LESSON PLAN: OPEN RESEARCH FOR PHD RESEARCHERS

Name of the class: Open Research in Practice: Building Confidence to Act, Community to Thrive and Skills for Life.		
Suitable context: (e.g., entry-level/ undergraduate/ postgraduate	Postgraduates; PhD researchers	
Total time: (e.g., 1 hour, 2 hours, 1 day)	2 hours, including 15-minute comfort break	
Pre-requisites:	• Basic research knowledge. • Describe the stages of the research cycle. • Be in a position to reflect on own research projects and decision-making processes.	
Related resources (e.g. slides, assignment materials, lecture recordings, etc)	Open Research Practices (ORP) Workshop slides (https://osf.io/82t9c/overview) including three active learning strategies; reflective group discussions (RGD), expert narrative (EN), and live demonstrations (LD). This workshop is based on the learning framework of moving Cognitive Awareness to Action-Oriented Ownership using the three active learning strategies. Each active learning strategy (RGD-EN-LD) complements and scaffolds learning across the learning framework.	
Learning outcomes:	1. **Knowledge**: Explain the purpose of Open Research Practices and identify where they may be implemented across the research cycle. (Aligns with whole workshop) 2. **Critical Reflection**: Critically reflect on how personal research values and motivations influence decisions about research transparency, openness and reproducibility. (Aligns with RGD) 3. **Professional identity**: Discuss how researchers engage with Open Research Practices in professional contexts. (Aligns with EN) 4. **Practical Skills**: Demonstrate the steps required to create an Open Science Framework (OSF) pre-registration and complete a basic pre-registration. (Aligns with LD) 5. **Application**: Identify Open Research Practices that are appropriate for own research project and justify the selection. (Aligns with EN and LD) 6. **Agency change**: Develop a personal action plan for incorporating relevant Open Research Practices within future research activities. (Aligns with RGD)	
Time	**Activity**	**Instructor notes**
5 minutes	Research as a behaviour, happening within an ecosystem.	Instructor leads explanation of 'Research as a behaviour, happening within an ecosystem' using Bronfenbrenner's ecological systems theory. References: Bronfenbrenner, 1976;

		Bronfenbrenner & Morris, 2007
10 minutes	Reflective Group Discussion. Instructor asks attendees to discuss a reflective question as a group at the beginning of the workshop: “What motivates you as a researcher?”	The intentional timing at the beginning promotes meaningful conversations while the collective learning experience fosters motivation. To enhance the experience, share the reflective 3-4 questions in advance of the workshop so the attendees can prepare answers to share within the group. Resources: Create a word map of attendees’ suggestions to support discussion.
15 minutes followed by 15-minute comfort break	Expert Narrative: Experiential learning via real-world connection. Two contrasting guest speakers share experience of 1) what motivates them as a researcher and 2) how that influenced them to engage with ORP.	The intention is to increase awareness of ORP value by demonstrating real-world practice. Two contrasting guest speakers allows for attendees to learn from varied experience and has been shown to improve understanding of relevance and application, enhancing cognitive and affective engagement by strengthening connections within research. To enhance the experience and engagement, share guest speakers’ information (who they are and role) in advance of the workshop. Offer 15-minute comfort break. Attendees can chat with guest speakers and guest speakers are welcome to leave after their presentations.
20 minutes	Problems, causes, and solutions.	Instructor leads explanation of the problems, causes, and solutions of the replication crisis. **Problems** Take home message: Replication is difficult. Debate is not whether there is a problem, but how widespread the problem really is. References: • Reproducibility project: Open Science Collaboration (2015) • Response: Gilbert et al. (2016) **Causes** Take home message: The replication crisis is less about widespread fraud and more

		about a research culture that rewarded exciting findings, tolerated methodological flexibility, and lacked transparency. References: • Questionable research practices: Ulrich & Miller (2020) **Solutions** Take home message: Researchers need not adopt every ORP, rather those appropriate to the designated project. References: • Definition of open research: Crüwell et al. (2019) • Language of ORP: Pennington (2023). • Pre-registration difference: Kaplan & Irvin (2015) • Registered report difference all of science: Allen & Mehler (2019) • Registered report difference psychology: Schijen, Scheel & Lakens (2019) • Why pre-print: Fraser et al. (2020) Slides inspired by Dr Dermot Lynott https://osf.io/km34v/files/pkjwn
10 minutes	Reflective Group Discussion. Instructor asks attendees to discuss reflective questions as a group: “Think about a study you are/have conducted. What would you include in a pre-registration for this study?” “What would you need to do more work on before you complete a pre-registration?”	Same intentions and suggestions as previous Reflective Group Discussion. Instructor to troubleshoot concerns from attendees.
5 minutes	Key Open Research platforms for postgraduates: Reproducibilitea: https://reproducibilitea.org/ Aspredicted: https://aspredicted.org/ PROSPERO: https://www.crd.york.ac.uk/prospero/ Open Science Framework (OSF): https://osf.io/	Instructor to discuss the key Open Research platforms for postgraduates for pre-registration, including Reproducibilitea. Explain the difference between each pre-registration platform and when to use them. Focus on OSF with explanations of each pre-registration template. Add Open Research guidance specific to host university.

30 minutes	Live Demonstration of OSF. Practical, step-by-step overview of how-to pre-register a study via OSF. Walkthrough different templates for pre-registration with live Q&A.	The intentional timing at the end of the workshop ensures attendees have an established mindset for ORP. Live demonstrations can then build on these foundations practically. Live demonstrations have been shown to reduce anxiety, built confidence and clarity through observations before independent ORP occur. For reassurance, remind attendees that they can use existing materials (e.g., content within ethics applications) when creating their pre-registration. To enhance the experience, organise a longer live demonstration that is more interactive. Ask attendees for specific demonstrations that they want covered.
10 minutes	Reflective Group Discussions Instructor asks attendees to discuss a reflective question as a group at the end of the workshop: “What might prevent you from engaging in open research practices?”	Same intentions and suggestions as previous Reflective Group Discussion. Instructor to troubleshoot concerns from attendees.
1 minute	Motivational quote	Finish on motivational quotes aimed at starting open research practices now and making it a habit. Examples of motivational quotes: “Reproducibility is like brushing your teeth. Once you learn it, it becomes a habit” - Irakli Loladze (2016; mathematical biologist) “The amount of energy needed to refute bullshit is an order of magnitude bigger than to produce it.” - Alberto Brandolini (2013; Italian programmer) “Science isn’t broken. It’s just a hell of a lot harder than we give it credit for”. – Christie Aschwanden (2015; science journalist and writer)

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