

Peer Writing Tutors Help International, Interdisciplinary Students to Stake their Claim

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Writing well is central to academic success, but writing skills are not always taught explicitly. This is especially problematic in international, interdisciplinary programs where such skills help students from diverse backgrounds to develop a shared vocabulary of writing and tools to decode their new academic context.

We tackled this issue by hiring and training peer writing tutors to encourage new students to learn writing skills (motivational scaffolding) and to help them understand how to improve their writing (cognitive scaffolding). Our student learning outcomes focused on making and supporting a main claim properly supported by evidence. We assessed student learning through analysis of their essay text and reflection papers, as well as surveys sent to both students and tutors.

We found that peer writing tutors helped to motivate students to understand why and how to make claims in academic writing. Focusing on citing sources as evidence for claims revealed that nearly a third of the class had not fully understood appropriate citation despite previous training, leading to plagiarism warnings, which required ongoing exercises and discussion to address. Tutors

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benefitted from participating in terms of improving their writing and honing teaching skills.

We conclude that peer tutoring is an effective strategy to help both students and tutors across disciplines, nationalities, and writing experience levels to become better and more reflective writers through reinforced motivation and scaffolded skill-building, and that collaboration across traditional departments and roles in the university linking teaching staff, support staff, and students was an effective and enjoyable way to promote interdisciplinary learning.

Introduction

Writing well is central to academic success in all disciplines. Through academic writing, we measure students' abilities to communicate and think critically about their field and about the world, two transferable skills with wide-reaching, lifelong benefits. Despite the importance of writing, explicitly teaching students to write well is sometimes neglected in higher education. This gap creates frustration for professors, who expect students to already be able to write well and for students, who might have wildly varying experience and education in writing and feel unable to live up to their professors' expectations.

These frustrations are especially evident across interdisciplinary and international higher education programs, where students with diverse cultural and disciplinary backgrounds arrive with writing backgrounds that span the range from confident writers with lots of practice writing in English, to students who have never penned an academic text in any language.

One such program is Lund University International Master's Programme in Environmental Studies and Sustainability Science (LUMES). LUMES was established in 1997 with an interdisciplinary, international approach to global environmental sustainability challenges. Approximately 40 students join the two-year MSc program every year, from a diverse range of backgrounds, both geographically (over the last six years, 90% were international students, often with more than 20 countries represented in each cohort), and in terms of subject training, with academic backgrounds ranging from engineering to anthropology, history to ecology.

Similar to many LU master's programs, LUMES students also represent a variety of writing and English experience and confidence levels. Only about 20% of

students are native English speakers, and though these students presumably have good command of the language, being a native speaker does not guarantee good writing skills. Other students come from academic cultures that do not emphasize writing at all, and thus lack writing practice even in their mother-tongues. Others have written in languages other than English, but have never practiced or received feedback in English.

Higher education in sustainability, like many fields, rarely includes explicit writing instruction, despite the essential contribution of writing skills to learning, and the need for good writing skills in sustainability to reach a broad audience of both scholars and practitioners. In a recent analysis of 27 international sustainability master's programs, while nearly 30% of student course time was spent on research in master's programs, not one program featured a course specifically on writing (O'Byrne et al., 2014).

To help these students become good writers, it is necessary to go beyond simply assigning writing tasks or handing out how-to documents. We must establish a shared context, and start conversations with shared vocabulary to create a space in which students can begin to decode the academic culture and writing expectations of their new environment. In this space, students can reflect on these expectations and relate them to their previous experiences in order to achieve deep learning.

This chapter tells the story of our response to the challenge to create such a space: a successful collaboration between a professor in sustainability science and a writing consultant from Lund University's Academic Support Centre (ASC) to hire, train, and employ peer writing tutors to encourage and give students feedback as they revised their first essay in the program.

The Academic Support Centre (www.lunduniversity.lu.se/academic-support) serves all students studying in English at LU in three areas: writing, presenting, and study skills. The writing consultant is currently its sole employee; she meets students individually and in small groups to discuss the writing process and their texts; designs and hosts seminars and workshops on academic culture and study skills, writing, and presenting-related topics; and collaborates with faculty who want to incorporate more writing and study skill support into their courses. This peer writing tutor project was one of the first direct collaborations between the consultant and a professor to co-design and implement a class learning activity as part of an ongoing course.

This collaboration grew to encompass one of the writing tutors as a colleague and co-author, which added invaluable perspective to the writing and analysis process, and produced a unique cooperation between faculty, academic staff, and students.

In this case, the professor provided the experience in designing assignments to achieve intended learning outcomes in a sustainability science context; the writing consultant provided knowledge on the theory and practice of writing, and experience in training and supporting tutors; and the writing tutors contributed to a collaborative learning environment as a bridge between teachers and new students.

We implemented the peer writing tutor project in the foundational natural science course that begins the LUMES program, Earth System Science, which is based around the concept of nine “planetary boundaries” necessary to sustain human well-being (Rockström et al., 2009; Steffen et al., 2015). The tutors introduced a diverse group of new master’s students in LUMES to Lund University’s writing expectations and provided meaningful, individual feedback to the students at their challenge levels on their first writing assignment: a 1200-word essay examining one of three planetary boundaries (water, biodiversity, or land use change) in a Swedish context. In this way, the assignment helps familiarize students with local examples of one of the core class concepts, giving them common ground for discussion that builds on pre-knowledge.

In previous years, teaching staff—largely professors, but also postdocs and PhD students—ran one 3-hour tutoring session with about 5 students to discuss these assignments, but often gave limited written feedback (often 4-5 sentences) without follow-up. The previous tutoring approach failed to signal the importance of writing in LUMES, did little to improve the students’ writing and thinking abilities, and didn’t help decode expectations for the new students. To solve this problem, we re-designed the assignment to require multiple drafts, where each iteration received structured response from the peer tutors, who helped to motivate students and provided more substantive and focused feedback than students received in previous years.

The theory of constructive alignment states that all teaching, learning and assessment activities should be driven by achieving a few key intended learning outcomes (Biggs and Tang 2011). The primary intended learning outcome of our peer tutoring project was to increase proficiency in academic writing (one of five intended course learning outcomes for the Earth Systems Science course), demonstrated by proficiency in the assignment task learning outcome of stating and supporting a central claim as concrete evidence of critical thinking.

After claim-making, the secondary learning outcome for this writing assignment was for students to learn and practice correct attribution of sources using APA referencing style in the first course, a result of previous LUMES teaching meetings

that centred around problems late in the program with sloppy or inconsistent citation formatting. A third intended learning outcome was to increase the tutors' writing and teaching skills through collaborative learning.

To determine how well the peer writing tutoring project worked, we assessed student writing directly throughout the revision of their essays and through short student reflection papers completed after the tutoring process. We surveyed the new students, both before and after participating in the tutor training, about their perceptions and knowledge of academic writing (Appendix II-A-1). We use quotations in our discussion from both the surveys and the reflection papers. Tutor learning was assessed through an online survey asking about their experience with the tutoring process and their suggestions for future improvement. In addition, the project leaders hosted an in-person feedback session to discuss the survey results with six of the tutors, who made additional suggestions.

Below we describe concepts that underpin why peer tutoring is an effective way to teach writing, then describe how we designed the writing assignment to benefit from peer tutoring, including recruiting and training the peer tutors, and assessing the impact of peer tutoring on tutors and students. We found that peer tutors were effective in helping students become better writers, and that the peer tutors themselves also benefitted from participating, but that the iterative nature of the assignment illuminated previously unrecognized problems with appropriate source use and potential plagiarism which had to be directly addressed. With this chapter, we hope to contribute to a catalogue of best practice in teaching writing applicable both within and beyond sustainability.

Concepts Supporting Peer Tutoring

The concept of peer writing tutors is, of course, not new. Their use is well-established in institutions around the world, with roots in the US where writing centres staffed by trained peer tutors have long been an element of higher education institutions. In Sweden, although peer review activities are prevalent in many courses, it is not as common to train and hire students to work as peer writing tutors. We designed this peer tutoring project based on two concepts: scaffolding and a focus on higher-order writing concerns.

Scaffolding: Key to Peer Writing Tutoring Success

Recent scholarship on peer tutoring argues that tutoring succeeds because it incorporates scaffolding (see, for example, Cromely and Azevedo, 2005; Mackiewicz & Thompson, 2013; Thompson, 2009), the idea that learning is often best aided through 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). The collaborator gives the learner feedback to bridge the divide between what he currently knows or can do and the next stage in the process, potentially leading to “development of task competence by the learner at a pace that would far outstrip his unassisted efforts” (Wood, Bruner, & Ross, 1976, p. 90).

The assignment for this peer tutoring project was designed to scaffold the writing process itself, requiring multiple drafts and revisions, and the tutors helped unpack and scaffold two fundamental writing skills important for success throughout the students’ academic careers: making supported claims and using sources correctly. Ultimately, teaching such transferable skills is the goal of peer tutoring: not merely to improve a text as an editor would, but to help the tutee become a more confident, skilful writer (North, 1984), eventually without scaffolding to help him along. In this way, tutees learn to take ownership of their writing improvements and texts.

Scaffolding can be divided into types according to its function. Thompson (2009) uses Cromely and Azevedo’s (2005) terms “motivational scaffolding” for how peer tutors motivate students to complete the task at hand, and “cognitive scaffolding” to describe how peer tutors scaffold their knowledge of writing and the writing process, helping students “figure out answers for themselves” (Thompson, 2009, p. 423). Motivational scaffolding can include putting the tutee at ease, identifying with the tutee’s struggles, giving positive and negative feedback (Thompson, 2009), and explaining the reasoning behind writing guidelines or assignment design. Cognitive scaffolding includes asking leading questions, offering choices to pick from, and asking the tutee to formulate possible next steps. The tutors were trained to employ motivational and cognitive scaffolding to encourage and empathize with the new students, as well as to explain the vocabulary and tools of claim-making.

The tutoring and scaffolding process is fundamentally collaborative, assuming that “the expert tutor and the less expert” tutee work to achieve the tutee’s goal, “which becomes shared by both participants” (Thompson, 2009, p. 419). Both the tutor and tutee stand to benefit from the conversation: they learn that “they

know something only when they can explain it in writing to the satisfaction of the community of their knowledgeable peers” (Bruffee 2008, p. 652), mirroring the peer exchange that occurs among peers in academic scholarship. As the tutee learns about writing and is further motivated to improve, the tutor learns and hones writing, reflecting, and teaching skills.

Higher-Order Focus

In order to choose the skill to start with, we look to a hierarchy of concerns in writing, sometimes also divided into “global” and “local” concerns. Higher-order concerns include context, whole-text coherence, argument and analysis, and structure and organization, while lower-order concerns include grammar, sentence structure, word choice, and style (Gillespie and Lerner 2008; Hoel 2001). This delineation of concerns helps the tutors know what aspect of the text to start with in order to more effectively focus on improving the writer and not only the text (Figure 1). Note that in the second level of the triangle, content knowledge and processes refer to the student’s strategies for “recalling and transforming content,” and discourse knowledge and processes refer to the student’s ability to recognize and produce a certain genre or type of writing, “e.g., narrative, descriptive, argument, or ‘the paragraph’” (Hillocks 1987). The arrows between the two emphasize their dependence on each other and indicate that when generating text, it’s possible to use either content knowledge or discourse knowledge as a starting point. Content knowledge in this case would include a student’s understanding of a sustainability issue, and their ability to retrieve that knowledge, while discourse knowledge is their ability to recognize and produce a certain type of text—in this case, a well-substantiated argument. The peer tutoring process emphasized how and why to make a claim, building discourse knowledge and process to supplement the content knowledge from class and independent research.

Focusing on higher-order issues helps writers learn to use more complex writing skills in the hierarchy of writing production, including making global revisions. Cognitive psychologist Kellogg (2008) identifies three stages of writing production: knowledge-telling, knowledge-transforming, and knowledge-crafting. At the knowledge-telling level, the author focuses mostly on his own thoughts, and the text is a direct transcript of his thought process. At the knowledge-transforming level, the author uses his writing to think and rethink, implying “an interaction between the author’s representation of ideas” and the text’s representation of ideas (p. 6). The third and most expert level, knowledge-crafting, involves considering readers and their potential interpretations of the text

and revising the text accordingly. In experts' writing processes, making revisions on every level of the text with the reader in mind is automatic and routine (Sommers, 1980). Inexperienced university students, by contrast, often perceive a writing assignment as "an exercise in knowledge-telling" (Kellogg, 2008, p.7). When students write about something they know about already, their working memory is more likely to be free to focus on the reader's perspective, but when the topic is new, they must prioritize learning the material (knowledge-telling) and then figure out what they think about that material (knowledge-transforming), often leaving no time for knowledge-crafting (Kellogg, 2008). Providing templates and other structural and visual guides of discourse form helps to relieve some of the cognitive burden of telling, transforming, and crafting new content knowledge, so students can focus on more on figuring out what to say, not how to say it. This method is especially helpful for international students writing in their non-native language.

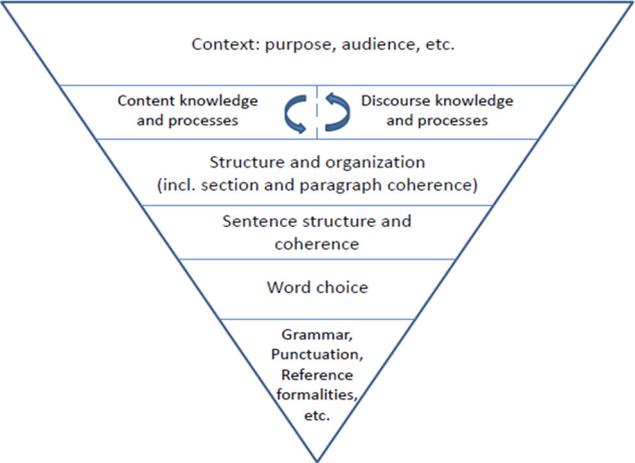


Figure 1. The “Hierarchy of Concerns” showing elements in a written text, ordered from higher-order (top of triangle) to lower-order (bottom of triangle) concerns, with width representing importance. In the tutoring process, students and tutors were encouraged to focus on higher-order concerns, including argument-building and claim-making with their sustainability content knowledge as part of “discourse knowledge.” Adapted from Hoel (2001) and Hillocks (1987).

In the essay assignment, we gave students multiple drafts as opportunities to move through these stages and give them space to talk about this process. To help scaffold their progression, we focused on a foundational, higher-order concern: making an argument. In the widely used research and writing handbook *The Craft of Research* (Booth, Colomb, & Williams, 2008), the authors set up

argumentation skills as fundamental to the academic writing and research process. They identify three essential elements of an argument: claim (a falsifiable statement to persuade the reader), reasons (logic connecting evidence and claim), and evidence (data or examples supporting the claim). All research projects, no matter the discipline, have these elements: “at the core of every research project is the answer to your research question, the solution to your problem—your main claim” (Booth et al., 2008, p. 110) (Figure 2).

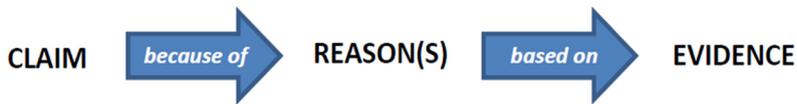


Figure 2. Elements of an argument in academic writing. The peer tutoring process focused on motivating and training students to make original claims, supported by logical reasons and appropriately cited evidence from the literature. Adapted from Booth et al. (2008).

The text’s main claim is often developed through the writing process; as we write, we think and rewrite through the process of knowledge transformation. Consequently, many writers state the claim in the conclusion, the place of its chronological development. However, many reader-focused writing handbooks argue that the claim should be moved during the revision process to the beginning of a text in order to give the reader the text’s “big picture” as early as possible. Williams (2007) argues that readers are more likely to experience a text as coherent if they find the main claim in the introduction, so our peer tutors were trained to help the new students make this revision in their drafts (achieving the knowledge-crafting stage).

Engaging Students as Peer Writing Tutors

Tutor Recruitment

The peer writing tutors were hired to interact with incoming students over the summer before they arrived in Lund. Nine peer writing tutors were selected from the cohort of students one year above the incoming students, based on their application in response to an open call sent to all students, as well as individual recruitment based on previous class performance and writing. The professor provided tutors with the materials given to the students writing the assignment,

including detailed instructions for the assignment and a form for both tutors and peers to use in giving students feedback at the in-person tutoring session, as well as a rubric for assessing the assignment (Appendix II-A-2). Practical guidelines on expectations and tips for facilitating writing sessions were also included (Appendix II-A-3). Tutors were paid for ten hours of work anticipated for their time in giving feedback to students at 120 SEK/hour (app. 12-13 EUR/hour).

Tutor Training

To prepare for their task, the peer tutors participated in a full-day training session held by the writing consultant, with the major goal to provide shared language with which to talk about writing. The training focused on principles of good writing based on the hierarchy of concerns and giving feedback aimed to improve the writer and not only the text. In line with this aim, tutors were encouraged to respond to texts as readers and not as editors. The training group discussed prioritizing comments on argument and coherence, especially focused on claims, reasons, evidence, connection with sources, and on connection between parts, following the hierarchy of concerns shown in Figure 1.

Training required that the tutors practice giving feedback on two sample essays (real student essays made anonymous) beforehand for the group to discuss on training day. One text was a LUMES student's pre-course assignment from a previous year, and one a seminar essay from another department. The second essay was meant to challenge the tutors and their ability to focus on elements of good writing and formulate poignant feedback without relying on content knowledge or previous experience with the assignment. To help the tutors focus their feedback practice, the writing consultant instructed the tutors to set a timer for 45 minutes per essay and provided specific guidelines for giving constructive feedback, including templates for structuring responses to student writing, and writing guides and resources (Appendix II-A-4). The group discussed effective time management and the importance of focusing and limiting the feedback, and the consultant encouraged the tutors to avoid line-editing, which is both time-consuming and ineffective when the goal is to improve writing skills rather than the text itself (see, for example, Stern & Solomon, 2006 and Zamel, 1985).

For an additional challenge, the sample essays differed substantially in grammatical quality, so the group had to balance grammar and language feedback with higher-order concerns. The consultant emphasized that grammar is not a higher-order concern, but if problems are severe, it is appropriate to address this

issue by identifying 1-3 repeated grammatical errors, modelling potential corrections, sending relevant resources for further practice, and recommending students with especially severe concerns to meet with the writing consultant directly. The consultant also referred the tutors to several writing resources for their own reference or to share when appropriate as part of the feedback, and the tutors were encouraged to contact the consultant for additional resources during the feedback period.

Peer Tutoring Sessions and Feedback

The peer writing tutors project was implemented over the summer before the new students arrived. The professor read each student's first draft and grouped them first by similar topic, and secondly by similar writing level, based on the reasoning that students learn best in groups of similar experience and ability, where they are better able to help each other and identify academic problems in others that they face themselves (Lang, 2008). Peer tutors sent electronic feedback to each student, and the resulting revised draft was discussed in an in-person tutoring session with approximately 5 students. In the in-person sessions, all students read every paper in their group, with one student assigned to take the lead as discussant for each paper, using the rubric and feedback form (Appendix II-A-2) provided to structure their comments. Both the peer tutor and the discussant provided written feedback to each author at the tutoring session. The writing consultant attended one of the tutor-led tutoring sessions as an observer.

For the resulting revised draft, students were paired with a new partner who had not previously read their essay to offer another round of feedback in a one-on-one peer review session. On this basis, students turned in a final fourth draft, which was not graded, but was required to make correct use of APA citation format to pass the class. Peer writing tutors offered final comments on this fourth draft and pointed out any errors in the APA citation format that had to be fixed. Finally, students wrote a 2-page reflection paper on their experience with the peer tutoring and writing process.

Findings

Below, we discuss our main findings from the experience with peer writing tutors, organized into four sections. The first reflects on the diversity of the new student

group and argues that using trained peers who employ motivational and cognitive scaffolding techniques helped to decode academic and writing expectations in LUMES. The second examines how students became familiar with and ultimately succeeded in making claims. The third section reflects on where the secondary learning outcome, to learn correct citation practices using APA referencing style went wrong. We discuss teachers who misunderstood what students need to avoid plagiarism, students who misjudged their own abilities to successfully avoid plagiarism, and why quick-fixes don't solve this issue. The final section briefly reflects on how the peer tutors benefited from this experience.

Motivational and Cognitive Scaffolding

Many students noted that they initially felt “daunted” by the task of completing an essay draft before arriving in Lund, especially those who had been away from studying for some time to pursue other work or family opportunities and were nervous about re-entering an academic environment. In the end, though, students felt the assignment and tutoring experience helped them “make a smoother transition back into an academic mindset”. One Brazilian student felt that the experience helped set the tone for what to “expect for the next two years: critical thinking, high level discussions, and construction and joint collaboration between students.”

The combination of motivational and cognitive scaffolding in a conversational environment with peers worked to decode the new academic context, helping students navigate differences from their previous experience and differences among each other. Cognitive scaffolding without motivation is not likely to produce the same results. While cognitive scaffolding supports the “what” and “how” questions—What is a claim? How do we formulate one?—motivational scaffolding supports the crucial “why” questions—Why do I need a claim? Why do academics make claims? Why should I care about this? The former helps break writing down into manageable pieces, and the latter helps illuminate the purpose of each piece in relation to the ultimate goal. Discussing how and why together helped to create shared vocabulary about writing (e.g., everyone can talk about a “claim”) and a shared purpose in the group.

These shared components are valuable to any course experience but take on particular weight in the multicultural and interdisciplinary context of LUMES. In this case, the students' culturally and discipline-based previous experience with writing contribute to a classroom filled with widely ranging preconceived ideas

about writing, and differing vocabulary with which to talk about those ideas. In a classroom with mostly local students, our knowledge of the local school system provides a general picture of how those students might have learned to write, which means the group has this framework of experience in common. Just as we can't be familiar with all cultural and linguistic backgrounds, we cannot all be familiar with writing preferences in every discipline either. Still, these are essential places to start conversations about writing. Reflecting on the transition from one discipline to another, a Danish student explained, "With a background in philosophy and cultural studies I am used to another way of writing. The sources, evidence and supporting data I have used in the PCA [Pre-Course Assignment] are totally different than the ones I have used in my former studies." She goes on to report that "it has been a challenge" in navigating these differences, but most importantly, she feels motivated to keep working: "...a challenge, which I look forward to work on."

For other students, the challenge was not to adjust discipline-specific writing habits, but in fact to create writing habits from scratch. One Chinese student explained that she had never written a paper before at all: "It's basically my first time academic writing. I have so many problems exposed during this writing process, and thanks to that, I know my weakness and what to improve in the future. It opens a new start for my writing." This lack of writing experience was reflected more broadly in the pre-project survey, where despite stating that they were rather confident in expressing themselves in English (with an average score of 3.7 out of a possible 5), two of the three lowest-rated items were previous practice writing academically in English and in other languages (both 3.4) (Figure 3).

This lack of writing experience was also observed in one of the tutoring sessions, where the tutor used the situation to motivate the group when a new student confessed what she perceived to be personal weakness: insecurity about communicating her thoughts in English, as this assignment was her second time ever to write a paper in English. Instead of emphasizing this weakness as something this particular student should work on, the tutor both empathized and started a discussion. "That's something we all deal with," she said, describing occasions when she gets stuck on certain words, thinking "Is this right and I just don't know because I don't have the language experience?" The tutor went on to address a disciplinary issue: "Is this common knowledge in this discipline that I don't know because I'm new at this?" The tutor's authenticity and the organic way these issues surface in this setting speak to the strength of peer tutoring in creating a supportive, respectful and inclusive space, while at the same time

decoding writing expectations and academic culture at LUMES and more broadly in Lund. In doing so, the tutors and new students create a shared experience of writing.

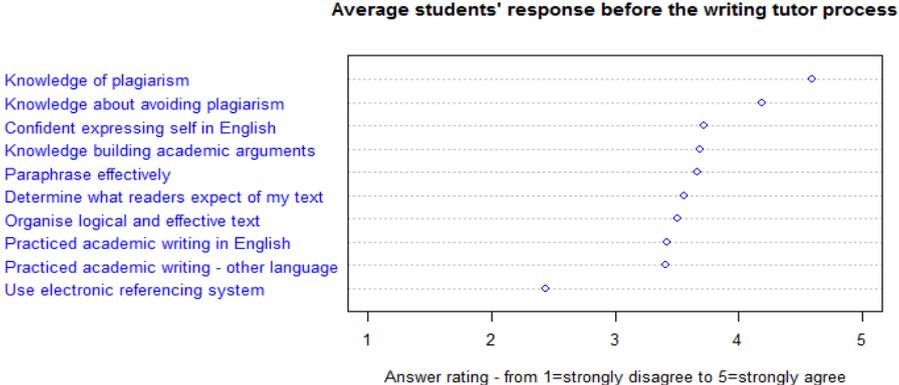


Figure 3. Average responses from 32 students who responded to a survey (Appendix II-A-1) about writing views and experience before participating in the peer tutoring process. Students reported very high levels of motivation to write, as well as strong knowledge of plagiarism, but less knowledge about how to avoid plagiarism through effective paraphrasing or referencing tools. They also lacked experience in academic writing.

Even students who had quite a bit of previous writing experience reported benefits from the iterative writing practice with peer tutors, noting the chance to hone more complex writing skills, such as a Danish student who “discovered that, while I have written academic texts for 5 years, there is still a significant amount of improvements that can be made,” especially in “selecting the correct evidence, more thorough analysis and a confident and convincing conclusion”.

As this example shows, the diversity of the tutor group played an important role in creating a supportive environment for learning and in maintaining respect for each student’s background and experience. Many of them were able to use their own experience as a new international student the year before to meet students where they were in their adjustment to Swedish culture and LUMES culture as well as at their level of writing knowledge. Indeed, the new students rated the tutoring experience highly in the post-survey, reporting that the in-person peer tutoring session was extremely friendly (4.7), an aspect of motivational scaffolding, and very constructive (4.3), suggesting that the cognitive scaffolding succeeded (Figure 4). Students also noted that they learned from reflecting over time on their work and enjoyed giving feedback (3.9) and receiving feedback (4.1) (Figure 4).

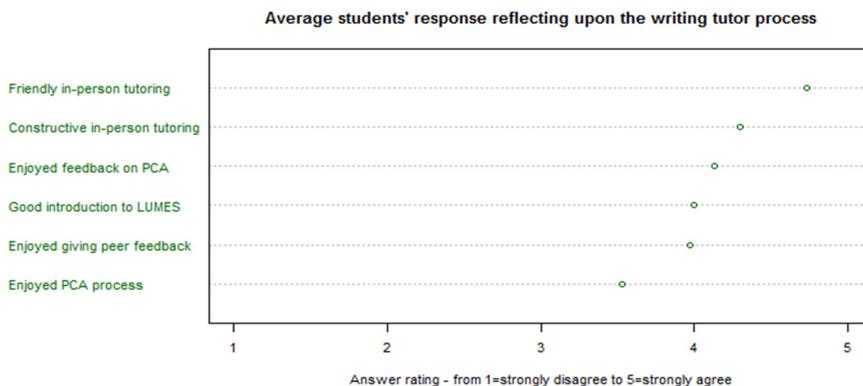


Figure 4. Average responses from 30 students who responded to a survey about the peer tutoring process after participating. Students reported experiencing a very friendly and constructive in-person tutoring session and an overall enjoyment of receiving and giving feedback on the Pre-Course Assignment (PCA). They thought that providing peer writing tutors was a good introduction to LUMES and enjoyed the PCA process as a whole.

Higher-Order Concern: Making a Claim

Many stated that claim-making was entirely new, reflected in one student's desire to work more on making his "own argument and stand up for it, I never learnt that before." This was also reflected in the lower scores from the pre-survey about making an academic argument (3.7), or organizing a logical and effective text (3.5) (Figure 3). In fact, despite the assignment instructions to focus on making a claim, none of the first draft essays succeeded in articulating a clear, strong claim. One British student recognized this tendency to write papers with many facts, but no argument from her bachelor's study, saying she was "prone to include everything I know about the topic, rather than focusing on a particular area or view of a topic". This was a common problem in the first drafts, where students provided evidence related to their topic, but they struggled to justify why this evidence was relevant using logical reasoning, and ultimately failed to articulate the overarching claim or conclusion that this evidence supported.

The revision process helped many students to develop a strong claim, such as this example from the first and fourth draft by a Norwegian student's essay about the economic importance of bees in Sweden, where substantial changes are evident in producing a logical structure and a strong, clear claim, namely that bee pollination

is not very important in Sweden, a provocative stance against the standard assumption in sustainability (Figure 5).

First draft	Fourth draft
<p><i>“In this essay I will discuss how vulnerable Sweden is to the decline in the number and diversity of wild bumblebees, with also including a comparison with the rest of the EU.”</i></p>	<p><i>“This essay intends to argue that bumblebees and their pollination services are not of a great economical importance to Sweden.”</i></p>

Figure 5. Comparison of first and fourth draft of student writing, showing improvement in clarity and strength of main claim after peer tutoring.

The first draft has a statement of intention, aiming only to “discuss” and “compare,” and the essay followed with a number of facts about bees in general (knowledge-telling), based on an untested assumption that bees were critical for Sweden. However, in subsequent drafts and in iterative conversation in person and over email with her writing tutor, she realized that her evidence, in fact, did not support that bee pollination was critical in Sweden (knowledge-transforming), though it was elsewhere in Europe, because of the kinds and distribution of crops presently grown in Sweden. In the fourth draft, the essay argues for a statement, and even though the student uses “intends” in this version, it is much closer to a claim statement than an intention statement.

Coming to state this bold claim was a challenge for the student, who told her tutor in an email exchange: “From my previous studies we were taught not to take a stance, we were only allowed to discuss and analyse, but always being objective. I therefore find it very hard to present a standpoint on a [specific] topic.” But her tutor reassured her that this is indeed what is expected, and necessary, to make an academic argument: “Now to make what we are writing significant and so that ultimately we can produce a thesis that contributes to scientific knowledge, rather than summarises it, we have been asked to write with an opinion.”

In this way, the peer tutoring process helped students see themselves as contributing to new knowledge, and empowered to make their own claims, working to support them with evidence, concluding as one Canadian student did that “developing as strong and clear an argument as possible ... in the end is the goal when writing a research paper.” An Indian student noted that reading others’ texts help him be able to improve his own: seeing the “direct and clear claim” in his partner’s paper “helped me in stating my claim very directly in the introduction.” Because all students found claim-making new, they will need more practice with this concept. When asked what skills students wanted to work on

Learning to make claims via peer tutoring helped many students realize for the first time that the fundamental goal of academic writing at the graduate level is to say something original. In their reflection papers, some students documented their progression beyond the knowledge-telling level from their bachelor's studies, like the British student above who was previously "prone to include everything I know about a topic." The next level of knowledge-transforming was demonstrated by one Chinese student, who described her new perception that the goal of "academic research is not to organize a paper with known outcome, but is a way to find the outcome," describing thinking- through-writing and revising to make an original contribution.

Some students also progressed to the knowledge-crafting level after participating in peer tutoring. After reporting in the pre-survey that they did not have much experience in knowing what readers expect from their texts (rating of 3.5, Figure 3), many students noted that they were now better able to imagine how a reader might experience their own texts, a sign of increasingly sophisticated writing skill. They credited this improvement to both giving and receiving feedback during the peer review process. For example, a British student reflected that, while she had previously seen metacommentary (signposts and transitions) as the first words on the chopping block with limited space, "I now appreciate the importance of metacommentary as a tool to allow my reader to follow my argument." A Swedish student captured the feeling of writing for a reader extremely well: "During the [revising] process, I was forced to try to look upon my paper with the eyes of an outsider, someone who has not been inside my head, to be able to see what I understand, but what others do not."

Overall, the focus on making a claim and writing multiple drafts helped students prioritize higher levels in the "Hierarchy of Concerns" (Figure 1) as they revised and improved their writing, with many ultimately achieving the knowledge-crafting level of thinking about their reader.

More than Formatting: No Quick-Fix for Avoiding Plagiarism

The learning outcome to properly cite sources using APA referencing style was intended to address the problem that the teaching team had identified with incorrect citation formatting in student texts (for example, citing all sources at the end of a paragraph rather than attributing specific ideas to specific authors, or incorrectly formatting in-text citations according to APA style), which we thought could be addressed through cognitive scaffolding (training proper mechanics, for

example following online tutorials and checklists). However, through the iterative writing and revision process and the careful attention of the peer tutors, we realized that many students did not know why proper citation was essential (e.g., for intellectual honesty, to distinguish their original claims from those of others and build valid arguments, and to avoid plagiarism problems). Because of this, simply enforcing proper APA style was a quick-fix that failed to consider the motivational scaffolding necessary to address the reason behind proper referencing and the other skills students need to practice in order to use sources appropriately (e.g., reading for the argument, good note-taking in the student's own words, synthesizing information from multiple sources, clearly distinguishing their ideas from others', and paraphrasing).

Our experience highlights a dangerous and pervasive idea held by some teachers that plagiarism issues can be solved with quick-fixes, a tutorial or one-off lecture. Instead, the root of many students' misunderstandings about plagiarism is deep: not *really* understanding why we have to signal every instance of claims taken from other authors nor the appropriate mechanisms to do so. These misunderstandings can be especially difficult to navigate for some international students, who must quickly become familiar with a new academic culture, expectations, and referencing systems and who have a potentially limiting command of English. It seems neither fair nor beneficial to student learning, as Pecorari (2003) observes, to present one lecture followed by threats of punishment to students who need ongoing instruction, practice, and feedback on the skills necessary to use sources appropriately and avoid plagiarizing.

In fact, studies on students' research practices and source use support the need for both motivational and cognitive scaffolding for students to achieve deep, transferable learning on proper source use. With data from the Citation Project, Jamieson and Howard (2013) mapped how a sample of first-year American students at 16 diverse universities incorporated sources to surmise that a majority of them either are not able to or simply do not take the time to "comprehend and make use of complex written text" (p. 127). They also warn that in assignments that focus on argumentation skills, without proper scaffolding and guidance in appropriate source use, students might be especially tempted to "mine" for evidence, scanning sources for a sentence or two to insert into their text as evidence instead of taking the time to fully comprehend each source's text as a whole and constructing a claim and argument that takes this comprehension into account. When teaching students to do this, Purdy (2013) emphasizes that we must lift the threat of punishment because it hasn't proved to be "an effective means to shape student behavior" (p. 135).

Not only did the LUMES teachers initially misjudge what the students needed to avoid plagiarism, many new students also overestimated their skills in this area, as found in the survey. They initially reported extremely strong knowledge of plagiarism (4.6) and very strong knowledge of how to avoid it (4.2), although this seemed to be somewhat at odds with their ability to paraphrase effectively, which was much lower (3.7), and use of electronic referencing tools, which was lower still (2.4) (Figure 3). Class activities and their later reflections revealed that in fact, a majority of students had substantial problems in this area. Specifically, a third of them (15 students) received unacceptably high scores for inappropriate source use when their third draft papers were run through plagiarism checking software. This occurred even after students had received guidance in the form of detailed instructions on how to properly attribute sources using APA style, links to tutorials on proper citation, and a two-hour session from the Director of Studies on academic integrity. This experience highlights the need for motivational and cognitive scaffolding and iterative, hands-on practice to achieve true proficiency in source attribution skills.

In their reflections, students elaborated on several factors that contributed to their potential plagiarism problems, including a lack of previous training in the purpose, importance, and mechanics of proper source attribution, struggles with expressing themselves as clearly in English as the authors they are reading, and problems with patchwriting, or using too much material from original sources. Many students held fundamental misconceptions about what is permitted in academic writing, as shown by this reflection:

“I made a huge mistake which sounds stupid and naive from the professional aspect, I cited the original words from other people’s papers, I thought it’s permitted if we write the author in the bracket at the end of the sentence which I wrote like this before but nobody correct me... what I learned most was the whole way of academic writing, how to use your own words to rephrase the original sentence.”

To address these widespread misconceptions about source use, after identifying the remaining problems with source attribution in the students’ drafts, all students received specific training in defining, recognizing, and avoiding plagiarism during a two-hour class session, using a presentation and activities jointly developed by the professor and the writing consultant (Appendix II-A-5). This session focused on the importance of correct attribution of ideas (both intellectually, and technically in terms of citation format). There were several hands-on exercises to demonstrate how to appropriately summarize or paraphrase (including sentence

structure and word choice to avoid patchwriting), and the need to properly cite every idea at the time it is mentioned (i.e., within or at the conclusion of sentences, rather than only at the beginning or end of paragraphs). Because sloppy note-taking that fails to separate the source's idea from the student's can lead to plagiarism, strategies were presented to take notes in their own words to avoid unintentional source repetition in later texts.

Less-confident English speakers sometimes feel that their language limits their paraphrasing ability, so we found it important to emphasize that it is better to choose the wrong word or have poor grammar than to plagiarize. For example, an Indian student pinpointed the origin of her problems in note-taking and language skills:

“What I have observed in the whole process of writing is that, when you read so many articles and scholarly papers for the writing assignment, I tend to express my thoughts in the same language and style with a little bit of minor changes in the vocabulary and sentence construction. But, this leads to unintended plagiarism warnings. So in order to avoid plagiarism, I paraphrase the sentence, but the quality of my writing dips drastically and I really have to move away from the original sentence which in my mind was the best way ever that idea/concept/fact could have been conveyed. I would like to work more on this aspect.”

Even students who had previous experience and knowledge of plagiarism became more aware of specific source-use skills to improve, like an American student who wants “to ensure I work on citing ideas properly and then clearly delineating in my writing when I am presenting someone else's idea versus when I am presenting my own original thoughts.” As evidence that he understands the link between good source use and making a good argument, he goes on to say “that such clear separation will make my papers much more convincing to my audience.”

Other students also mentioned source-use skills as something to practice further. A German student noted her goal to “improve the fair, consistent, and correct attribution of ideas from other authors in the text.” Another admitted to “still [feeling] very nervous about [what] plagiarism means and - theoretically- how to avoid it. But as an international student I feel still very uncomfortable and think that more help is needed, at least in the first semester.” This unease underlines the importance of providing students with many low-stakes opportunities to practice these skills with feedback without the threat of punishment, especially in the beginning of their education.

This peer tutoring experience demonstrated that unsuccessfully avoiding plagiarism is often a result of much more than sloppy formatting; instead, it can be a symptom of a much bigger issue in proper source use, a skill that needs to be explicitly taught, particularly in an international master's program with students from different educational systems and academic cultures all over the world. While peer writing tutoring can play an important part in teaching and reinforcing source use, citation and paraphrasing skills in writing in the individualized context necessary to inspire student motivation and engagement, an ongoing focus on proper source use throughout international programs is essential.

Tutors Benefit from Participating

Our project strongly confirms the idea that one of the greatest benefits of the peer tutoring process is not only that the tutees benefit, but the tutors do, too. Despite the fact that they all agreed that they spent more time than was allocated on the tutoring processes (4.3), they very strongly felt that the time spent was valuable (4.4), both in terms of the in-person tutoring session going well (4.7), as well as benefits they gained for their own writing from the tutoring process (4.6), including being better equipped to identify their own writing strengths and weaknesses (4.4) (Figure 8). Tutors especially noted that they themselves had improved their ability to make an effective claim, mirroring the tutees' experience: "Most of us had previously been taught to write summaries or review papers but never to have an opinion. Regurgitating what is already written is boring... learning to make a claim has really boosted my writing skills." Further, participating in the training and tutoring process helped tutors to see "progress I seem to have made during the year." One tutor advised future tutors to "Try and see it as improving your own writing by helping others, it makes it much more enjoyable and much less like 'work'."

The tutors also enjoyed the chance to interact with their peers in a teaching capacity. They were effective in this role, providing more substantial, ongoing, and in-depth feedback than faculty usually have time to deliver, and they enjoyed the process of teaching. One tutor reported that leading the group session was "the most interesting and rewarding part of the tutor experience. It was great to see the students' enthusiasm, tact, and effort when commenting on each others' work, and it was gratifying to hear them express appreciation for all of my comments." Another tutor felt so inspired by the experience that "I now even consider that teaching could be a future career path."

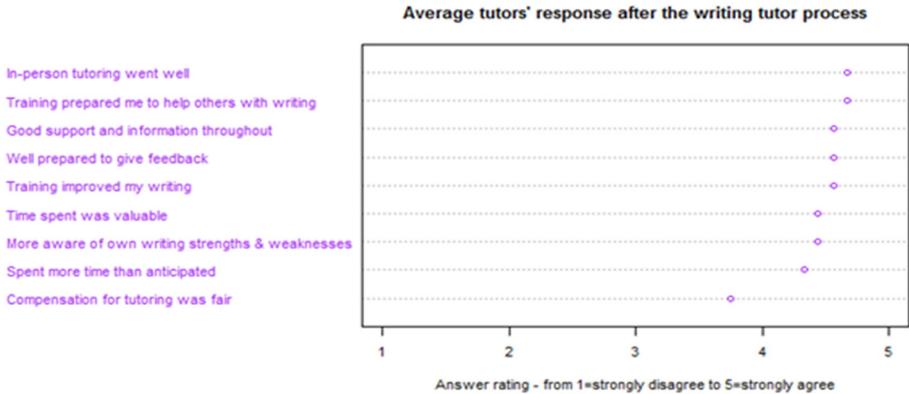


Figure 8. Average responses from all 9 tutors to a survey about the peer tutoring process after participating in the program, showing their high motivation and positive experience with tutoring, with the most room for improvement in compensation.

Lessons Learned: Limitations and Future Improvements

The original goal of our peer writing tutor project was to help interdisciplinary, international students in the LUMES master's program improve their writing through making stronger academic arguments by making and supporting strong claims. We have shown that this succeeded; our students went from not recognizing or making claims to making and supporting increasingly sophisticated claims. Still, we can do better in the future. One improvement will be to more explicitly teach how and, crucially, why to make a claim from the very beginning of the assignment. The “how” (cognitive) can be taught through concrete writing practice throughout the process, making use of templates and exercises from the book *They Say/I Say: The Moves That Matter in Academic Writing* (Graff & Birkenstein, 2010). We have developed materials to articulate why making a claim matters (motivational scaffolding), starting with a short guide to academic writing produced by the writing consultant (Appendix II-A-3) and the writing rubric produced by the professor (Appendix II-A-2).

Still, we have lots of room to better develop and integrate the explicit teaching of academic writing across the two-year program, using lessons learned here in making writing part of course learning outcomes, and in assigning fewer assignments with more time for revision and peer review. In particular, we would like to scaffold the focus on claim development throughout the two-year program,

culminating in strong, original research presented in the master's thesis. LUMES teachers are discussing a writing workshop to better integrate how we teach writing across the program, and teacher training in effective strategies for teaching writing would also help to achieve this.

Similarly, we have learned that interdisciplinary, international students know that plagiarism is bad and should be avoided, but they need a chance to learn why and how to do so through meaningful practice. In the future, rather than focusing on APA citation formatting as an explicit learning outcome, the writing assignment will be designed to focus on appropriate source use as an essential tool for making their own claims--the purpose of writing in the first place. Purdy (2013) affirms that learning how to engage with sources to make new claims is more likely to discourage plagiarism than writing to report the "right answer," which many of our students perceived to be the purpose of academic writing upon arrival to the master's program.

We will address plagiarism and how to avoid it in the future through this claim-making angle in four ways. First, we will incorporate critical reading exercises analysing why and how academic texts use sources, including both professional and student examples. Second, the professor and writing consultant have collaborated to produce lectures and teaching materials to give students practice in concrete skills like paraphrasing to avoid plagiarism (Appendix II-A-5), which will be incorporated throughout the course. Third, while it is important that the professor retain ultimate responsibility for enforcing expectations against plagiarism, tutors can be trained to play an important role in clearly communicating expectations and can lead discussions during tutoring sessions on source-use throughout the writing and claim-making process. They can also refer students to online references like the *Purdue OWL for learning APA style*, and *Grammarly* to check their own texts for plagiarism. The tutor training can also cover the university's plagiarism software system, which many new students asked about. Fourth, students can be enlisted to develop expertise in correct citation practice through using an APA checklist that the professor has developed (Appendix II-A-5) for both their own and their peers' essays. Correct citation formatting will also be assisted by continued training in the use of the referencing software EndNote, which the pre-survey showed was very unfamiliar to students before starting the program (Figure 3).

The basic design of the peer writing tutor project was well-received by both students, who enjoyed the process as a whole and thought it was a good introduction to LUMES (Figure 4), as well as tutors, who reported that they were well-prepared by the writing consultant and supported by the consultant and the

professor (both ratings of 4.6) to help their peers improve their writing (Figure 8). However, there are many possible improvements for the future. First, to help students make better claims, we will provide more resources and training in this area, including annotated versions of excellent papers from this year showing the argument structure to use as a model, as well as more resources on how to participate in the peer review process. Second, to better support tutors, we will further develop the template (Appendix II-A-3) to use when sending the first round of feedback that was friendly in tone and outlined space for summarizing three main higher-order concerns for improvement. (We have decided to eliminate electronic feedback in future peer tutoring, and instead hold two in-person tutoring sessions to maximize the friendly atmosphere and the learning they generate.) At the tutor's request, we can extend this to include developing a suggested script for introducing and running the in-person tutoring session, and suggestions for dealing with common problems, such as students becoming defensive about feedback.

We also need to revisit the compensation model and make sure that tutor time is budgeted to ensure fair compensation for their efforts, as pointed out by the relatively low score (3.8) for tutor perception of compensation fairness (Figure 8). The amount of time allotted for each activity as well as the total will be set before tutor training begins so that tutors are fully informed of the expected time commitment and compensation. Finally, to streamline the process and make the intended learning outcomes clearer to the students, the assignment design will be modified to include explicit areas for focus in each revision, starting with higher-order concerns. We can also provide both students and tutors with more complete instructions and information further ahead of time (difficult this year as materials were being developed in real time), and these documents can also be better integrated with each other to increase consistency and avoid repetition.

Conclusions

Our peer writing tutor project has confirmed that teaching academic writing through writing tutors can help establish a shared context for international students with a variety of disciplinary backgrounds, decoding academic expectations and developing a common language in which to talk about writing. Motivational and cognitive scaffolding—the why and how of a task—explain the mechanisms at work during tutoring that contribute to its success. The tutors

focused on an essential higher-order writing concern, to make and support a main claim, which was new for most of the new students and to some of the tutors before training. With guidance from the writing consultant and reassurance from the writing tutors, the students began to make their own claims, which improved throughout the essay revisions. The secondary learning outcome to learn APA format morphed into a much broader outcome to use sources appropriately. Initially, plagiarism was thought of as a problem with sloppy referencing, but we realized that students actually did not really understand why academics cite other sources, and most students had not been taught how to avoid plagiarism, neither at Lund nor in their previous education. This project started to address the root cause of plagiarism, with positive results, but the techniques taught during this time need to be continued for the students to become confident in source use.

In addition to the benefits to the tutees, the tutors also benefitted greatly from the project through increasing their knowledge of academic writing, self-awareness of the writing process, and gaining teaching skills. Even though the project only lasted for a short time, our evidence suggests that there is both a need and a desire for peer writing tutors in international, interdisciplinary graduate programs. They are an effective and worthwhile method to raise both students' and tutors' academic writing proficiency. When the tutor group is as diverse as the new student group, they are especially valuable in empathizing with the new students' experience, having been in a similar position a short time ago. Because they are trained, they are able to use this empathy to motivate and then to help break down the task at hand.

Our experience with this project confirms our assumption that although many instructors under-prioritize teaching writing and space for meaningful feedback, writing and the writing process unquestionably need to be taught. This became especially clear in most response papers and anonymous surveys, where many students reported little previous experience with academic writing in general, and more specifically with claim-making and, as illuminated through the writing process, avoiding plagiarism. Even the students who had some previous experience and practice with academic writing reported insecurity in making claims and needed to learn this and other aspects of academic writing. The fact that both experienced and less experienced students felt they benefited as part of this process, not least in gaining awareness about how they can continue to hone their writing skills, shows that we succeeded in designing a project and training tutors to meet the incoming students at their individual challenge level, an essential element of scaffolding and learning. Ideally, in order to build on the academic writing skills gained as part of this first course in LUMES, explicit focus on these

skills would continue to be scaffolded throughout the two-year master's program, building on the results of this introduction to academic writing through peer tutoring to develop an expanded peer tutoring program integrated with courses throughout the master's program.

Ultimately, teaching course content simultaneously with transferable skills makes learning more meaningful, facilitating and inspiring the students to think deeply about the course material. This critical thinking and learning process was made transparent during the tutoring sessions, in the students' draft development, and in their reflection papers. In this way, the students took responsibility for their own learning and helped promote their peers' learning in the community environment that peer tutoring created. The success of this tutoring project highlights the value of collaboration among faculty, academic support staff, and students in reaching across discipline, nationality, and (in the faculty-staff case) job boundaries to tap resources and ideas that we don't have alone.

References

- Biggs, J., & Tang, C. (2011). *Teaching for Quality Learning at University*. Maidenhead, England: McGraw-Hill and Open University Press.
- Booth, W. C., Colomb, G. G., & Williams, J. M. (2008). *The Craft of Research* (3rd ed.). Chicago, IL: University of Chicago Press.
- Bruffee, K. A. (1984). Peer tutoring and the "Conversation of mankind." In G. A. Olson (Ed.), *Writing centers: Theory and administration*, (pp. 3-15). Urbana, IL: NCTE.
- Cromely, J. G. & Azevedo, R. (2005). What do reading tutors do? A naturalistic study of more or less experienced tutors in reading. *Discourse Processes*, 40, 83-113.
- Gillespie, P. & Lerner, N. (2008). *The Longman Guide to Peer Tutoring* (2nd ed). New York, NY: Pearson Education, Inc.
- Graff, G. & Birkenstein, C. (2010). *They Say/ I Say: The Moves that Matter in Academic Writing* (2nd ed). New York, NY: W.W. Norton & Company, Inc.
- Graham, S. & Perin, D. (2007). *Writing next: Effective strategies to improve writing of adolescents in middle and high schools--A report to Carnegie Corporation of New York*. Washington DC: Alliance for Excellent Education.
- Hillocks, George. (1987). Synthesis of research on teaching writing. *Educational Leadership*, 44(8), 71-82.

- Hoel, T.L. (2001). *Skriva och samtala: lärande genom responsgrupper* (S. Andersson, trans.). Lund, Sweden: Studentlitteratur AB.
- Jamieson, S. & Howard, R.M. (2013). Sentence-Mining: Uncovering the Amount of Reading and Reading Comprehension in College Writers' Researched Writing. In R. M. McClure & J. Purdy (Eds.), *The New Digital Scholar: Exploring and enriching the research and writing practices of nextgen students*, (pp. 109-129). New Jersey: Information Today, Inc.
- Kellog, R. T. (2008). Training writing skills: A cognitive developmental perspective. *Journal of writing research*, 1(1), 1-26.
- Lang, J. A. (2008). *On Course: A week-by-week guide to your first semester of college teaching*. Harvard, MA: Harvard University Press.
- Mackiewicz, J. & Thompson, I. (2013). Motivational Scaffolding, Politeness and Writing Center Tutoring. *The Writing Center Journal*, 33(1), 38-73.
- Nicholas, K. A., & Gordon, W. (2011). A quick guide to writing a solid peer review. *EOS*, 92(28), 233-234. [On-line]. Available: onlinelibrary.wiley.com/doi/10.1029/2011EO280001/abstract [23 June 2015]
- North, S. (1984). The Idea of a Writing Center. *College English*, 46(5), 433-446.
- Purdy, J. P. (2013). Scholarliness as Other: How Students Explain Their Research-Writing Behaviors. In R. M. McClure & J. Purdy (Eds.), *The New Digital Scholar: Exploring and enriching the research and writing practices of nextgen students*, (pp. 133-159). New Jersey: Information Today, Inc.
- Stern, L. A., & Solomon, A. (2006). Effective faculty feedback: The road less traveled. *Assessing Writing*, 11(1), 22-41.
- Thompson, I. (2009). Scaffolding in the Writing Center: A Microanalysis of an Experienced Tutor's Verbal and Nonverbal Tutoring Strategies. *Written Communication*, 26, 417-453. doi: 10.1177/0741088309342364
- Williams, J. M. (2007). *Style: Lessons in Clarity and Grace* (9th ed.). New York, NY: Pearson Education, Inc.
- Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17, 89-100.
- Zamel, V. (1985). Responding to Student Writing. *TESOL Quarterly*, 19(1), 79-101. [On-line]. Available: www.jstor.org/stable/3586773 [23 June 2015]

Harnessing student diversity: The case of the Lund University MSc Programme in Human Factors and System Safety

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Our experiences of having worked with diverse students in the Lund University Master's Programme in Human Factors and System Safety is that diversity is not necessarily a challenge to manage, as much as a resource to harness. The programme engages students from different high-risk domains (diverse experiences), having various functions within their domains (diverse roles and hierarchical positions), working in different countries (diverse nationalities) and ages. In this chapter, we discuss how student diversity as a resource, together with peer review as a pedagogical method, can contribute to the development of critical thinking skills amongst students who mainly have operational or managerial backgrounds. We have worked with peer review in an open environment in which students, together with faculty mentors, share experiences and critically review arguments rather than particular standpoints. The chapter reflects upon our experiences with potential and the challenges related to teaching diverse students, as well as the students' reactions to the teaching methods used. We conclude by arguing that harnessing student diversity not only facilitates the learning of the students, it also stimulates the learning of the faculty mentors involved in the programme.

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Introduction

In this chapter, we discuss how one of the main aims of higher education, teaching critical thinking, can be achieved by harnessing student diversity. With harnessing student diversity, we mean to see this diversity as a resource in achieving our pedagogical aims. Using the case of the Lund University Master's Programme in Human Factors and System Safety, we will discuss the challenges, but mainly the potential of engaging diverse students and faculty mentors in an open peer review environment, in which the arguments are more important than the standpoints argued for.

The Master's Programme in Human Factors and System Safety was established at Lund University in 2006.³ The programme is unique in that it is the only MSc programme at Lund University that is run as commissioned education for safety-critical industries. This means that the students are generally highly experienced in their fields (e.g. airline pilots, anaesthesiologists, master mariners, safety managers in mining, oil and gas, air traffic controllers, accident investigators), but not necessarily experienced or trained as academics or researchers. They represent several different high-risk domains and come from various OECD countries over many continents (Scandinavia, Canada, USA, Australia, Europe). The programme not only offers a platform for students to connect their working practices to a body of scientific literature, but also one for critical thinking and learning from each other's experiences. The programme is designed to be followed part-time, while still working, mainly through distance learning. During the first of the two years, the students are required to participate in three mandatory 'learning laboratories'; one-week campus sessions which establish a sense of community and introduce the different courses of the programme. Table 1 offers an overview of the programme and its courses.

The course syllabus has been developed from the perspective of constructive alignment (Biggs & Tang, 2007). Constructive alignment is a form of outcome-based learning in which the teaching/learning activities are systematically aligned with the assessment procedure as well as the desired learning outcomes (ibid, p. 54-55). While this model serves as a good reminder of structure for the teacher developing the course syllabus, one additional aspect also needs to be emphasised:

³ The programme was mainly developed and run by Professor Sidney Dekker (the second author of this chapter), and since January 2012, the programme director is Johan Bergström (first author of this chapter).

a model of the students. Below we will give some examples of important aspects of the constructive alignment of the programme, specifically focusing on student diversity.

Table 1. Courses included in the MSc Programme in Human Factors and System Safety.

MSc Human Factors & System Safety				
Year one			Year two	
FLMU01: The New View of Human Factors and System Safety (10 ECTS)	FLMU02: The Sociology of Safety and Accidents (10 ECTS)	FLMU03: Accountability and Learning from Failure (10 ECTS)	FLMU04: Forensic Safety Investigation and System Change (15 ECTS)	FLMU05/06: MSc Thesis or project report (15 ECTS)

It is typical in higher education (at least in Sweden) to take in students in their early twenties without much previous experience of working in a domain of their field of study. This programme is different. We have found that it is quite difficult to meaningfully discuss the deep ethical, political, economic, psychological and social aspects of safety with young students who have never seen an organisation from the inside; who are not familiar with the many messy details of unwritten rules, with work not as imagined, but as practically done on a daily basis. So, the students in our programme are typically in the middle of their careers, working in safety-critical environments. They take the course in order to gain deeper understanding of how to make progress in their safety management strategies. In order to constructively align the teaching aims, activities, and assessment, the model has been complemented with the possibilities and challenges associated with the kind of students enrolled in the programme.

The students who apply for the MSc programme in Human Factors and System Safety are typically highly motivated. With the programme being run as commissioned education, with no possibility for the students to cover their own tuition, they have typically spent a long time convincing their employer how the company would benefit from covering their tuition for two years. Furthermore, we accept only a limited number of students—typically 15—making it possible for us as faculty representatives and mentors to get to know them well.

Student diversity offers the greatest benefit, and at the same time is our greatest challenge in building the programme curriculum. The diversity means that the students will be of different ages (currently from 25 to 60 years old); from different parts of the world; having different kinds of constraints (available time, travel, etc.) from their normal job; entering the programme with vastly different

background knowledge of their field; and with different work-life experiences to relate their studies to. The varying background knowledge that students have of the various application fields, of course, creates some challenges for the level of teaching. But it is also a great starting point for peer learning. That our students live in different parts of the world is a great challenge for establishing possibilities for real-time interaction. At the same time, it is also a great advantage for learning about the diversity of safety-practices internationally. Despite the general experience level of our students, some, of course, have less work-life experience or relevant roles in their organisations than others. Such students, however, might have more recent academic training. This contrasts with others who have a full working life of experience, but no academic training. This is also a challenge to us when introducing academic conduct, how to read, and constructing academic arguments, but can again form a great basis for peer interaction and mutual learning. A typical challenge with diversity of student nationality is language. We do consider ourselves lucky, having few students who struggle with English in a way that challenges our ability to read and give feedback to the written assignments. Even though we do not require the students to take a formal English test before starting, we stress the importance of good writing skills in English before the students apply. We find that most students, even those who are not native English speakers, have English as an important language in their day-to-day working environments.

The structure of this chapter will basically follow the constructive alignment of the programme. After first outlining important extracts from the degree objective, we will introduce the pedagogical methods used in order to harness the student diversity described above. In our descriptions of the pedagogical methods used to address the degree objectives, as well as of our experiences of the possibilities and challenges related to student diversity, we will begin by describing how the programme is mainly made up of open essay questions designed to trigger critical thinking by formulating arguments. We will further describe how faculty provided mentors to continuously coach the students in order to improve their skills in formulating critical arguments. Our main point however will be how to involve the students, and to harness their diversity, in the teaching processes of their peers using an open peer review environment. In this chapter, we make use of students' accounts (from course evaluations, the final part of the constructive alignment-model) in order to highlight how they respond to the teaching methods used and reflect on their learning process. We will also discuss the challenges that we face in our efforts to engage the students in interactive learning. Prior to summarising our conclusions, we will also introduce how we see a cross-

fertilisation of teaching and research through the collaborative environment established in the programme.

Extracts from the degree objectives

There is a particular emphasis on ethical aspects and consideration in the degree objectives of the programme. This programme was institutionalised based on the premise that critical thinking is a highly necessary, and often lacking, skill of human factors and safety practitioners in today's high-risk fields (Dekker, 2001; 2014; Dekker, Nyce, van Winsen & Henriqson, 2010). From the degree objectives, connected to *Ethics and Making Judgements*, examples include that after course completion the student shall be able to:

- Avoid judgmental language and jumping to conclusions in understanding past actions.
- Show a deep appreciation of the social context—and the skills and vocabulary necessary to navigate it—in which organisational learning from failure takes place.
- See both the social and scientific possibilities of, and limits to, making progress on safety, in particular, safety-critical domains, given their opportunities and constraints.
- Be scientifically sensitive to the limitations of each model or explanation offered, and that the applicability of models can only be gauged if their limits are known.

Apart from the emphasis on critical thinking, the degree objectives stress the ability to communicate and argue for a particular standpoint. Selected from the list of objectives related to student *skills and abilities*, the students, after course completion, shall:

- Have developed their ability to work both independently and in interdisciplinary teams, particularly when it comes to constructive dialogue with different stakeholders about safety problems, and offer well-argued written opinions about diagnosis or proposed change.

From this objective, two aspects need to be stressed: (1) that the students should learn from each other's disciplines, and (2) practice the ability to construct arguments for their standpoints; critical arguments regarding the current safety

practices of their domains, communicated to people who might not work in the same domain.

There are also knowledge-transfer aspects of the degree objectives for this programme, and domain-specific knowledge is an important aspect of the development of critical thinking (Stanton, Wong, Gore, Sevdalis, & Strub, 2011), but there is a clear emphasis on the more ethical and judgmental aspects of higher education. As written above, this has to do with our perceived need for questioning not only the current safety practices in high-risk domains, but also the scientific body of knowledge informing such practices (Dekker 2001, 2003, 2009, 2010, 2014; Dekker, Bergström, Amer-Wählin, & Cilliers, 2013; Dekker, et al., 2010). This is a heritage that we take seriously and that, as we will show below, the students seem to appreciate.

Critical thinking as the main academic skill

I do not believe anything anymore because I question everything. (Answer to the question “Has the course developed your critical and analytical skills?” course FLMU02, 2013)

High-risk industries increasingly focus on achieving safety by means of bureaucratic accountability through compliance-based approaches. With slogans such as ‘safety first’, and appeals to employees’ ‘hearts and minds’ being completely non-problematic, there is an increased need for critical reflections to not hesitate in taking ethical concerns into consideration. An emphasis on critical thinking as the main skill is often new to our students, and is being used to safely discuss—in non-problematizing terms—while ignoring any epistemological or ontological assumptions inherent in the language used.

Our framework for designing the curriculum assignments, as well as for assessing the students’ ability to reflect critically, is the Structure of the Observed Learning Outcome (SOLO) taxonomy (Biggs & Tang, 2007). The taxonomy was developed in order to design and assess the complexity and quality of the students’ learning outcome. Table 2 introduces the four levels of observed learning outcomes according to the SOLO taxonomy.

Table 2. The four levels of the SOLO taxonomy (as formulated by Biggs & Tang, 2007).

Academic level	Verbs describing the level
Extended abstract	Theorise, hypothesise, generalise, reflect, generate, create, compose, invent, originate, prove from first principles, make an original case, solve from first principles
Relational	Apply, integrate, analyse, explain, predict, conclude, review, argue, transfer, make a plan, characterise, compare, contrast, differentiate, organise, debate, make a case, construct, review and rewrite, examine, translate, paraphrase, solve a problem
Multistructural	Classify, describe, list, report, discuss, illustrate, select, narrate, compute, sequence, outline, separate
Unistructural	Memorise, identify, recognise, count, define, draw, find, label, match, name, quote, recall, recite, order, tell, write, imitate

Asking the students to critically reflect on current safety practices, and connecting literature to experience in order to provide their own argument, is not only a much-needed critical perspective to the field of safety practice, it also reflects the *relational* level in the SOLO taxonomy of academic quality. To us, it is important that academic teaching at an advanced level should be aligned in order for the students to develop, and show, their capability to formulate arguments of relational quality. Aiming even higher, the *extended abstract* level is our aim with all of our MSc thesis projects in which these students, in particular, have the possibility to act as insider ethnographers critically reflecting and theorising upon practices their organisations take as natural parts of their operating systems:

All colleagues in my profession consider themselves as safety experts, however, they are not. That counts also for me, although in the meantime I've gained a little more background information. Having this knowledge, changed my idea of safety. It made me absolutely more critical. (Answer to the question “Has the course developed your critical and analytical skills?”, course FLMU01, 2014)

I actually started to think ‘what's going on’ when it comes to my own industry... (Answer to question “Has the course developed your critical and analytical skills?”, course FLMU01, 2014)

In practice, the critical skills of our students are taught through having them formulate arguments; arguments that typically need to be connected to the literature in order to be assessed and judged as persuasive. A typical example would be the following assignment: the students are asked to answer, in 1000 words, the following question: “What would make the culture of your organisation ‘just?’”.

The question needs to be based on a critical reflection on their own organisational practices, an understanding of the writings on the notion of “just culture” (and the main conflicts within the field), and a clear connection between the two. Different students will, based on their domain experiences, organisational roles, and expertise, interpret the question differently, and they will come to different conclusions regarding what would make their organisations just. Together they form a broad, diverse and complex picture of the notion of a just organisation.

The first year mandatory courses are also designed in order to challenge the students to get higher and higher in the SOLO taxonomy as the year progresses. While the first courses (FLMU01-02) indeed focus on applying theory and constructing arguments based on the theory, it is in the third course (FLMU03) that the ethical implications of current practices in the safety field get most explicitly considered in the course material:

I both liked and hated that the subject material was much tougher than the other courses (at least for me). Liked it because it made me stretch, hated it because it made me stretch. (Answer to the question “What did you like with this course”, course FLMU03, 2013)

Assessing assignments, in which the main pedagogical emphasis is on critical reflections and convincing arguments, poses certain demands on the way in which we assess the students. Asking the students to argue for a standpoint, without emphasising which standpoint to argue for (which is done from the very first assignment of the first year), essentially means that there are no right or wrong answers or standpoints. This also makes sense given the diversity of the students. Different students will interpret the questions differently, and answer them according to their diverse interpretations. In the *Mentor Guidelines* (further outlined below) the main philosophy is formulated as follows:

There are no right or wrong answers to the questions given in the course assignments. The students should be given feedback related to how they structure their argument, how they connect their argument to the literature, and how they are able to encourage dialogue and reflections amongst those reading their analyses. (Mentor feedback guidelines, p. 2)

The role of the mentor becomes one of a coach; determined to help the student to come up with an even more convincing argument in the next assignment.

Teaching as coaching

In this programme, there is a constant interaction between students and between students and faculty mentors. In order to stimulate the development of critical thinking, the role of the mentor is one of a coach. The coach is not supposed to teach the student what methods to use, what standpoint to take, or which strategies are right or wrong, but rather to facilitate the development of the student's own ability to reflect and argue for his or her standpoint. We see this as vital at any advanced level teaching and something that is appreciated by the students:

The mentor feedback has been well considered, well structured and appropriately critical. While I came to this course because of its unique structure and the focus on critical thinking, the mentor feedback and engagement has been the most valuable aspect of the program. (Answer to the question "Have the mentor(s) given you relevant feedback?", course FLMU03, 2012).

In the MSc programme in Human Factors and System Safety, we use an online Learning Management System for distance-based teaching. The students submit written reflections (typically 1000-2000 words) every second week. During the week following submission, they receive feedback from at least two students and one LU-provided mentor. They are also required to write critical peer reviews for at least two fellow students. The submissions of assignments and reviews all take place in a forum structure to encourage dialogue and follow-up questions to be asked, answered, and elaborated upon.

The mentors are recruited from the university staff, but also from previous students of the programme. Last year, it became evident that the teaching philosophy emphasised here needed to be formalised and communicated to the mentor group. The feedback principles in Box 1 are taken from the document entitled *Mentor Feedback Guidelines*.

The last couple of bullet points in this list also make it clear that the role of the programme director is to coach and support the mentors by sometimes reviewing their suggested feedback (which are indeed also analyses), and advise them on how to develop their argument prior to posting it as feedback to the student.

Box 1: Feedback Principles

The following mentor feedback writing principles are extracted from the more elaborate text in the programme's *Mentor Feedback Guidelines*:

- There are no right or wrong answers.
- The role of the mentor is to coach the student, not to judge them as right or wrong.
- The feedback should encourage critical reasoning, creative thought, and further readings of the literature.
- Feedback is a proactive measure; it is intended to give the student the possibility to improve the analytical skills needed for future assignments, and ultimately for the thesis.
- The feedback should encourage dialogue.
- The mentors should, in general, not use less than 500 words in their feedback.
- No reference is ruled out independently of how the reference is used in the analysis. The use of the reference is as important as the reference itself.
- The feedback should help the student to develop understanding and use of the APA citation format when writing.
- The mentor role is different from the role of course manager. The course manager officially assigns credit points to the students upon finishing their courses. It is also the course manager alone who can make the call to fail an individual assignment.
- The course manager is also the coach of the mentors and will give the mentors feedback on their feedback to students.
- Mentors will always turn to the course manager when, or if, they suspect that the student have failed an assignment.
- Mentors follow the same deadline for publishing feedback as the students do. If unable to publish specific feedback before the deadline, the student and course manager need to be advised

Facilitating interactive learning among students

Possibly one of the greatest strengths of this course is the diversity of disciplines and experience base that necessarily translates into valuable alternate perspectives. (Answer to the question “How did the different experiences of the students affect your learning process?”, course FLMU01, 2014)

The fact that we work with students who (1) are highly experienced, (2) represent different domains, (3) work in different roles (from sharp-end practitioners to

blunt-end managers), together with our pedagogical aim to develop their critical thinking skills, makes peer review an excellent teaching method to make the students learn from each others' experience, at the same time as they critically analyse the texts of their peers. While the benefits of using peer review as a teaching method has been well discussed by the academic literature focusing on higher education (Mulder, Pearce & Baik, 2014; Thomas, Chie, Abraham, Jalarajan & Beh, 2014; van den Berg, Admiraal & Pilot, 2006), there are few studies focusing on peer review as a way to harness student diversity. Our students emphasise how the diversity of the group is a crucial part of their interactive learning:

Having such a diverse class is integral. Don't ever stray from that! (Answer to the question "How did the different experiences of the students affect your learning process?", course FLMU01, 2013)

Again: this diversity should be considered mandatory in future classes, not optional. (Answer to the question "How did the different experiences of the students affect your learning process?", course FLMU03, 2013)

With the students responding so well to the potential of learning from each others' diverse experiences, peer review—naturally engaging the students in each others' work—should be a suitable way to continuously harness this diversity. Reviewing several different kinds of case-studies related to peer review and assessment, Topping (1998) finds that students may even respond better to peer review than to teacher assessment. Pre-requisites for this activity to be meaningful include ensuring a discussion climate in which critical arguments are encouraged and appreciated. In order to ensure a well-functioning peer review environment, in which student diversity can be harnessed by having the students critically reflect on each others work (based on their own experience, expertise and understanding of the literature), we deliberately create a social environment on campus. The programme starts with a mandatory one-week learning laboratory, in which we make sure that we not only have days characterised by discussions and group assignments, but that we also have dinner tables booked during the evenings. Once a well-functioning social environment is established, the students typically give us the feedback that the peer reviews are valuable parts of their learning experience:

Very much so! Some of my peers really kept me motivated with good questions and supportive comments! (Answer to the question “Was the peer feedback valuable for your learning experience?”, course FLMU01, 2014)

Interesting to see that what goes on in my own mind, is not always self-explaining. This is where I learned most, even if I did not expect this to be such an important part of the program. Mentor and peer feedback really are a nice way of achieving this. (Answer to the question “Has the course helped you develop skills in building a good argument?”, course FLMU01, 2014)

Writing critical reflections is hard, and we have several classroom sessions during the first mandatory learning laboratory dedicated to examples of constructively critical, extensive, and analytical peer reviews; discussions of the structure of peer review; and the difference between critique and criticism. The students also get to read examples of extensive and analytical reviews. Not only is the process of writing and receiving peer reviews an important part of the learning experience (because it is a way to critique the argument made), it is also a way to continuously harness the diversity of the student group. Indeed, we encourage the students to use their previous experiences not only in writing their assignments, but also their peer reviews. And typically, the students acknowledge this as a positive aspect of their learning processes:

Good to learn how aspects of the course apply to other areas. If you cannot quite relate a topic to your own area, often the experience of others allows you to "get it" and see how a concept works. (Answer to the question “How did the different experiences of the students affect your learning process?”, course FLMU03, 2012)

Having the assignments and feedback published in an open forum allows for all students and mentors to read all of the published assignments and feedback reviews. When publishing an assignment, a student creates a new forum thread, and all the feedback reviews are then posted as answers—further contributing to the thread. Often we find follow-up questions written from the student posting the original assignment to his or her feedback authors. We also find that students tend to read, and appreciate, the feedback of their fellow students:

I actually often find assignments and feedback on others assignments as useful as feedback on mine. (Answer to the question “Was the peer feedback valuable for your learning experience?”, course FLMU01, 2014)

The diversity of the students and mentors also brings a diversity of review-writing styles. Mulder, Pearce and Balk (2014) recently concluded that students are reassured of the quality of higher education when, together with peer feedback (the fellow who is in the same boat), also receive feedback from a university mentor (the coach who might have been in the same boat). We appreciate that the peer feedback typically focuses on differences in ways to interpret the questions and domain experience of the issues being addressed in the questions, while the mentor feedback is more targeted to a review of the text as an academic argument. Our students also appreciate the combination of the two:

Difference between mentor and peer feedback is a real added value. (Answer to the question “Was the peer feedback valuable for your learning experience?”, course FLMU01, 2014)

In our experience (and as supported by Lundstrom and Baker, 2009), writing a peer review is often as analytically challenging as writing up the original assignment. This is also confirmed by our students, sometimes even complaining that it is too much of a challenge, not allowing them to focus enough on their own work:

Whilst there is the occasional gem of knowledge that comes through the online peer to peer feedback, I am not convinced that it is worth the effort and I feel I could make better use of my time reading or preparing my own work. Maybe I am just from a different generation as I find most blogs and the like quite tedious and ineffectual, while many of my younger colleagues live for online communications. I personally prefer personal contact wherever possible. (Answer to the question “Was formulating feedback to your peers valuable for your learning experience?”, course FLMU03, 2012).

Since we find the peer review such an important part of the pedagogy applied in this programme we take accounts such as the one above seriously, and try to address them in several ways. First and foremost, we stress to the mentors their crucial roles as role models for the students. If the students receive high-quality feedback, they should also be more likely to get inspired and produce high-quality feedback. We also note, and appreciate, that the students’ feedback writing skills improve dramatically over the first year of study. During a recent learning laboratory, the students stressed that they could benefit from fewer—but more comprehensive—assignments with longer deadlines, allowing them to dedicate more time between assignments to work on peer review, read the assignments and feedback of other students, and on preparing for the upcoming assignment. As

this chapter is going to press, we are running a course that has incorporated these suggestions from the students. The quote above also requests a feedback exchange by personal contact, rather than in an online forum environment. We include the possibility to do so (and then write a short summary of the discussion) as the students move on to their second year, in which they focus on thesis writing.

One teaching activity that we would like to develop further is real-time online interactive sessions using software like Google Hangout or Adobe Connect. It is a challenge to make this work in a meaningful way, given that the students are located in different time zones all over the world. Nonetheless, reflecting on past and future assignments, each other's writings and experiences, and interacting directly with peers and mentors, are all activities that could take place in such an online environment. We have made some attempts to use Adobe Connect and Google Hangouts during the last two years, but need to make this a more intuitive and natural part of the future teaching activities. Here we really struggle with the student diversity:

Not enough of them. And because we are such a diverse group regarding time zones, participation is a bit prohibitive for those at the edges, though probably just as tricky for those in Europe where they are in the middle of the working day. (Answer to the question "Were the online seminars valuable for your learning experience?", course FLMU03, 2012)

Teaching through research and research through teaching

A final point that we would like to make in this reflection is one that we think could be considered to a much greater extent in general: the cross-fertilisation of teaching and research through MSc thesis work. With the aim already in the beginning of any MSc thesis project to make the results publishable in peer-reviewed literature, the relationship between supervisor and student also becomes one of collaborators; one from which they can both benefit. Advanced education is intended to give the student the competence needed to proceed with a career in academia; the thesis work is the final test of this ability. Furthermore, we believe that the quality of the theses produced in our programme would increase, in general, if the supervisors also benefit from the collaboration with their students.

We have been fortunate enough to see several cases of our students successfully publishing their thesis work in peer reviewed journals (Bakx & Nyce, 2012; Hill, 2010; Larsson, Dekker & Tingvall, 2010; Mikkers, Henriqson & Dekker, 2013;

Raymer & Bergström, 2013; Raymer, Bergström, & Nyce, 2012). In one of the cases (Raymer et al., 2012), and were even nominated to the 2012 Editor's Shortlist for Best Publication in the journal *Ergonomics* (a high-profile journal in the field). Also, several of our students have also pursued further studies:

There may be something supernatural about this course because now I want to do a PhD. (Answer to one of the course evaluation questions "How do you feel about your upcoming studies in this programme?", course FLMU03, 2013)

The idea to publish thesis results may make some of the employers uneasy—who, after all, pay for their employee/student to be in the programme. This is because of the inevitable clash between companies wanting to protect their safety data from outside probing; being concerned about proprietary information on the one hand; and the democratic principles of academic freedom and universal availability, and sharing of scientific knowledge on the other. We have always been able to solve such conflicts of interest on a case-by-case basis for individual students, even though our position has remained unwavering and strong; knowledge produced as part of research at a public university like Lund, should be available to other researchers and interested parties in an unencumbered fashion. Typical concessions to employers' concerns can be made in the form of anonymising the data source or inserting different kinds of acknowledgments and qualifications that allay their concerns and liabilities. Although, at the end of the day, we are convinced that publishing thesis results is a benefit to all parties. The pursuit of a publication, after all, (1) increases the academic quality of the work, (2) increases the visibility and shareability of the research, (3) increases the supervisor's engagement in the project, (4) gives the student early experience of academic work, and (5) supports the student as well as supervisor with important academic qualifications.

Concluding remarks

In this chapter, we have discussed how student diversity (professional experience, geographical location, and age) can contribute to pedagogical aims of higher education; especially the development of critical thinking skills. We have described how we work with peer-review in an open forum environment, where we emphasise critical thinking and that there are no right or wrong answers.

We have often said that in this programme, we don't necessarily teach our students to *know*. We teach them to *think*. This is more of a pedagogical and ethical commitment than a pure empirical fact, of course, because naturally we teach our students to know. The reading list for the programme alone is huge, and there is much that we *want* them to know, or even *need* them to know in order to have critical and meaningful discussions and reflections on their own organisations and practice. If you want your students to think critically, after all, they need to have something to think critically *about*. But ultimately, the knowledge base on safety in complex organisations will forever remain unfinished, instable, and incomplete. We all keep learning. This means that teaching students to think critically, to ask questions (and how to ask questions that help generate meaningful reflection and discussion) is a skill we have learned to value much higher than them simply *knowing* stuff. Harnessing student diversity in the way that we have been able to do in the MSc programme discussed here has created one huge additional benefit: it has also turned mentors into students. The wealth of experience and insight brought into the classroom—virtual or physical—by the students who typically enrol in this programme, is such that all encounters between student and mentor create learning opportunities for both.

References

- Bakx, G. C. & Nyce, J. M. (2012). Is redundancy enough?: A preliminary study of apache crew behaviour. *Theoretical Issues in Ergonomics Science*, 1-15.
- Dekker, S. (2001). Follow the procedure or survive. *Human Factors and Aerospace Safety*, 1(4), 381-385.
- Biggs, J. B. & Tang, C. S. K. (2007). *Teaching for quality learning at university what the student does* (Third ed.). Maidenhead: McGraw-Hill/Society for Research into Higher Education & Open University Press.
- Dekker, S. (2003). When human error becomes a crime. *Human Factors and Aerospace Safety*, 3, 83-92.
- Dekker, S., Bergström, J., Amer-Wählin, I. & Cilliers, P. (2013). Complicated, complex, and compliant: Best practice in obstetrics. *Cognition, Technology & Work*, 15(2).
- Dekker, S. W. (2014). The bureaucratization of safety. *Safety Science*, 70, 348-357.
- Dekker, S. W. A. (2009). Just culture: Who gets to draw the line? *Cognition, Technology & Work*, 11(3), 177-185.

- Dekker, S. W. A. (2010). We have newton on a retainer: Reductionism when we need systems thinking. *Joint Commission Journal on Quality and Patient Safety/Joint Commission Resources*, 36(4), 147.
- Dekker, S. W. A., Nyce, J. M., van Winsen, R. & Henriqson, E. (2010). Epistemological self-confidence in human factors research. *Journal of Cognitive Engineering and Decision Making*, 4(1), 27-38.
- Larsson, P., Dekker, S. W. A. & Tingvall, C. (2010). The need for a systems theory approach to road safety. *Safety Science*, 48(9), 1167-1174.
- Lundstrom, K. & Baker, W. (2009). To give is better than to receive: The benefits of peer review to the reviewer's own writing. *Journal of Second Language Writing*, 18(1), 30-43.
- Hill, W. (2010). An original qualitative study of resilience and techniques ICU clinicians report they use to develop their anticipation, intuition and foresight at change of shift report. *Canadian Journal of Respiratory Therapy*, 46(4), 16-24.
- Mikkers, M., Henriqson, E. & Dekker, S. W. A. (2013). Managing multiple and conflicting goals in dynamic and complex situations: Exploring the practical field of maritime pilots. *Journal of Maritime Research*, 9(2), 13-18.
- Mulder, A. Pearce, M. & Baik, C. (2014). Peer review in higher education: Student perceptions before and after participation. *Active Learning in Higher Education*, 15(2), 157-171.
- Raymer, K. E. & Bergström, J. (2013). User image mismatch in anaesthesia alarms: A cognitive systems analysis. *Ergonomics*, 56(10), 1525-1534.
- Raymer, K. E., Bergström, J. & Nyce, J. M. (2012). Anaesthesia monitor alarms: A theory-driven approach. *Ergonomics*, 55(12).
- Stanton, N. A., Wong, W., Gore, J., Sevdalis, N. & Strub, M. (2011). Critical thinking. *Theoretical Issues in Ergonomics Science*, 12(3), 204-209.
- Thomas, S., Chie, T., Abraham, M., Jalarajan Raj, S. & Beh, S. (2014). A qualitative review of literature on peer review of teaching in higher education: An application of the SWOT framework. *Review of Educational Research*, 84(1), 112-159.
- Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of Educational Research*, 68(3), 249-276.
- van den Berg, I., Admiraal, W. & Pilot, A. (2006). Design principles and outcomes of peer assessment in higher education. *Studies in Higher Education*, 31(3), 341-356. Retrieved from ERIC.