to the re-use of data (Horizon 2020) or by open access strategies (Plan S). However, and this is the thesis of this paper, scientific practices will only change connected to disciplinary cultures (Becher, 1981) and their values, norms and patterns of acting, thinking and perceiving (Bourdieu, 1977). Schatzki defines practices as: "temporally unfolding and spatially dispersed nexus of doings and sayings". The awareness of practices is part of the process of socialisation into a disciplinary culture, when individuals incorporate the typical social structures and practices of the disciplines (Schneijderberg, 2018). This means, if the practices of the discipline are not characterized by openness and the principles of Open Science are not part of socialization, then they will have difficulties to finding their way into the practices of scientists.

Research limitations/implications

The proposed contribution is a theoretical reflection and therefore no empirical material is used.

What is original/value of paper

Up to date, Open Science has been viewed primarily from a normative perspective, without paying attention to distinction, power imbalances, micro-political negotiations or the stability of existing practices. This paper will explore the research gap of scientific practices in the discussion on Open Science and give some ideas to fill the gap by using the theory of practice.

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Experiencing open practices – a qualitative long-term study among early career educational researchers

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ABSTRACT

Keywords

Open research practices, qualitative study, educational research

Purpose of this paper

The long-term study aims at getting deeper insights in how early career researchers adopt open practices in their daily work, i.e. research and teaching. Quantitative surveys show that researchers think differently about open practices (Levin & Leonelli, 2017; Levin, Leonelli, Weckowska, Castle, & Dupré, 2016), have attitudes against data sharing (Ünal, Chowdhury, Kurbanoglu, Boustany, & Walton, 2019) and are influenced by diverse factors like communities and policies (Bossu & Stagg, 2018; Kim & Nah, 2018; Linek, Fecher, Friesike, & Hebing, 2017). The current study offers researchers to test open practices and reflect on them during their active daily work. The focus lies on practices that relate to aspects of open science (Kramer & Bosman, 2017) and open education (Cronin, 2017). The study contributes to a better understanding on how personal-, social- and environmental-dependent factors influence the adaptation of open practices in research and education. The approach is user-centric, i.e. participants choose their own practices to test and reflect on them for about half a year.

The study focuses on two main research questions:

- Which factors influence research practices?
- In which way are those factors dependent from each other?

Design/methodology/approach

The long-term study started in April 2019 with five educational researchers. In a workshop, participants learned about the ideas of open science and education (Table 1) and were able to test several tools to be applied in their research or teaching. At the end of the workshop, participants wrote up scenarios (Table 2) in which they would like to apply open practices for the next months. Currently, they are reflecting on their experiences via diary entries, i.e. text or audio they send to us.

A second phase in September started with four new participants. In April 2020, all participants will join a workshop to share experiences and reflect on drawbacks and best practices to apply open scenarios.

Expected Findings

The workshop data analysis gives first insights into the experiences of our participants regarding open science topics (Table 1). Those topics were discussed within the workshop and participants got shown examples on how to apply those practices with exemplary tools and services. We summarized workshop discussions in an online editor pad and a Wikiversity website[9]. We are currently analyzing interview data and first diary entries and will discuss first at the symposium (Table 2). With the interviews, we get deeper insights into the researcher's past and current work and environment, their attitudes towards roles and tasks in research and teaching and their experience with practicing openness. With the diaries, we expect to see a reflection on the open scenarios tested in relation to influencing internal and external factors.

Table 1. Number of participant answers (multiple choice) at workshop in April, asking about experience with open science aspects.

	I heard of that	I have own experience with that	I'd like to know about that
Open Access	3	3	2
Open Data	3	1	4
Open Source	1	3	4
Open Peer Review	1	-	**5**
Open Methodology	-	1	**5**
Open Educational Resources	3	**4**	2
Citizen Science	3	1	1
Open educational practices	3	-	**5**

Table 2. Participants, their scenarios and first experiences.

Participant	**Scenario**	**Diary entries**
Participant 1 Background: 2013-2019 PhD in education	- Use of Cryptpad for teaching in a seminar for language advancement in primary schools	Three entries: - Limited applicability of Cryptpad due to little usage of laptops by students

[9] https://de.wikiversity.org/wiki/OPER

	- Goals: - Encouraging collaboration among the students - Training of the articulateness of the students	- Feedback from 19 students at the end of the seminar: - Some found it practical, others confusing to use - Participant's conclusion: - For optimal utilization of Cryptpad further training of students is needed
Participant 2 Background: 2012-2018 PhD in engineering mathematics	- Use of Cryptpad for collaboration with colleagues for project for evaluation of the study program - Goal: - Transparency of the workflow	Three entries: - At first reluctance of colleagues - Pros: - Location-independency for collaborative work - Easy change from Excel - Cons: - Lack of user friendliness - Error reports undermining of the acceptance of Cryptpad
Participant 3 Background**:** 2011-2016 PhD in education	- Scenario 1: Use of Cryptpad for collaboration with colleagues - Goal: - Higher efficiency of collaborative work	Two entries - Pros: - Transparent workflow - Easy to access and to use - Easy storage of different pads in drive (folders) - High acceptance among colleagues - Cons: - None so far
	- Scenario 2: Use of Zotero for the organization of literature - Goal: - Independence from Citavi	One entry: - Pros: - Open Source = costless - Easy to use - Works faster than Citavi - Cons: - Less clarity in comparison to Citavi
Participant 4 Background : 2019 start with doctorate in education *Has left the OPER-study due to other work duties*	- Use of the platform OPAL in a seminar - Goal: - Promoting collaboration among students	One entry: - Pros: - Platform is already known among students - Cons: - Disappearance of uploaded materials - Constant system changes of the platform > undermining of usability

Participant 5 Background: 2016-2018 PhD in chemistry education	- Scenario 1: Use of OLAT in a seminar - Goal: - Better collaboration among students	No entry so far
	- Scenario 2: Use of Zenodo and Impactstory - Goal: - Enhancement of the participant's outreach	No entry so far
Participant 6 Backround: 2018 start with doctorate in education	- Scenario 1: Use of Hypothes.is in a seminar - Goal: common annotation of texts with students	No entry so far
	- Scenario 2: Upload of own teaching materials in ZOERR	No entry so far

Research limitations

The qualitative study gives deeper insights, but is not representative for early career educational researchers. Researchers, who were willing to participate, had already heard of open science or open access and are highly interested to learn about it. We would not find researcher, who are rather reluctant towards open practices or have good reasons not to apply them. Moreover, one participant opted out because their work tasks changed and they could not apply educational scenario intended.

Practical implications

The findings from researchers' practical experience will allow actors to better understand scientists' needs while practicing openness. This informs providers of research infrastructures and services, policy makers and heads of research institutes and will help them to improve their support for early career researchers.

What is original of paper

To our best knowledge, the study is one of the first approaches to accompany early career researchers on their way to apply open practices in their actual working environment during a long-term phase. Results will reflect on the success and drawbacks in practicing openness in time and in real-life spaces.

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Going beyond statistical rituals: Improving the understanding of statistics using blog posts and workshops

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ABSTRACT

Keywords

Replication crisis, statistical literacy, p-value,

Purpose of this paper

In recent years, it has become increasingly clear that many empirical findings in psychological science are not replicable (Open Science Collaboration, 2015). This is problematic, because this suggest that psychological theories, which are often used for high-stake decision making, may be based on effects that, in reality, do not exist. The proximal causes of the replication crisis have been identified as publication bias (selective publication of significant results), questionable research practices (tweaking the data and analyses until one obtains a significant result), low power (too few participants to yield a high probability of obtaining an effect of interest) and hypothesising after results are known (HARKing; writing a rationale for a study after the data has already been analysed) (Bishop, 2019). To a large extent, these issues can be traced back to a poor understanding of statistics.

Design/methodology/approach

Improving statistical training in higher education provides a potentially powerful cure to the replication crisis: specifically, researchers need to develop a deep understanding which goes beyond the calculation of a single summary statistic such as a p-value (Gigerenzer, 2018). In a series of workshops and blog post, I aim to provide mathematically correct but intuitive explanations of basic statistical concepts which are often used for inference. For example, questionable research practices are often a result of a lack of understanding of how the p-value works (Simmons, Nelson, & Simonsohn, 2011): It is unintuitive why it is incorrect to calculate a p-value and determine whether to continue testing depending on whether the result is approaching significance or whether it is already significant. It is more intuitive, however, to think of an example of tossing a coin: if I promise to correctly guess five outcomes in a row, I will achieve this if I continue tossing the coin until I obtain five correct guesses in a row, even though I lack

any clairvoyant powers. The coin analogy can therefore provide an intuitive explanation about why optional stopping is inappropriate when relying on a p-value for inference.

Implications

The development of such materials is the first step to improving statistical literacy. Here, the challenge is to find a level of depth that does not oversimplify complex concepts which could, in turn, lead to an increase in the inappropriate use of statistical methods, while at the same time avoiding technicalities that are irrelevant to researchers. The next step is open dissemination. Here, there are several options, each with benefits and drawbacks. For example, workshops and seminars allow the attendees to ask for clarifications, but have strong limitations in terms of accessibility. These are issues that warrant further discussion.

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Open Science Online Training package for African scientists

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ABSTRACT

AfricArxiv is a free, open source and community-led digital archive for African research output in the form of a non-profit open source platform for African scientists to upload their working papers, pre-prints, accepted manuscripts (post-prints), and published papers as well as associated data packages and article versioning. AfricArxiv is dedicated to enhance and open up research and collaboration among African scientists and non-African scientists that work on African topics.
We aim to choose a platform (Eliademy, Moodle, or other) to allocate resources and training materials for African scientists to familiarize themselves with possibilities and existing options to present, disseminate and discuss their research output in a licensed, Open Access and career-benefitting way. The course content should be available in English, French, Arabic, kiSwahili, and other traditional African languages through machine translation and manual adaption. Content materials should be adaptable over time to ensure up to date information.The abstract itself should not exceed 1000 words.

Keywords

Research in Africa, preprint, OER, Language Diversity

Purpose of this paper

Resources on Open Science and Open Access do exist in abundance but are scattered around the world wide web and tailored towards different target audiences. A first step will be to collect those resources that are clearly relevant and adaptable to scientists working on the African continent with limited educational resources and online infrastructure - varying widely across the continent. The content development shall be done in the open with active recruitment for participation by African stakeholders and non-African stakeholders that have a proven track record on expertise in online educational resources, ICT4D, EduTech and related fields.
From discussions and exchange of knowledge and expertise of building OER for the HE context we hope to be able to inform the other participants and sensitize for a potentially global audience for their OER projects as well as learn from the other participants and get feedback and valuable input for our proposal and next steps.

Practical implications

The project needs to address severe limitations and varieties in online infrastructure across the continent.

What is original/value of paper

To our knowledge, no specific training on Open Science targeted to the working environment of many African scientists exists to date. Also, the open approach and active recruitment of African stakeholders for content creation seems novel. Language diversity is often neglected and can bridge language barriers across the continent as well as facilitate science communication to the general public in various regions based on traditional languages.

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