

Teaching Portfolio
for application to Excellent Teaching Practitioner
in the Pedagogic Academy of the
Faculty of Social Sciences, Lund University

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1. Introduction

In this document I will build on my successful appointment as a Qualified Teaching Practitioner in 2017, where I demonstrated fulfilling Criteria 1-5 (student learning, scientific anchoring, teaching skills, holistic approach, and continuous reflection).

In my unsuccessful application for Excellent Teaching Practitioner last year, the evaluation recognized my work as an “appreciated colleague and leader” (criteria 6) and as a “great asset to Lund University and the public conversation on the global climate crisis and sustainability” (criteria 7). However, I failed to demonstrate sufficiently clearly my pedagogical philosophy and view on student learning, grounded in literature; how I observe outcomes for student learning and benefit; and to use a narrative structure.

I am using my failure from my unsuccessful application for Excellent Teaching Practitioner last year to demonstrate my progression and reflection as a teacher, and more generally as an example of how I approach inevitable failures in teaching and supervision as opportunities for learning and growth.

I hope that by reflecting on how I see my teaching philosophy grounded in the scholarship of teaching and learning, illustrated through three case studies of these philosophical pillars in practice, alongside my CV, letters, and supporting materials, I will demonstrate my continued progress and development within these already strong areas, as well as how my teaching demonstrates Criteria 6 and 7 required for appointment as Excellent: leadership (discussed in the next section) and creative dialogues with society (the subject of a theme and case study below).

2. Narrative teaching history and evolution

I have experience in designing, developing, and delivering educational courses and programs at the bachelor’s, master’s, and PhD level, in Sweden and South Korea, including playing a leading role in program reform and evaluation, and international guest lecturing across six faculties at Lund University and at over 45 universities in Sweden and internationally.

I have been **course responsible for 4 courses** in the Lund University International Master’s Programme for Environmental Studies and Sustainability Science (LUMES), including redeveloping and teaching the foundational course on socio-ecological systems and Earth Systems Science for 8 years to over 400 students; designing and teaching the Rural Systems and Sustainability course for 4 years; and 3 years of teaching a two-week module, Quantitative Methods for Sustainability. Following a program reform to which I contributed, I co-developed a new course, Methodology for Sustainability, which I co-taught in November 2022 and will continue in November 2023. I have earned **4,642 teaching hours since coming to Lund in 2010**, nearly three times the 1,600 hours required. (See Appendix for teaching hour certificates).

I have taken advantage of numerous **pedagogical development opportunities**, including completing **both levels of the Learning and Teaching in Higher Education (LATHE) course**, as well as the **docent course at LTH, the teaching portfolio workshop, and the LUPod course in professional development for early-career researchers**. This training has given me a deep appreciation for focusing on student learning as the core of my teaching, and opportunities for my own learning in aiming to continuously improve my teaching.

At the **PhD level, I have designed and delivered two courses**: Write for Change, a PhD course on academic and popular science writing held at Lund University that attracted students from across the Nordic countries and the UK; and Storytelling for Science in the Climate and Ecological Emergencies, a PhD course held at Stockholm University to help early-career researchers share their expertise with a broader audience, which attracted students from across Sweden. I have also contributed to the design of the foundational Sustainability Science course for our PhD students while serving as Director of PhD Studies. At the bachelor's level, I co-developed and taught a summer course on Global Climate and Environmental Change at Kyung Hee University in South Korea.

In terms of supervision, I am currently main supervisor for one PhD and one postdoc, and co-supervisor for another postdoc. I have supervised 5 PhDs, 1 licentiate, and 39 MSc students to successful degree completion, as well as supervised several postdocs and other early-career researchers. I frequently mentor early-career researchers in the research and publication process, including mentoring 11 MSc students in writing and publishing their first paper in international peer-reviewed journals, based on guiding their revision of the thesis that I supervised. I have coauthored 10 studies with PhD students, which includes both PhDs I supervise, and others who have sought me out for international collaborations (e.g., Dooley, Christoff, and Nicholas, 2018). The names of students under my supervision are underlined on my publication list.

Since 2021, I have served as a Masters' Thesis Examiner, responsible for the assessment of 8-12 theses per year in Sustainability Science, on topics ranging from rewilding to climate communication on TikTok. I have learned a great deal from conversations with senior colleagues regarding assessment. Students came up to me at graduation to thank me for the detailed feedback I provided on their theses, where I focused on identifying both what was successful and specific areas where they could improve.

I am honored that I have been chosen twice by the LUMES students as a Commencement Speaker at graduation, which I believe reflects positively on their assessment of my commitment to teaching.

I have been external examiner for six PhD dissertations: three in Sweden (two at Stockholm Resilience Centre, one at Lund University), one in Denmark (Aarhus University), one in Germany (University of Potsdam), and one in Switzerland (at ETH Zurich; winner of the ETH Medal after my nomination).

In my own research, I have demonstrated skills in **leading pedagogical development** (Criteria 6) through producing widely used and shared teaching materials (such as rubrics for writing, discussed in the case study below), writing scientific articles on pedagogy, and participating in pedagogical conferences. In terms of scientific articles, it is important for me that education informs and

contributes to my scholarship, both in using evidence-based pedagogical approaches to support student-centered learning, and in contributing to educational research. My publications demonstrate current shortcomings of sustainability science education programs, finding little integration between natural and social sciences (O’Byrne, Dripps, and Nicholas, 2014; see publication list); and show that government recommendations and high school teaching curricula are poorly aligned with high-impact climate actions (Wynes and Nicholas, 2017), and lack coverage of scientific consensus, impacts, or solutions (Wynes and Nicholas, 2019). I have developed a university [climate curriculum based on IPCC synthesis science](#) (Nicholas et al., 2014), which I have presented at international conferences in the US, France, and Belarus, with enthusiastic response by teachers who are adopting it internationally, and which I presented at the Lund University Teaching and Learning Conference (Nicholas, 2019). I accepted an invitation to give the Keynote at the LTH Teaching and Learning Conference 2023, "Teaching for the end of the world as we know it."

My progressive development in **educational leadership** has included service as Director of PhD Studies for the Sustainability Science program, as well as 3 years of service on the LUCSUS Board and 5 years on the Board of Directors for the Centre for Environment and Climate Research, both of which included strategic directions for education (at the master’s/PhD and bachelor’s/master’s level, respectively). I also served for 7 years on the Advisory Board of the ClimBEco Graduate Research School, Lund University (Climate, Biodiversity, and Ecosystem Services in a Changing World), to advise the development of an interdisciplinary PhD education program encompassing both Lund and Gothenburg Universities, where I am still involved in teaching.

3. Teaching philosophy

Overall, I am guided by the **philosophy of constructive alignment** in my approach to teaching: the process of coordinating course learning goals with activities and assessment, so that the student’s learning is in focus (Biggs and Tang, 2011). As I reflected in a pedagogic report (Nicholas, 2013):

*“Biggs and Tang (2011) give a clear example of constructive alignment from real life. In teaching a child to tie her shoe, the **intended learning outcome** is that the child is able to tie her shoe independently and so that the shoe stays on her foot. The **activity** used to achieve this outcome is lots of practice tying her shoe (not listening to long instructions on shoe-tying). The assessment is based on whether or not she can tie her shoe.*

This simple example illustrates important points about intended learning outcomes, and the process of constructive alignment. First, learning outcomes represent an absolute rather than a relative bar. To pass the class, or to be considered a proficient shoe-tier, the student must be able to demonstrate a sufficient level of proficiency. The important thing is not how well a student performs relative to other students, but how well they perform relative to the standards established by the learning outcomes. Second, learning outcomes must contain a verb that specifies the activity that the student is expected to perform, and this skill must be practiced through the design of thoughtful teaching and learning activities that allow the development of skill and the opportunity for self-reflection on learning, as well as teacher and peer feedback, some of the most important elements for promoting student

learning (Biggs and Tang, 2011). Finally, it is important to “start with the end in mind,” knowing what it is that you want students to be able to do as a result of your course, so that you can design the class to achieve this.”

Using the teaching philosophy of constructive alignment to reflect on my own teaching, the overall **intended learning outcome** of my teaching approach is to give students the necessary content knowledge, and more importantly the skills in critical thinking, argumentation, and confidence, to be effective, persuasive agents of change in making a fast and fair transition to a fossil-free world. Thus, I judge how well I achieve this “teaching outcome” by how well students can use qualitative and quantitative evidence to identify, analyze, and implement climate solutions that are effective in reducing emissions quickly and ethically sound, and how well they are able to communicate these ideas persuasively to their target audience.

In support of achieving my pedagogic goals, I focus on **three core themes in my teaching: developing students’ writing, research, and communication skills**. I see these as deeply interlinked. First, writing is central both to research design and execution. I try to help my students see writing as an iterative process that generates and is integral to thinking, not a mechanical way to record ideas “after the fact”. I want students to approach writing with an attitude of cultivating a lifelong skill that develops with practice, not as a talent they have or they don’t. Second, through my supervision and teaching, I want to train my students to approach their work with the curiosity and rigor of a researcher, and to think of their scholarship as research, not “just” an ivory tower assignment. I want my students to develop the fundamental skill of research: to ask and answer questions. Finally, I give my students opportunities to consider an audience and communicate directly to them, and try out what works to effectively convey a message, as part of deepening their writing practice and communicating their research to benefit society. I will now examine the scholarly basis for these three themes before turning to how I apply them in my teaching practice.

Theme 1: Writing as Thinking Made Visible

Drawing from my earlier scholarship on peer writing tutors to improve writing (Nicholas et al., 2017, pp. 39-42), I will briefly summarize here the philosophy I follow to improve the *writer* and not only the text. My goal is to help students become more confident, skillful writers. To achieve this goal, I focus on building transferable skills that the student will take with them to their next endeavor, rather than focusing on improving the text, as an editor might (North, 1984).

Argumentation skills are essential for academic writing and research. The three essential elements of an argument are a **claim** (a falsifiable statement), **reasons** (logic connecting evidence and claim), and **evidence** (data or examples supporting the claim) (Booth, Colomb, and Williams, 2008). The goal of academic writing is to persuade the reader of your claim, using well-structured reasons based on convincing evidence. Making well-supported arguments is the essence of academic scholarship, and essential to meaningfully engage with, and contribute to, civic discussion and debates.

My goal in focusing on writing skills is to support students in moving up **Kellogg's (2008) three stages of writing production, from knowledge-telling through knowledge-transforming and finally knowledge-crafting**. In the first stage, the author focuses mostly on their own thoughts, and the text is a direct transcript of their thought process. Inexperienced university students often perceive a writing assignment as "an exercise in knowledge-telling" (Kellogg, 2008, p.7). My goal is to help students move through the knowledge-transforming stage, where they use their writing to think and rethink, and achieve the most expert level of writing, knowledge crafting, where they revise the text based on considering readers and their potential interpretations (Kellogg, 2008). For expert writers, making revisions on every level of the text with the reader in mind is automatic and routine (Sommers, 1980). However, achieving this level for students requires support, because it is cognitively demanding to learn new material (knowledge telling) and to figure out what they think about that material (knowledge transforming), often leaving no time for knowledge-crafting (Kellogg, 2008).

To focus on the skills that will most improve long-term, global writing ability, I develop assignments and structure feedback mindful of the "hierarchy of concerns" (Figure 1), prioritizing the more important, higher-order or global concerns at the top, including context, whole-text coherence, argument and analysis, and structure and organization. I give less emphasis to lower-order or local concerns that students often fixate on, like grammar, sentence structure, word choice, and style (Gillespie and Lerner 2008; Hoel 2001).

I use this hierarchy of concerns because focusing on higher-order concerns helps writers learn to use more complex writing skills, including daring to make global revisions across a document, which can have a huge impact on its clarity and strength. I provide scaffolding (Graham & Perin, 2007) to support this process, an example of functional supervision as discussed in the next section, but the ultimate goal is for students to take ownership of their writing improvements and texts without these aids (emancipatory supervision).

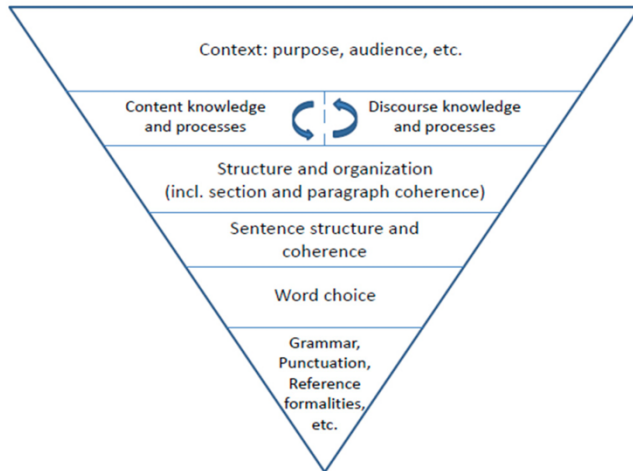


Figure 1. Hierarchy of concerns showing elements in a written text, ordered from higher-order concerns (top of triangle) to lower-order concerns (bottom of triangle), with width representing importance. I focus on higher-order concerns, particularly argument-building and claim-making. Source: Nicholas et al., 2017, adapted from Hoel (2001) and Hillocks (1987).

Writing depends on students’ knowledge about both content and process, which are linked; either may be the starting point of writing a text, as shown in the second level of the triangle (Figure 1). In my case, content knowledge includes student understanding about a sustainability issue from class and independent research, and their ability to “recall and transform” that content, while discourse knowledge is the student’s ability to recognize and produce a certain type of writing (Hillocks 1987), in my case a well-substantiated academic argument.

By explicitly teaching the process and structures of writing, including providing templates and other structural and visual guides of discourse and analysing written texts for their form and function, I support students in developing more sophisticated and robust arguments. They can focus on what to say, not how to say it. This method of providing explicit discourse support is especially helpful to level the playing field for international students writing in their non-native language, which is the case for the majority of our LUMES students, and to support moving from functional to critical thinking.

Theme 2: Teaching and Supervising to Develop Research Skills

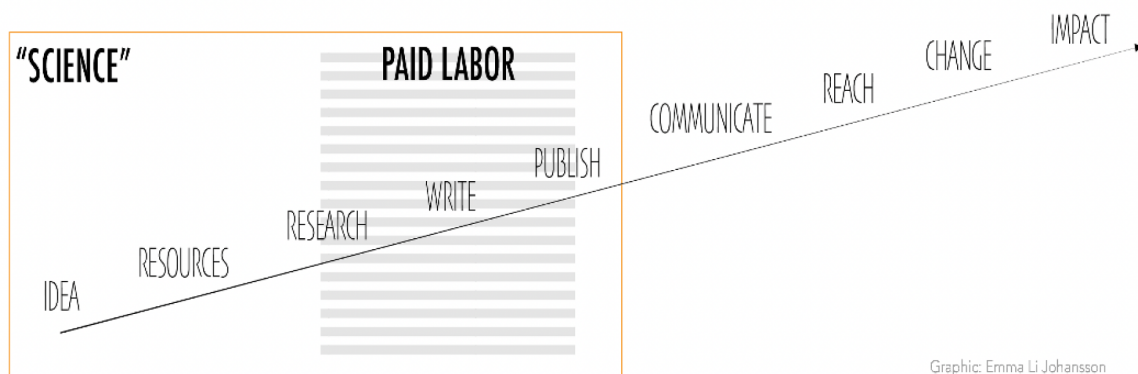
I want to empower students to ask and answer meaningful questions, that is, to conduct research. To do so, I have developed a teaching practice that focuses on explicitly teaching research skills. In designing research training in the classroom, as a supervisor of masters’ and PhD students writing a thesis, and as Director of PhD Studies, I use scaffolding, the idea that learning is facilitated by collaborating with someone who has more knowledge about the task at hand and helps divide the task into smaller, more manageable pieces (Graham & Perin, 2007; Wood, Bruner, & Ross, 1976). Done well, feedback on their progress helps the student in their “development of task competence by the learner at a pace that would far outstrip his unassisted efforts” (Wood, Bruner, & Ross, 1976, p. 90).

Several models exist for understanding the supervisor role and relationship with students. Gatfield (2005) classifies research supervision on two axes: structure and support. Murphy et al. (2007) use the axes of control (high to low) and focus (task or person). I appreciate the model from Lee (2012), which includes **five approaches to research supervision: functional** (directing students on a rational progression through tasks), **enculturation** (coaching students and connecting them with work and people in the field), **critical thinking** (challenging students to argue, analyze, and synthesize), **emancipation** (mentoring students with a focus on reflection and personal growth), and **relationship development** (supporting students in developing emotional intelligence as part of a team). I see my supervision practice evolving from grounding in a more functional approach, to realizing the importance of enculturation and critical thinking, and still developing further.

Theme 3: External engagement and dialogues with society

Lund University's [vision](#) is to “understand, explain, and improve our world and the human condition.” Achieving this sweeping goal requires linking the three core activities of the university: cutting-edge **research** to expand knowledge; **teaching** that develops critical thinkers and links research and the real world; and work to translate the discoveries of academia into benefits for society. This work for social benefit goes by various names, such as “external engagement”, “impact”, “outreach,” or sometimes called the “third task” after the wording in the Swedish Higher Education Act (tracing back to 1977, updated by SFS 1992) that established it as a core task of Swedish universities.

Here I will call the work of bringing scientific research to reach and benefit society “impact”. I recently wrote about my vision for **societal engagement** to increase the positive difference that researchers can make in the world in an [invited post](#) for Nature, “Taking research from idea to impact” (Nielsen and Nicholas, 2022). We described how the labor usually considered “science” only encompasses the first half of that process: conceiving an idea, assembling the resources to carry it out, then conducting, writing up, and publishing the research. Only part of this work is supported under most research grants. However, we argue that scientists are uniquely positioned to produce the greatest benefit to society of the research (which is, as [Mark Reed](#) says, how to understand impact: the good that researchers can do in the world). Too often, academic efforts at outreach which aim for impact achieve only “reach”, which is the number of people who have seen the work (e.g., measured by citation count or Altmetric score). For work to have real impact, it must change hearts and minds in some way that leads to changes in policy or practice, ultimately leading to the *tangible benefits for society* that constitute true impact. My students are eager to have a real-world impact, and I see it as an important part of my teaching practice to support them in developing communication skills to reach a target audience and achieve this benefit.



Graphic: Emma Li Johansson

Figure 2: The research process, from idea to impact. Source: [Nielsen and Nicholas, 2022](#). Illustration by Emma Li Johansson.

Impact work is of high priority at Lund University, as seen in its current Strategic Plan (2017-2026) which emphasizes the need for the university to benefit society, help meet our social responsibility as a university, meet global challenges, and play an influential role in public debate and cultural life. The recent guide from Social Sciences Faculty also emphasizes the two-way nature of this work; rather than only diffusing ideas from the “ivory tower to the real world”, universities can also benefit from external engagement, where connections and knowledge from wider society can improve the originality and relevance of research and education (Simonsson, 2021).

Historical education curricula focused on giving students technical knowledge without the cultural, context, and conflict negotiation understanding and practices to apply it skillfully (Frodeman, 2011). But modern academia now recognizes its role in educating future leaders who can successfully navigate complex problems and tradeoffs. Academic leaders can support students in developing these skills through bringing partnerships from outside academia into research, and giving students opportunities to produce not only academic research products but also “public-facing knowledge products” such as policy briefs, websites, and blog posts (Kittinger et al., 2021; Beyond the Academy, 2022). Teaching to support external engagement includes practices such as helping students developing a network of mentors, who may be able to meet different needs and play different roles, thereby reducing the power imbalance in traditional one-on-one advising (Davies et al., 2021).

Academic mentors, in the position of either supervisor or director of graduate programs, “**play an important role in establishing norms and expectations for engaged scholarship**” (Jaeger et al., 2011). Before students can apply working knowledge from practical training and study, they build on a foundation of professional norms and roles, of what it means to be “professional” in the field, based on both their own self-perceptions and the perceptions of others (Pieczka, 2002; Fähnrich et al., 2021). Pairing students with academic mentors who self-identify as engaged scholars is an important way to develop a culture of external engagement within the university (Davies et al., 2021). An important part of this work is exploring where students place themselves along the continuum of science and advocacy, using self-reflection and considering whom they represent

(Donner, 2014). This continues decades of the tradition of navigating the “double ethical bind” of climate scientists first described by Schneider (1998): the obligations to be honest about the limits of knowledge, while being effective in communicating climate risks and the urgency to act.

Current scholarship on effective external engagement for academics emphasizes a relational approach between academics and practitioners. Rather than a traditional hierarchy emphasizing the transfer of authoritative information from knowledge-creator (researcher) to knowledge-implementer (practitioner), a relational approach is based on empathy and listening, cultivating an understanding of how practitioners see and experience the world to address *their* perceived problems and concerns, and focused more on connection based on self-awareness and contextualization rather than persuasion (Kearns, 2021). In this approach, conflict is seen as a necessary and sometimes healthy driver of change rather than a mistake to be avoided, and understanding is seen as emerging from not just dissemination but relationships cultivated through listening and motivational interviewing techniques, such as asking questions about what and how rather than why and when (Kearns, 2021).

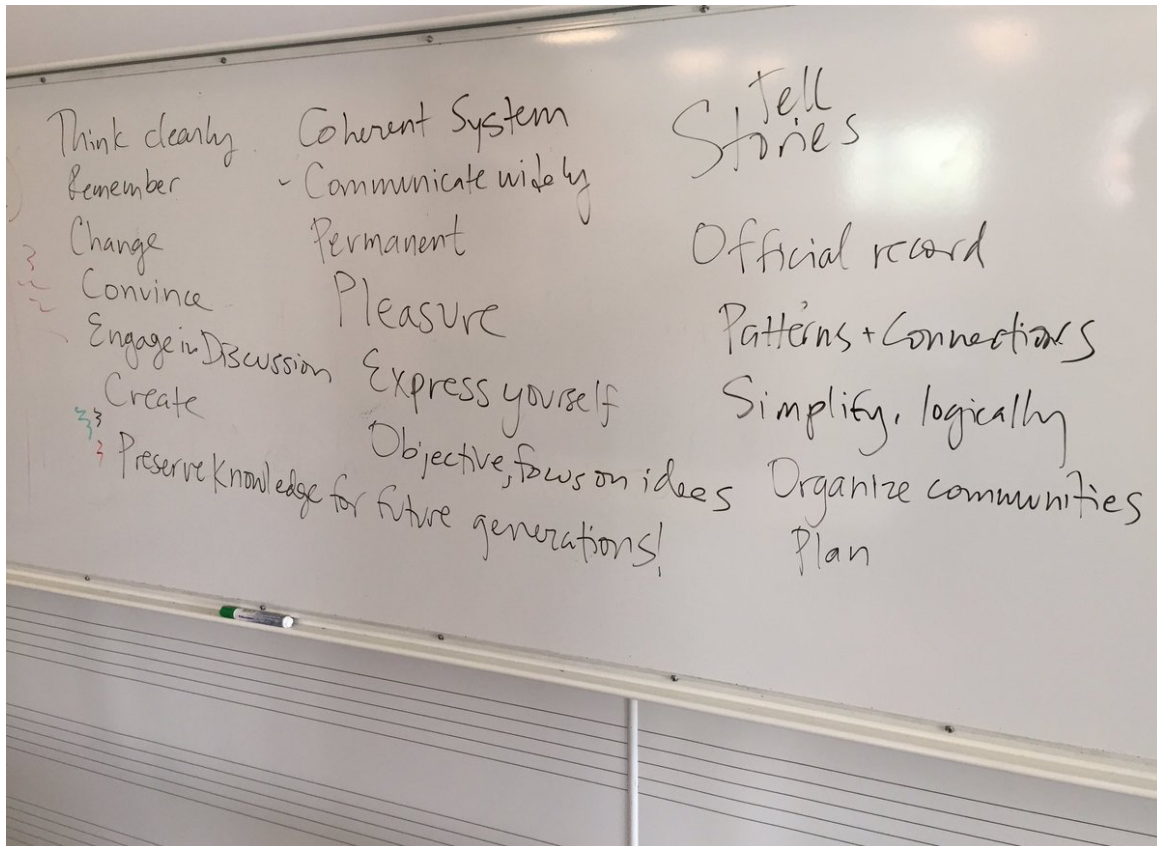
4. Cases Illustrating Student Learning Outcomes from My Pedagogic Philosophy

Here I will share three cases that allow me to explore how my teaching philosophy, integrating writing, research, and communication scholarship and skill development, results in learning for students, faces and sometimes overcomes difficulties of student learning and of my own teaching practice, and reflect on next steps and ways forward.

Case 1: Teaching Writing

Background

My students want to write for many reasons. I ask them to reflect on why they write at the start of class, and their answers range from “preserve knowledge for future generations” to “help myself remember and think clearly” to “make change” to “tell stories” (Figure 3). Students know that writing well is essential to their success in school, culminating with writing their thesis as an independent piece of research, and that writing is an important generic skill for their future, whatever career path they choose. Their motivation to write is high.



Figure

Figure 3. Why LUMES students write. Image of whiteboard notes during class I taught on academic writing.

Challenges

However, I have seen that many students struggle with writing, often with a large gap between impressive verbal articulation and what they are able to convey on paper. I find students are often eager but intimidated to write. Many students feel constrained by outdated “rules” and by the abundant examples of bad writing that they read in academia. They get tangled up in long, convoluted sentences avoiding the first person and over-relying on the passive voice, which is boring for readers and harder to follow their meaning. About 90% of my students are writing in their non-native language, which imposes additional challenges to express their arguments with confidence. Perhaps the biggest struggle I see in student writing is in positionality. How do they express a clear claim in a “scientific” way? What level of personal reflection and storytelling is appropriate for different texts? How do they see themselves as writers in relation to the text they produce and their intended audience, which is necessary to move through knowledge-telling to knowledge-crafting (Kellogg, 2008)?

Response

Overall, I work to de-mystify writing and make it less intimidating, to empower students to find their professional voice in their writing. I break assignments down into logical steps and give instructions

for how the different parts of a paper relate to each other in terms of the function they serve to answer the overall research question. In teaching writing, I've drawn from the excellent and practical book "The Scientist's Guide to Writing" (Heard, 2016) that make the function of writing clear. For example, we analyze texts and discuss what content and structure (higher-order "levels of concern" from the writing pyramid in Figure 1) the authors used to achieve the goals of different sections: how the Introduction sets the stakes, motivates the importance, and establishes the gap that the research question (RQ) will fill; how research design selected appropriate methods to answer the RQ, and used logic to link evidence and claims; how results present the answer to RQs, which can be in both words and images, either graphs of data or visualizations of abstract relationships; how the discussion reflects back on the answer to the RQ, puts it in context, and speculates on implications.

A learning outcome I focus on for structure and organization (level 3 of the writing pyramid) is introducing and strengthening topic sentences that make an initial claim, which is then nuanced, contested, problematized, or further supported in the rest of the paragraph. This fundamental principle goes a long way to produce better writers. In a second draft of a grant proposal I reviewed for a postdoc, I saw a huge improvement in the clarity of the argument from her implementation of my suggestion that "a busy reviewer should be able to read just the first sentence of every paragraph and understand what you want to do and why."

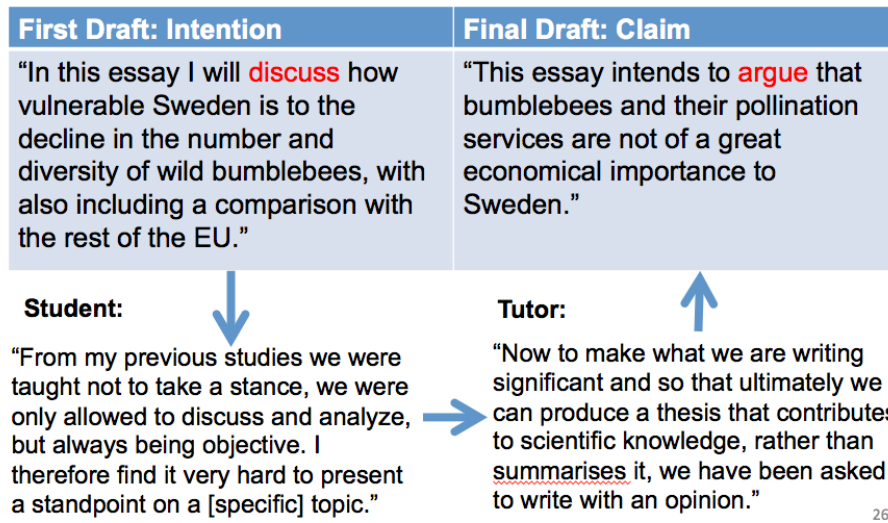
To reduce the cognitive load at the sentence level and allow students to focus on higher levels of the writing pyramid, I incorporate frameworks for how to establish why claims matter ("Ultimately, what is at stake here is _____") (Graff and Birkenstein, 2010, p.231) or indicate who cares ("These findings challenge the work of earlier researchers, who tended to assume that _____.") (Graff and Birkenstein, 2010, p. 230). Students can use these "moves that matter" to elevate their reasoning and writing and make claims more vivid.

Outcomes

Teaching writing is deeply satisfying, because I can see the emergence of more skillful and confident writers, and sometimes dramatic improvements in student texts, over time. I deliberately structure assignments to consist of multiple rounds or drafts to make this process of revision and improvement visible to both me and the students, which builds their confidence. I also ask students to reflect on their writing process as part of assignments. Reflection helps students solidify their learning, and also lets me see their evolution as a writer, including what skills and understandings they will take with them to apply to future writing I'll never see.

Teaching the craft of writing has proven to be a powerful way to improve students' critical thinking and communication skills. In working with students over a longer time, such as the MSc and PhD students I supervise, or the PhD students I mentored in my role as Director of Studies, I can see their approach to writing evolve. For example, over successive rounds of feedback and discussion, I can see PhD students go from writing "about" their topic, to using their research questions to structure a much sharper text. Even over a few weeks of a peer writing tutor program in my class, students can make big improvements in claim-making, from a timid and well-worn repetition of unquestioned

knowledge, to a provocative claim that might be true or false, making the reader want to know more:



Source: Nicholas et al., 2017, showing how feedback from a peer writing tutor program I co-created supported both student and tutor learning about writing.

I am heartened to see in student evaluations that students find the focus on writing one of the most valuable parts of my classes, while also finding suggestions for further improvements. For preparing this teaching portfolio, I re-issued a survey to the students in the class to see what the long-term learning outcomes were. I received a 50% response rate (Appendix 1), which I think is itself a good sign for students contacted two years later! Students reflected on practices that have stuck with them since the course, such as separating writing and editing tasks and considering their audience (the highest-order concern in writing).

Next steps

A major writing assignment in my current teaching is a research proposal for the Methods class I'll teach in November. Based on student feedback from the first time teaching the course last year, I am currently revising the assignment to include more clear milestones and opportunities for peer review, to help students get feedback on developing and answering a research question and focus on knowledge crafting (Kellogg, 2008). I would like to host a writing workshop for LUMES teachers to reflect on and better integrate how we teach writing across the program, in particular to culminate in stronger and more original MSc theses.

Case 2: Shaping researchers through supervision

"Research has consistently shown that advising is one of the most significant variables associated with academic success."

– Jaeger, Sandmann and Kim, 2011

Background

Many students are intimidated by doing research. It's hard to identify the right scope of a question that is exciting yet feasible to answer with available resources, and easy to feel overwhelmed by having to structure their own time to design and carry out a thesis project. Having supervised nearly 40 successful masters' theses, about a quarter of which I mentored students in turning into peer-reviewed publications, and having examined nearly as many, I try to give students clear roadmaps of what is expected, breaking the thesis process down into bite-sized pieces.

When I supervise masters' students, I ask at the first session what success with their thesis would look like for them. Their answers can range from "I want to pass the thesis course with my mental health intact" to "I want to produce new knowledge that can be immediately applied by decisionmakers" to "I want to do research that will prepare me for applying for further PhD study." Understanding the diverse goals of students helps me to support them in preparing for the professional career that best aligns with their interests.

Challenges

I face several challenges in supervision. An ongoing challenge for me is balancing giving students structure and support with space to learn, grow, establish their independence, and even make mistakes on their own. It's also a challenge to know the right level of detail and quantity of information to give, so that students are motivated and capable of making good progress, without feeling overly constrained. Another challenge is finding the right balance between supporting and encouraging students who need help, while not getting drained by the "squeaky wheels"—those students who may demand time and attention beyond what is fair to other students or to me as a teacher and supervisor.

Response

Over time, my approach to teaching research design has evolved. From starting with a highly detailed, 10-page template of a research proposal, I've moved on to more streamlined guidelines and prompts that I think better balance student independence with structure and provide the scaffolding for them to develop their own ideas with confidence.

For MSc students, I've learned to set advising times at the start of the term, and give some concrete deadlines in advance. For example, last year I held thesis group supervision meetings every other Wednesday afternoon, and I gave deadlines for when students should submit their first, second, and final drafts to me to allow them to submit on time to graduate. This year I plan to add deadlines for feedback on different sections, such as the Methods and preliminary results. The goal is for students to have enough structure to work within to keep motivated and making progress, while developing their skills in project management to set and meet milestones along the way.

I help students take responsibility for their own learning by looking together at the grading sheet that will be used to assess their thesis. Seeing that this seemingly insurmountable task of writing a

masters' thesis in fact consists of 13 discrete elements makes it feel more manageable to students, and confident that they can demonstrate them in their thesis. We revisit the criteria regularly during supervision to ensure constructive alignment between the skills they are supposed to demonstrate to pass their thesis, and how they allocate their time.

Sometimes the challenge is students who don't easily ask for the help they need, where I as a supervisor have to put in extra effort to make sure they are well supported. I try to stay aware of my students' wellbeing. There are at least three students in the past few years who have had serious mental health crises. In these cases, I've helped connect them with professional support resources, helped them adjust expectations and ways of working to manage and support their health. I still remember the hug at graduation a thrilled student gave me who had been struggling months before; they finally took action to get needed support when I said, "Hey, I'm worried about you." I see this as an example of relationship development supervision (Lee, 2012).

At other times, when the challenge is students who are unreasonably demanding, the solution is the opposite: for me to set clear, kind boundaries and stick to them. I've done this by stating what students can and cannot expect from me, starting with the first supervision meeting. Last year, when the student I supervised chose to pursue other priorities (a full-time and a second part-time job outside of his thesis) during the thesis semester, and then demanded feedback after the thesis deadline was past, I was able to say no because I had established clear boundaries from the start of the term. After years of teaching I began to notice how the 80/20 rule manifested in supervision, namely that 20% of the students took 80% of my time and energy, which was an unfair drain away from other students, and an unsustainable drain on my own energy. I now actively try to cultivate situational awareness of when I can make a big difference and invest the extra time and effort to really help a student who's struggling, versus when some students are going beyond reasonable demands and I have to stick to appropriate boundaries to have energy for other students and to sustain my work.

In my enculturating role of supervisor (Lee, 2012), especially for PhD students, I see student need for role modeling and support in making often tacit expectations and personal connections important for success. This "disciplinary rectitude" is one of the learning outcomes for a PhD in Sweden, but is often a struggle for especially international or otherwise less privileged students. I have found that a major barrier to educational equality is the informal knowledge required to successfully navigate higher education, and thus I place a high value on demystifying and sharing the usually unwritten rules of academic success to enable more to succeed. This includes through regular posts on my [academic blog](#) and [social media](#) to share advice and teaching and learning materials on applying for faculty jobs, [defending a thesis](#), [giving a research talk](#), navigating the [peer-review and publication process](#), or [rubrics for assessing research papers](#). I also make time to contribute to professional development for early-career researchers, such as through giving a Sunday workshop on "[10 things I wish I'd known 10 years ago](#)" aimed at PhD students, and participating in a [webinar](#) on Academic Failure for the international Postdoc Training.

Outcomes

In office hours yesterday, a student told me that my research design lecture was the first time she'd thought about how to operationalize research, to go from having a question to having a research question that can be answered. See her own visualization and interpretation of the research process for the Methods course in Appendix 2. I can see that students in group supervision sessions are really internalizing the research process when they ask each other, "What's your research question?" to help figure out what methodological choice to make or how to meaningfully represent their findings.

Student feedback has been that they appreciate supervision combining academic advice with personal stories, including reflecting on my own shortcomings, failures, and learnings. They deeply valued these examples to overcome the cultural pressures in academia to constantly perform and achieve. Recognising failure as an inherent part of life, and perhaps a sign that you are taking sufficient risks to continue to grow, is a helpful framing for me, and early-career researchers tell me it has been extremely encouraging for them to see modeled and encourage them to persist. See Appendix 3 for a sample of the enculturating tips I shared for PhD students in a Twitter thread, and some of the appreciative responses I received in Appendix 4.

Next steps

I will raise a discussion reflecting on how we see our supervision in light of Lee's (2012) five supervision styles at the next PhD supervisors' meeting, a tradition I started as Director of PhD Studies. I am curious to learn from my colleagues how they approach the task of supervision, a topic we recently discussed as part of the recently completed evaluation of our PhD program.

Case 3: Empowering student science communicators to create dialogues in wider society

Background

Many sustainability students are hungry to not just observe or document decline, but to help society succeed in getting on a better path for people and planet. But many obstacles stand in the way of students achieving real-world impact. For masters' students, who only have a few months to go from project proposal to finished thesis and graduation, time pressure is a major challenge. International students often lack local relationships and context needed to meaningfully connect to a relevant challenge, and sometimes language is a barrier. For PhD students, they are often focused on the pressure to publish scientific articles to meet requirements for degree completion and to compete in academic careers.

For PhD students, I led the development and co-taught a course, "Storytelling for the climate emergency". Research shows that climate storytelling is persuasive (Gustafson et al., 2021) and that

storytelling around taking positive action can build agency in others, noting that actions often come before beliefs in daily life (De Meyer et al., 2020). We based the course on students demonstrating their understanding of their purpose in telling climate stories for a public audience, the process of storytelling, and practicing telling their own stories.

Challenges

Students struggle with some of the same things established researchers struggle with in engaging with society: finding time for important and meaningful work that is not incentivized in current academic reward, promotion and hiring structures; finding their voice in an appropriate balance between their perceptions of a scientist as objective and an acknowledgement of the subjectivity that human beings bring to choosing a topic to study and the way in which they study it; and pursuing the research that is most academically valued, often based on a narrow theoretical approach, with the more applications- and solutions-focused, but perhaps less theoretically aligned, work often valued by decisionmakers.

Response

To address the challenges of empowering students to conduct scholarship with impact, I have developed several practices. Perhaps most important is to plan and design for impact from the start, in selecting a relevant topic of interest to a particular audience and approaching it in a way that can link with current debates in popular media (Nielsen and Nicholas, 2022). For students who state they want to have impact with their research or storytelling, I work with tools such as the Message Box (Baron, 2010) to help them distill and communicate their key findings effectively. I discuss with students what kinds of communication they prefer (for example, writing an op-ed in a newspaper, as I mentored a student to do to share her thesis findings – Appendix 5). We discuss at lab meetings and in individual supervision sessions the role of scientists in society, and where students place themselves along the continuum of science and advocacy (Donner, 2014), to help them position themselves relative to an audience while staying within their preferred mode of communicating, another example of enculturating supervision (Lee, 2012).

One important step for impact is to develop relationships with partners in society to create educational opportunities for students. For example, in 2021 I mentored Paula Kuss in a masters's thesis designed within the context of my Formas project to help Lund Municipality become climate-neutral by 2030. The most urgent priority for Lund is to reduce emissions from transport, which primarily come from private cars. Therefore, Paula conducted a study of studies, examining nearly 800 published studies and case studies to identify which measures have already worked in European cities to reduce cars, and using transition management theory (Loorbach et al., 2015) with interviews with local experts to suggest which measures would be most effective in Lund. Paula presented her work to Lund policymakers at graduation (see Appendix 6), I mentored her in publishing it in a peer-reviewed journal (Kuss and Nicholas, 2022), and included her in the science communication of this work in The Guardian (Nicholas and Kuss, 2022). Because it is based on real-world data, especially in the context of the EU Mission to deliver 100 climate neutral cities by 2030, practitioners have found the work extremely useful. Paula and I have been invited to present it to transport, planning,

regional, political, and international networks in the US, Canada, Sweden, and Brussels, which she has found a valuable link between learning and impact. Paula is now leading work in the city of Stuttgart, Germany to reduce cars in the region; she told me her thesis was invaluable for landing this job, and she refers to her findings regularly in her work.

Outcomes

Public science communication is a great way for students to demonstrate their abilities in many of the learning outcomes for the LUMES program. Relevant learning outcomes this skill touches on includes knowledge and understanding about the scope, causes, interactions, impacts, and possible societal responses to complex sustainability challenges; competence and skills in analyzing and identifying improved technological, ecological, and governance measures to address complex sustainability problems, and in involving stakeholders and clearly communicating research findings, including the evidence on which they are based, in speech and writing to diverse audiences, and contributing to sustainable development in a variety of arenas including international and applied arenas; and judgment and approach in their own insight into the potential contributions and limitations of science and its role in society.

I see the learning outcomes in student engagement both in the short-term, in their production of successful communication materials under my supervision and in the longer-term, in the impact my students make in the world. I judge it as a success that for example, my current PhD student has moved on from coauthoring outreach that I initiate, like op-eds in Swedish newspapers and popular science research summaries in *The Conversation*, to giving public talks and writing for new audiences under her own initiative.

Next steps

I plan to incorporate more public-facing science communication elements in my teaching, such as including a social media post in the research proposal assignment. I've seen the incredible creativity my students bring to their shared Instagram account of inside jokes about their academic experience.

5. Looking back and looking ahead

Reflecting back on my development as a teacher, I think I am evolving towards more nuanced and contextual understandings of teaching. I am more flexible in dealing with the inevitable unexpected events that arise in the classroom, and in supervising human beings. Over the years, I have tried to make "more time for kindness" in my teaching and supervision: to move from sometimes overly rigid structures, to help develop the person in front of me in my classroom or office, not only their work products. At the same time, I learn every day from students, whether it's a new way of looking at an old problem, or a chance to reflect on how to explain what I know in a way that makes sense to others, and where I identify gaps in my own knowledge.

Looking ahead, one area I'd like to develop further is to create opportunities to develop a community of practice and learn from my fellow Teaching Academy members more explicitly.

Perhaps once per year, the latest cohort of newly accepted members could get together to plan a theme of broad interest, such as peer evaluation of teaching or scaffolding student learning across a whole degree program, to host a seminar or workshop on the topic, led by Teaching Academy members.

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7. Appendices

1. Student evaluations from “Storytelling for Science” writing course, summative at end of course in 2021 and long-term reflections on what they still remember and use from what they’ve learned, September 2023.
2. MSc student submission for Methods course, demonstrating her own understanding, approach and visualization to research design
3. Twitter post demonstrating my enculturating supervision role, advising on professional networking for PhD students facing isolation while working from home during Covid restrictions.
4. Some appreciative responses to my networking advice. (For full responses, see comments on https://x.com/KA_Nicholas/status/1370050168406560769?s=20)
5. Op-ed (debattartikel) written by MSc student to share her thesis findings in a local newspaper. I introduced the student to the newspaper editor and mentored her in writing the piece.
6. Sample of student societal engagement: presentation by MSc student Paula Kuss to politicians, civil servants, and citizens with her findings on how to reduce car use in Lund.