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What Collaboration Means to Us: We are more powerful when we work together as a community to solve problems

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We Are More Powerful When We Work Together as a Community to Solve Problems

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It Started Off With a Tweet

In March 2017, Lisa Matthias and Jon Tennant walked down a crowded street in the middle of central Hanoi, Vietnam, surrounded by strange and wonderful smells and sounds. We talked about the lack of Open Science training and how this seemed to be at odds with the strong political motivations towards Open Science at the time, especially in Europe. It echoed a discussion Bianca Kramer, Julien Colomb, and Johanna Havemann had had during an OpenCon satellite event in Berlin, earlier that year. Moreover, the European Commission (EC) had just published two critical reports: *Evaluation of Research Careers Fully Acknowledging Open Science Practices*, and *Providing Researchers with the Skills and Competencies They Need to Practise Open Science*. But the big question was (and still is), who is training researchers at scale to adapt to the changing world of open research practices?

We tweeted this problem out, asking whether we needed some sort of massive-scale online training initiative, to gauge whether there was interest. Within minutes, we had dozens of responses saying yes! There seemed to be a huge appetite out there from (early-career) researchers for this sort of project. 'So when are you going to do this?' people asked. And with that, the Open Science MOOC was born.

How Did It End Up Like This, It Was Only a Tweet

'MOOC' traditionally stands for 'Massive Open Online Course', and is not a small undertaking. It was time for action, but where to start? The first step was to assemble a steering committee. We contacted known Open Science aficionados and sent out an open invitation to anyone interested in joining the project. This allowed people from outside our immediate social bubble to participate, and resulted in a 13 strong team, mostly from across Europe. With this in place, we drafted a statement of interest and sent it to

virtually everyone related to those two EC reports mentioned earlier. Their response was good: go for it. And so we did!

The course began to develop further shortly after this, simply as a website and a group of Open Science enthusiasts. After defining the core structure, we went through a lengthy debate about what to call ourselves. We settled on the more popular 'Open Science' MOOC in the end, acknowledging that while it might not be the most inclusive term, as long as we were explicit about who actually was included within our mission (i.e., everyone, irrespective of background or discipline), this was a good middle ground.

Using a shared Google Doc, we opened up the idea to the community and began to draft the modular structure of the MOOC, and listed useful resources (online content and people), learning objectives, outcomes and activities for each module. This was an enormously collaborative effort over a period of months, and it formed the basis for the actual MOOC.

One of the most important things at this early stage was to define our mission. We were not just going to build a platform or a tool, we were also thinking about the world we wanted to help create. Our mission became: "Help make 'Open' the default setting for all global research. We want to help create a welcoming and supporting community, with good tools, teachers, and role models, and build upon a solid values-based foundation of freedom and equitable access to research."

How Are We Collaborating?

Given our mission, we actually consider the C in MOOC to stand for Community (not just for Course). However, getting this community off the ground was certainly not easy. The project is almost entirely driven by the passion and support of individuals as part of the wider Open

Science/Open Scholarship community. We received a donation thanks to the kindness of Simon Adar at CodeOcean, to help kick things off, which we used to purchase some technical equipment. Jon also received a personal Shuttleworth Flash Grant which helped to support the project, but besides this the main driver was a strong will to achieve our mission. And, well, lots of caffeine.

Collaborating on the MOOC was a new and fun experience for us. Before rushing headlong in, we decided to create a pilot module, selecting Module 5: Open Research Software and Open Source. We soon realized that the tools we wanted to introduce in this module were also the same tools we were using to develop the MOOC (e.g., *git*, GitHub, Zenodo, RStudio and Python notebooks). These tools proved to be extremely helpful in content development and project management for such a large-scale collaboration.

GitHub is where most of the fun happens. Here, we have a repository for each module, one for the website (developed through GitHub pages and Jekyll, by Danny Colin) and one just for general MOOC-related things. Each module has (or will have) a core team to assist with development, again following the outlined procedure (first directly ask people, then open a public invitation). Although GitHub was primarily designed for software development, it is really handy for pretty much anything that is text-based, as well as for project management. Module 5 emphasizes quite nicely the interaction we had for its development: 316 commits to date, 33 contributors, and 45 different branches for people to work on along with the master branch.

Now, we know GitHub can be a bit tricky for newcomers. So we made things as easy as we could, guiding people through the basics of collaboration before starting. We wrote contributing guidelines for assistance, and we have a

code of conduct so that people feel more welcome contributing in the space. For this, we followed solid advice from Mozilla. For those less familiar with the GitHub workflow, we had the issue tracker, where people could contribute feedback, questions, and guidance as the project evolved. We had people from all sorts of backgrounds willing to contribute, from hardened Open Source veterans, librarians, and education specialists, through to researchers and members of NGOs. It is really quite a beautiful process to be a part of - everyone simply contributes what they feel comfortable with in the open, with the aim of advancing the project.

To make it easy to join the Open Science MOOC project, we built a little app where anyone can join the GitHub team if they want (rather than us having to explicitly invite them), and to date 140 people have joined in! At the moment, the community can be categorized into 4 groups. Advisors, or 'hackers', help to provide general support for the MOOC development. Authors engage with the development itself - the editing and creation of new content. Reviewers, by far the biggest group, provide feedback on the content as it evolves, and check for any bugs or errors. And finally, teachers use the content either offline or online for training purposes.

In sum, this means that we have a very fluid, efficient, and dynamic way of creating content. The process begins with a solid foundation, including a full production toolkit, standardized across each module, and from there evolves constantly and iteratively. More people checking things means more eyes to spot errors, and means we unlock the wisdom of diverse crowds. Because we develop everything in such a radically collaborative manner, it means we are able to release things as soon as they are done. What we are essentially doing is a mode of 'agile development', where iterative production of "minimal viable products" are realized by adaptive team collaboration. This means that even before

a module is officially launched, the tasks, videos, and other learning content can be shared and re-used as much as possible. We periodically create releases through [Zenodo](#), so that the content is safely archived and a DOI is minted to make re-use and citation easier. Everything is also licensed either CC0, CC-BY or CC BY-SA to this effect too.

The outcome we are the proudest of, are probably the introductory videos for each module. You can find one for the module on Open Principles [here](#). Now, we didn't exactly have a huge budget for this, so we couldn't do anything too fancy. However, in these videos, what we wanted to communicate were the *people* behind Open Science and their experiences and stories. Why does it matter to them? What real-world effects on real-life people has it had? To get this across more effectively, we recorded people from across diverse backgrounds, with stories from across the world: Indonesia, Hungary, USA, Australia, Ecuador, and Benin.

How Are We Growing the Community?

OK, so that is how the development works. But how do we keep the community together? At the moment, we use Slack as an open discussion forum. It currently more than 800 participants from an incredible variety of backgrounds. Not everyone is a researcher too - some are service providers, librarians, or students. The point is, everyone is welcome to the spaces we create, irrespective of their experience with Open Science. We want to set a highly inclusive standard as the default. To help with this, again we have a [little app](#) where anyone can join in the Slack group. As well as individuals, we have also partnered with a number of groups, companies, and organizations in the Open Science space to offer mutual support; this includes the [Center for Open Science](#), [Open Access Nigeria](#), [IGDORE](#), and [Open Knowledge Maps](#). With these partnerships, we hope to help create a space blending the most progressive or useful

tools, services, and organizations in the Open Science base, with those who would ultimately benefit most from them.

However, a community is more than just a platform. For a community to thrive, it helps to have a shared and authoritative sense of organization, values, collaboration, and reciprocal sharing - and since Open Science is based on principles of equity and freedom, we decided to implement those as part of our community. The shared sense of belonging comes from anyone being able to contribute as they wish. The lines between creators, learners, and teachers are all very blurry in the community. As part of the Open Source module, we even help to train participants to make direct edits to the MOOC content on GitHub. This helps to create a shared sense of ownership too - no-one 'owns' the MOOC, and it is something for everyone.

What we haven't told you yet is which platform we are using for the training courses themselves. Well, this was actually a long and tough decision. We could not settle on one which met all of our criteria - low cost, open source, no fees for participants, sleek front and back ends. It was a discussion that seemed like it would never end. Then, one evening in Berlin, Germany, Jon and Julien were out at an event all about Open Education and online learning. There, we met a gentleman called Sotiris Makrygiannis. Sotiris was a wonderful speaker, and very charismatic. We had the chance to talk, and described to him what we were trying to do with the MOOC, and the issues we were having trying to find a platform. Then it was one of those beautiful moments in life where everything seemed to just to fall into place when Sotiris simply said "Yes, we have a platform that can do all of that for you." This is when we discovered [Eliademy](#), founded by Sotiris, and it seemed to be everything that we needed.

With a platform for the courses set, it was time to steam ahead with development and get the

first module out. We launched it in December 2018, and already have more than 900 active participants engaged in the platform itself. Everything we have created is available outside of Eliademy too, so we don't have to lock people in to a single platform if they do not want to. Everything is archived in the Internet Archive and Zenodo, as well as shared on YouTube and Soundcloud to maximize our reach. What this means is that it is likely we have a sort of core community, based around Eliademy, GitHub, and Slack, and then a secondary community which just interacts with the content in a more temporary manner. Giving people the freedom they want to engage with the MOOC content is important for us, which is why we try to produce material in as many formats as possible for different user experiences (e.g., video, audio, text, PDF, iPython notebook, HTML/markdown). Having a variety of formats means that we are able to communicate two things more effectively: knowledge and skills. Each module is distilled into these core sections, where you hopefully gain new insight into the various elements of Open Science, as well as new practical skills to enhance research workflows, save time, and make your work more open and efficient. People are also free to use the content offline for their own training courses or workshops. We see no reason at all to restrict the ways in which people want to engage with and re-use what we have all created. The only difference is that if you complete the full course on Eliademy, you get a pretty cool certificate to show off.

I Just Met You, And This Is Crazy, But You're Into Open, So Call Me Maybe?

The MOOC began to evolve into a community hub of like-minded people. It was incredible to see people come from all walks of life and emerge around a shared interest in Open Science. One of the cool things is that people who met via the MOOC began to also meet in real life. And also bring their friends and colleagues who they knew offline into the community. We

are now seeing the formation of smaller sub-communities that overlap with the MOOC, and a number of projects spawning as a result of this. Perhaps one of the most important here was the coalescence of different translation teams. Now, small groups of the community are beginning to work on translating the different modules into Portuguese, Spanish, French, Russian, Chinese, Italian, and *bahasa Indonesia*! The aim here is to not exclude participants based on their language. This is not an easy task by any means, but is certainly a worthwhile part of our mission. Another great project that developed in parallel with the MOOC was an incredible convergence of ideas in the [Foundations for Open Scholarship Strategy Development document](#), showing what can be achieved through the power of small, dedicated, and passionate communities.

So It Was All Sunshine And Daisies?

Like all big and ambitious projects, we encountered a number of problems, many of them still very much ongoing. For example, being a project that is all about being 'open', we have to make decisions about [how open we want to be ourselves](#). This means, for example, looking at Open Source alternatives to GitHub and Slack, where at the moment a lot of the action happens. A further issue is around [which licenses to use](#). At present, things are a combination of CC0, CC-BY, and CC BY-SA, depending on the type of content. We want to maximize re-use without restriction, but the world of licensing is complex, and finding a solution that satisfies every need is even more complicated.

At the moment, we are still very small-scale and have distributed the work and responsibilities somewhat unevenly in the community; something you can see by looking at the contributions on Slack and GitHub - most of the core work is still done by a handful of people, like with many projects of this scope (see this [excellent Dashboard](#) that Lisa Hehnke created). As we scale up

and grow, we need to think strategically about how to sustain this, and how to engage with and support the wider community. This means we also need to break out of our own little largely STEM-focused bubbles, offline and online, and make sure that we are still being as inclusive as possible. With this in mind, we will keep revisiting the organizational structure, and make sure that efforts are distributed more equally across the different sectors of the community. We are aware of these issues, and discuss them as much as possible, creating actionable items that we can work on to drive this project forward.

The Future

The future of this project is very exciting. It is very dynamic, so predicting exactly where things will go is a bit difficult at times. One thing we will be working on much more in the future is collaborating with research institutes, and especially those that have an interest in developing Open Science training courses. As we mentioned above, all of the MOOC content can be used online via Eliademy, or repurposed into existing learning management systems by any research institute around the world. There's no point, really, in having everyone building their own course and duplicating or wasting all that time and effort. Now that we also know how the development workflow works, we can streamline and accelerate the process for future modules. This is why we are tackling the next three

modules in parallel, with multiple sub-groups working on their own. The final thing we are conscious of at the present is how to define success for the MOOC, and assess the impact that we are all having. Time will tell.

At the end of the day, we hope to combine the best parts of Open Source, Open Education, and Open Science, to help break down barriers to scholarship. We wanted to show that if you just get a good group of people together, with strong intentions, then you do not have to spend millions of Euros to do Open Science training. And we think we have succeeded in this by being open, honest about our intentions, and by creating a healthy and productive collaborative environment.

Acknowledgements