Navigating Online Peer Assessment in Land Surveying Education: Enablers and Constraints

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Abstract: This paper presents an observational study focused on online student peer assessment within the context of land surveying education. Conducted over the course of one semester, the study aimed to identify the enablers, constraints, and impacts of peer assessment on learning outcomes among final-year land surveying students. Enablers included the promotion of critical thinking, collaboration, and self-reflection among students However, constraints such as time limitations and variability in peer feedback quality posed challenges to the effective implementation of peer assessment. From my perspective as an academic observer, online student peer assessment holds potential benefits for enhancing learning outcomes. When properly implemented, online peer assessment can serve as a valuable complement to traditional assessment methods, offering students a more holistic learning experience. However, allocating time and energy towards peer assessment must be carefully balanced against its perceived benefits for students. The implementation of online student peer assessment significantly influenced the outcomes of this particular module. Through online peer assessment activities, final-year students were encouraged to actively engage with course content, develop critical evaluation skills, and provide constructive feedback to their peers. This active involvement in the assessment process facilitated a deeper understanding of the module concepts and fostered a supportive learning community within the classroom. Despite challenges, the potential benefits of online peer assessment for learning outcomes justify its integration into educational practices. By leveraging online peer assessment effectively, educators can empower students to take ownership of their learning journey and cultivate essential skills for their future careers in the field.

Keywords: Enablers and constraints, learning outcomes, observational study, online assessment, peer assessment.

1. Introduction

Peer assessment is an increasingly popular educational tool used in higher education assessment due to its pedagogical value and potential to enrich student learning. Peer assessment has been established in research literature developed over the last 30 years, and the efficacy of an effective assessment method has been well debated in the literature (Kerman et al., 2024). An evaluation of this literature finds a generally positive sentiment towards peer assessment as a method that supports student learning with a host of additional benefits for students (Adachi et al., 2018; Kerman et al., 2024). Peer assessment is understood as a method that involves students assessing work, providing feedback, and engaging in and critically evaluating each other's work (Chin, 2016). Peer assessment flips the traditional assessment practice and power relations around from

one in which the academic grades and provides feedback into a system in which students are actively engaged in the entire assessment process.

The research literature on peer assessment has focused on different elements of peer assessment. The positive effects of peer assessment have been extensively studied, as well as the challenges associated with peer assessment. Similarly, the design considerations required to implement peer assessment successfully have been well researched (Adachi et al., 2018; Kerman et al., 2024). The rise of ICTs during the 1990s fuelled the development of web-based services for peer assessment, which, in turn, led to the development of peer assessment research on design considerations and best practices for the effective implementation of online peer assessment (Latifi et al., 2021). Based solely on this literature, assessment researchers can easily advocate for an ideal form of peer assessment and what needs to be considered in the assessment design for peer assessment (Adachi et al., 2018). Peer assessment research in higher education is supported by a considerable body of literature on student perceptions and experiences of peer assessment (Chin, 2016; McGarr and Clifford, 2013). In contrast, studies focused on teaching academics' perspectives on peer assessment have received limited attention in research. Specifically, this research focuses on the enablers and constraints academics experience in implementing peer assessment in their courses (Adachi et al., 2018).

Peer assessment in land surveying and geospatial disciplines has not been extensively researched. Where it has been, research has focused on the correlation between student grade allocation and that of the tutor/academic. McLaughlin and Simpson (2003) studied peer assessment with a focus on the differences between students' and tutors' grades. El-Mowafy (2014) examined if peer assessment could support students' practical training by evaluating peer fieldwork and found that students could develop a critical understanding of the fieldwork and improve their practical knowledge. Similarly, Kelly (2019) studied the effects of peer assessment on students' ability to develop professional skills and foster lifelong learning. The limited studies indicate a broader limitation of peer assessment research, which is focused primarily on the validity and reliability of assessment rather than the learning outcomes of assessment. Regardless of the limited literature on land surveying, where practical and theoretical knowledge must be integrated, online peer assessment proves particularly beneficial. It leverages digital platforms to foster a collaborative and interactive learning environment, encouraging students to engage more deeply with the material and one another. Therefore, this paper aims to address the gaps by focusing on the experience of one academic and an academic developer in peer assessment.

2. Enablers of Peer Assessment

This section outlines some potential enablers of peer assessment that have theoretical or empirical support in the literature.

2.1 Development of soft skills

One of the most frequently reported benefits of peer assessment is the enhancement of writing and communication, which is attributed to the student feedback provided and received. This not only provides students with exposure to the work of others but also gives them the opportunity to reflect on their own writing in a structured manner (Huisman et al., 2018; Noroozi et al., 2023). Evaluating peer work supports argumentation and critical thinking skills (Noroozi & Hatami, 2019). Topping (2009) argues that peer assessment forces students to engage actively in cognitive engagement by participating in peer evaluations. This requires students to engage with the course material and the work they critically evaluate. Critical evaluation is a central part of peer assessment, which develops students' ability to evaluate the work of others within the confines of the discipline's knowledge.

2.2 Fostering collaboration

Peer assessment is social in nature and requires student engagement with the work of others. Providing feedback and facilitating discussion in class or online establishes the conditions for reviewing, discussing, and sharing insights about the work of others. Offering constructive feedback supports critical thinking and evaluative judgment and can lead to a deeper understanding of the course content (Van Gennip, Segers, & Tillema, 2010). Creating a collaborative learning environment encourages students to take responsibility for their own learning. It enhances student learning through knowledge diffusion and the exchange of ideas, which all motivate the active engagement of students with the course material (Chin, 2016).

2.3 Promotes active learning

Assessment is usually considered an activity in which lecturers and tutors (any experts in the field) conduct with or to students. Students are passive assessment participants and receive criticism from others who are more knowledgeable. Peer assessment can reverse this relationship and empower students to be more active as assessors and developing experts in their field (Brindley and Scoffield 1998). Peer assessment allows students to be more reflective about their own work and the work of others, and this self-reflection enables students to identify areas for improvement (Boud & Falchikov, 2006). Taking an active self-reflective stance towards student learning can improve students' understanding of course content.

2.4 Developing professional skills

Peer assessment develops transferable skills, which are often the ones that future workplaces demand of our students when they enter the workforce (Kearney 2013). Peer assessment requires making evaluative judgements, understanding assessment standards, and providing feedback. This combination provides opportunities for students to develop a range of transferable, cognitive, and behavioural skills (Reinholz, 2016). These skills include communication, conflict management, developing evaluative judgement, teamwork, and the

ability to provide feedback (Nicol, Thomson, and Breslin, 2014). A significant benefit of using peer assessment is that it develops students' personal skills, which differ based on the discipline and the type of assessment outcomes, whether authentic or functional. For example, an assessment designed to improve writing and communication would have different outcomes from an assessment evaluating project plans of competing student groups. However, it would still develop some generic skills, such as communication and writing abilities. Chin (2016) argues that some of the primary benefits of peer assessment are the promotion of social interaction among students, which may have a social benefit, the development of a social network of support, and the development of self-confidence, which are crucial to assisting students in developing their own capabilities. Brill (2016) and Lowell & Ashby (2018) further highlight the positive impact of peer feedback in developing the professional skills of students.

Peer assessment also develops decision-making, judgement, and evaluative skills needed later in a professional career by enhancing the ability to evaluate the quality of ideas and the communication (Bayat et al., 2022). The most significant benefit of peer evaluation is the development of communication skills within the discipline and the enhancement of students' ability to communicate appropriately in disciplinary ways (Ritzhaupt & Kumar, 2015). Implementing peer feedback in classrooms not only helps teachers activate students' engagement but also assists students in broadening and deepening their understanding of the subject matter (Bayat et al., 2022; Noroozi et al., 2022).

3. Constraints of Peer Assessment

This section outlines some constraints of peer assessment.

3.1 Reliability and variability in the quality of peer feedback

The peer assessment literature views students' feedback as unreliable, with significant variability in the quality of the feedback. This is a central concern, as can be seen in the significant focus on the correlation between student and academic staff grading (Kulkarni et al., 2015). This view is problematic in the assessment literature, which is centrally focused on the validity and reliability of assessment instead of focusing on how peer assessment supports student development and learning.

3.2 Students' resistance to peer assessment

Students view other students as novices in the discipline and in evaluating the work of others, and they regard peer feedback as inferior to the tutor's or lecturer's feedback. This lack of trust in their abilities and that of their peers is sometimes met with scepticism or even student resistance (Wanner & Palmer, 2018). Students could view peer assessment as unfair and biased if they are unprepared (Brindley & Scoffield, 1998). This ultimately results in students viewing assessment as part of the academic role and placing less value on alternative forms of assessment, like peer assessment (Tai et al., 2014).

Involving students as assessors could influence the power relationship between academics and students, with some academics feeling uneasy about giving power to students in assessment

(McGarr and Clifford, 2013), while students themselves may not be willing or able to take on this role.

3.3 Time and resource limitations

Some studies have argued that peer assessment saves time for academics (Kerman *et al.*, 2024), while others have cautioned that the design and implementation of a successful peer assessment is complex and demanding on academics in terms of administrative planning and managing the process, especially if it is the first time implementing the peer assessment and impact on limited time academics have to balance all their responsibilities (Berg & Seeber, 2016).

3.4 Need for adequate training and support

The planning, design, and training of students and academics are important to ensure a successful peer assessment. Ensuring that students know what peer assessment is and how to conduct it is a crucial element that could determine the success or failure of its pedagogical value (Chin, 2016). This requires time in class and discussions with students to ensure they receive adequate support (Kerman et al., 2024). When peer assessment is conducted online, familiarity among academics and students is important, and adequate planning and backup plans must be in place to ensure the successful implementation of peer assessment.

4. Research Methodology

This study aims to provide insight into some of the enablers and constraints experienced by an academic when implementing peer assessment for the first time in a land surveying course. To achieve this, a qualitative study was designed using autoethnography and critical reflection to deeply explore the social context in which the study occurs(Chang, 2016). Additionally, focus groups were conducted with 14 final-year students to triangulate the academic experiences and observations (Ellis et al., 2011).The autoethnographic data was generated through reflections from the first author, which were then analysed by writing a narrative of these reflections and ultimately evaluating and analysing them for themes (Ellis et al., 2011). Data analysis of the focus group data was completed via thematic analysis, allowing for the identification of themes emerging from the data (Braun & Clarke, 2006, 2017). Thematic analysis is a flexible method that can be applied to different forms of data and can be used to delve into deeper meanings by looking beyond the surface (Braun & Clarke, 2017). The two sets of data were triangulated with the identified themes, which were then further triangulated with literature in the findings section below.

5. Presentation and Discussion of Findings

The findings reveal both the potential benefits and challenges associated with this assessment method.Through detailed observation and analysis, several themes emerged that highlight the strengths and areas for improvement of this assessment method. These themes aim to provide

insights into the enablers and constraints experienced by academics when deploying peer assessment in a module.

5.1 Enablers of online peer assessment

Online peer assessment in higher education, particularly within specialised fields such as land surveying, offers several enablers that enhance the learning process. These enablers include promoting critical thinking, fostering collaboration, encouraging self-reflection, and developing professional skills. Each aspect plays a crucial role in providing a holistic and enriched learning experience. It should also be noted that many of these aspects overlap, and the complexity of the interplay between the enablers is difficult to untangle.

5.1.1 Promotion of critical thinking

The primary enabler was the promotion of critical thinking. Critical thinking is a fundamental skill in higher education, and online peer assessment is a powerful tool for cultivating it. When students evaluate their peers' work, they must engage deeply with the material, analyse it from various angles, and provide constructive feedback. This process goes beyond passive learning; it requires active cognitive engagement (Topping, 2009).

The lecturer found that one of the most notable enablers of online peer assessment was its ability to promote critical thinking. Students were required to engage deeply with their peers' work, analyse it critically, and provide constructive feedback. This process necessitated a thorough understanding of the subject matter, as students had to identify both strengths and weaknesses in their peers' projects. Student 3 remarked, *"Reviewing my peer's work forced me to think critically about the methodologies we use and question why we do things a certain way."*

By critically assessing their peers' work, students are able to understand the underlying concepts thoroughly. This analytical process aligns with Bloom's Taxonomy of higher-order thinking skills, particularly analysis, evaluation, and synthesis (Bloom, 1956). For example, in a land surveying course, students might evaluate a peer's surveying project, scrutinising the accuracy of data, the appropriateness of the methodologies used, and the clarity of the final report. Such detailed scrutiny necessitates a deep understanding of both theory and practice.

Moreover, this continuous practice of critical evaluation can lead to improved problem-solving skills. As students encounter various approaches and solutions through peer assessments, they learn to compare and contrast different methods, fostering a more comprehensive understanding of the subject matter (Noroozi & Hatami, 2019).

5.1.2 Fostering collaboration

The peer assessment process fostered a sense of community and teamwork among students. As they reviewed and discussed each other's work, they shared insights and constructive feedback, leading to a richer understanding of the course content. This collaborative learning environment

aligns with previous findings that highlight the social benefits of peer assessment (Van Gennip et al., 2010). Such interaction exposes students to diverse perspectives and ideas, significantly enriching their learning experience (Van Gennip et al., 2010).

This collaborative environment was instrumental in enhancing the learning experience. Student 5 commented, *"The discussion forums were great for debating different techniques and approaches. I learned a lot from seeing how others approached the same problems."* These interactions not only enriched students' understanding but also mirrored the teamwork and communication skills required in professional settings, motivating active student engagement in the learning process (Chin, 2016).

5.1.3 Encouraging self-reflection

Self-reflection was significantly enhanced through peer assessment. Students reported that evaluating their peers' work prompted them to reflect critically on their own. Self-reflection is a vital component of effective learning, and online peer assessment strongly encourages this practice. When students assess their peers' work, they inevitably compare it to their own, which prompts them to reflect on their performance. This reflective practice helps students identify their strengths and areas for improvement (Boud & Falchikov, 2006). Over time, this habit of self-reflection can lead to continuous improvement and a deeper understanding of the subject matter (Nicol et al., 2014).

Online peer assessment strongly encouraged self-reflection among students. By comparing their own work with that of their peers, students were prompted to reflect on their performance and identify areas for improvement. Student 8 noted, *"Reading my peer's feedback made me realise some mistakes I hadn't noticed before. It was a humbling and enlightening experience."* This reflective practice is crucial for continuous improvement and a deeper understanding.

5.1.4 Developing professional skills

The peer assessment process also contributed to the development of essential professional skills, including communication, critical evaluation, teamwork, and time management. Student 6 highlighted, *"Providing feedback helped me improve my ability to articulate my thoughts clearly and constructively, which I know will be valuable in my future career."* These skills are directly transferable to professional settings and are crucial for students' future success.

The process of critically assessing peers' work enhances analytical skills. Students learn to evaluate various aspects of a project, identify strengths and weaknesses, and suggest improvements. This ability to critically evaluate work is invaluable in professional roles where quality assurance and continuous improvement are key (Nicol et al., 2014).

Participating in peer assessment requires students to manage their time effectively. They must balance their own work with the responsibility of reviewing their peers' work, meeting deadlines, and providing timely feedback. This practice helps students develop strong time management skills, which are essential for professional efficiency and productivity (Topping, 2009). As an

academic observer, the study underscores the potential benefits of online peer assessment in complementing traditional assessment methods by providing a more holistic learning experience when properly implemented.

5.2 Constraints of online peer assessment

Despite these benefits, the study also identified several constraints that posed challenges to effectively implementing online peer assessment. These constraints include time limitations, variability in the quality of peer feedback, students' resistance to peer assessment, and the need for adequate training and support. Addressing these constraints is crucial for optimising the benefits of peer assessment.

5.2.1 Time limitations

One of the primary constraints of online peer assessment is the significant time commitment required from students. Both the students and I encountered challenges in managing the time necessary for thorough peer assessments. Student 4 noted, "*Balancing my own assignments with the responsibility of reviewing my peers' work was quite challenging. It felt overwhelming at times."*This issue is particularly pronounced in courses with heavy workloads, where students may already struggle to manage their time effectively. Consequently, this time constraint sometimes leads to rushed or superficial evaluations, undermining the potential benefits of the peer assessment process.When students lack adequate time to engage deeply with the peer review process, the quality of feedback diminishes, and the learning outcomes are compromised. Therefore, according to Adachi, Hong-Meng Tai, & Dawson (2018), careful planning and scheduling are essential to ensure that students have sufficient time to engage meaningfully in peer assessment. Adjusting the assessment design and pacing in our case could significantly enhance the quality and depth of student engagement with peer assessment in the future.

5.2.2 Variability in the quality of peer feedback

Another constraint was the variability in the quality of peer feedback (Adachi et al., 2018). Some students provided detailed, constructive comments, while others offered only superficial critiques (Tai et al., 2014). Student 7 observed, *"The feedback I received varied a lot. Some of it was really helpful, but some comments were too vague to be useful."* This inconsistency can reduce the overall effectiveness of peer assessment and lead to frustration among students who receive less useful feedback. Addressing this issue requires targeted training to ensure all students are equipped with the skills needed to provide high-quality evaluations (McGarr & Clifford, 2013; Tai et al., 2014).

The quality and utility of feedback received from peers were generally viewed positively, with most students acknowledging that the feedback was insightful and constructive. However, the variability in feedback quality noted by some students suggests that, while many students are capable of providing high-quality feedback, further training is needed to ensure consistency. This could be addressed by incorporating more comprehensive training sessions focused on

developing students' evaluative skills and providing ongoing support throughout the peer review process.

5.2.3 Students' resistance to peer assessment

Resistance to peer assessment among students is another constraint that we, as academics, must address. Some students may be sceptical about the value of peer feedback, doubting their peers' ability to provide meaningful evaluations. Others might feel uncomfortable critiquing their classmates or fear negative repercussions from offering honest feedback (Wanner & Palmer, 2018). Some students expressed a preference for instructor feedback over peer feedback, questioning the reliability of their peers' evaluations. Student 9 remarked, "I value my peers' opinions, but I still feel more confident in the feedback provided by the instructor." This sentiment highlights the importance of balancing peer and instructor assessments to ensure credibility and trust in the evaluation process.

5.2.4 Need for adequate training and support

Adequate training and support are essential for the success of online peer assessment. Without proper guidance, students may struggle to understand the assessment criteria, provide constructive feedback, and use the online platforms effectively. A lack of training can result in poor-quality feedback and negative experiences for students (Zhang, Schunn, & Baikadi, 2017).

To conduct this online peer assessment, the academic had to learn how to use and set up the systems.In addition to the workshop the academic attended, there was also a process of trial and error until the system worked properly.The academic then had to train the students on how to use the system. From the students' perspective, one session was sufficient, as most of the work went into setting up the online peer evaluation. Once they understood it, the students could easily navigate the system.

As an academic observer, it was evident that the success of peer assessment hinges on careful planning and support, as well as recognising the time and possible discomfort of both academics and students when undertaking this for the first time.To maximise the benefits of online peer assessment, it is crucial to allocate sufficient time and resources to train students in providing effective feedback. Workshops and clear guidelines can help standardise the quality of evaluations and ensure that all students are prepared to participate meaningfully in the process. Furthermore, integrating regular check-ins and feedback on the peer assessment process can help maintain high standards and address any issues promptly. This continuous support can alleviate some of the time pressures and ensure that the process remains beneficial for all participants.

6. Conclusion and Recommendations

Online peer assessment presents a dynamic and interactive method for enhancing student learning in higher education. While the process is enriched by multiple enablers, such as

promoting critical thinking, fostering collaboration, encouraging self-reflection, and developing professional skills, it is also accompanied by notable constraints. These constraints, including time limitations, variability in the quality of peer feedback, students' resistance, and the need for adequate training and support, must be strategically addressed to optimise the benefits of peer assessment.The positive impacts observed in terms of increased student engagement, deeper understanding of course material, and improved evaluative skills demonstrate the potential of online peer assessment. However, the challenges identified through student feedback and academic observations highlight areas for improvement.By understanding both the enablers and constraints, educators and institutions can better design and implement online peer assessment strategies that maximise benefits while minimising drawbacks. This balanced approach will enhance the learning experience and prepare students for professional environments that demand critical thinking, collaboration, and continuous self-improvement.

To fully harness the potential of online peer assessment and address the identified constraints, it is recommended that academics offer initial and ongoing training sessions to familiarise students with the online peer assessment process, including the use of digital platforms, understanding assessment rubrics, and techniques for providing constructive feedback.Developing and distributing clear, detailed guidelines outlining the objectives, expectations, and criteria for peer assessment will also benefit students.Technical support is important to assist students in navigating any technological issues.Standardised assessment rubrics to guide students in providing consistent and objective feedback would also be very helpful.

By implementing these recommendations, educational institutions can create a more effective and supportive environment for online peer assessment. This, in turn, will enhance the learning experience for students, helping them develop critical skills that are essential for their academic and professional success.

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References

Adachi, C., Hong-Meng Tai, J., & Dawson, P. (2018). Academics' perceptions of the benefits and challenges of self and peer assessment in higher education. *Assessment & Evaluation in Higher Education*, 43(2), 294-306.

Bayat, M., Banihashem, S. K., & Noroozi, O. (2022). The effects of collaborative reasoning strategies on improving primary school students' argumentative decision-making skills *The Journal of Educational Research* 1-10.

Berg, M., and B. Seeber. 2016. Slow Professor: Challenging the Culture of Speed in the Academy. Toronto: University of Toronto Press.

Bloom, B. S. (1956). *Taxonomy of Educational Objectives: The Classification of Educational Goals*. Longmans, Green.

Boud, D., & Falchikov, N. (2006). Aligning assessment with long-term learning. *Assessment & Evaluation in Higher Education*, 31(4), 399-413.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology *Qualitative Research in Psychology* 3(2), 77-101.

Brindley, C., & Scoffield, S. (1998). Peer Assessment in Undergraduate Programmes Teaching in Higher Education 3(1), 79-90.

Chang, H. (2016). *Autoethnography as a method*. Routledge.

Chin, P. (2016). Peer Assessment *New Directions in the Teaching of Physical Sciences* 13-18.

Ellis, C., Adams, T. E., & Bochner, A. P. (2011). Autoethnography: an overview. Historical social research/Historische sozialforschung, 273-290.

Huisman, B., Saab, N., Van Driel, J., & Van Den Broek, P. (2018). Peer feedback on academic writing: undergraduate students' peer feedback role, peer feedback perceptions and essay performance *Assessment & Evaluation in Higher Education* 43(6), 955–968. https://doi.org/10.1080/02602938.2018.1424318

Kearney, S. (2013). "Improving Engagement: The use of 'Authentic Self-and Peer-assessment for Learning to Enhance the Student Learning Experience." Assessment & Evaluation in Higher Education 38 (7): 875–891.

Kerman, N.T., Banihashem, S.K., Karami, M., Er, E., van Ginkel, S & Noroozi, O. (2024). Online peer feedback in higher education: A synthesis of the literature *Education Information Technologies,* 29, 763–813. https://doi.org/10.1007/s10639-023-12273-8

Kelly, W. (2019). Innovative Pedagogy for Geospatial Lifelong Learning. FIG Working Week 2019: Geospatial Information for a Smarter Life and Environmental Resilience, Hanoi, Vietnam, 22-26 Apr 2019.

Kulkarni, C., Wei, K. P., Le, H., Chia, D., Papadopoulos, K., Cheng, J., Koller, D., & Klemmer, S. R. (2015). Peer and self-assessment in massive online classes. In H. Plattner, C. Meinel, & L. Leifer (Eds.), *Design thinking research* (pp. 131–168).. Cham: Springer.

Latifi, S., Noroozi, O., & Talaee, E. (2021). Peer feedback or peer feedforward? Enhancing students' argumentative peer learning processes and outcomes *British Journal of Educational Technology*,52(2), 768–784.

McLaughlin, P. & Simpson, N. 2003. Peer assessment for construction management and quantity surveying students. *Australian Journal of Construction Economics and Building, 3(*2), pp.43-49.

McGarr, O., and A. M. Clifford. 2013. Just Enough to make you take it Seriously': Exploring Students'Attitudes Towards Peer Assessment. *Higher Education,* 65 (6): 677–693.

Nicol, D., A. Thomson, and C. Breslin. 2014. Rethinking Feedback Practices in Higher Education: A Peer Review Perspective. *Assessment & Evaluation in Higher Education,* 39(1), 102–122.

Noroozi, O., & Hatami, J. (2019). The effects of online peer feedback and epistemic beliefs on students' argumentation-based learning. *Innovations in Education and Teaching International,* 56(5), 548–557.

Noroozi, O., Banihashem, S. K., Biemans, H. J., Smits, M., Vervoort, M. T., & Verbaan, C. L. (2023). Design, implementation, and evaluation of an online supported peer feedback module to enhance students' argumentative essay quality. *Education and Information Technologies,* 1–28. https://doi.org/10.1007/s10639-023-11683-y

Noroozi, O., Banihashem, S. K., Taghizadeh Kerman, N., Parvaneh Akhteh Khaneh, M., Babayi, M., Ashrafi, H., & Biemans, H. J. A. (2022). Gender differences in students' argumentative essay writing, peer review performance and uptake in online learning environments *Interactive Learning Environments* 1-18.

Reinholz, D. (2016). The Assessment Cycle: A Model for Learning Through Peer Assessment. *Assessment & Evaluation in Higher Education*, 41(2), 301–315.

Ritzhaupt, A. D., & Kumar, P. (2015). The impact of peer feedback on communication skills in online discussions. *Journal of Educational Computing Research,* 53(1), 31–50. https://doi.org/10.1177/0735633115592429

Tai, J. H.-M., Haines, T. P., Canny, B. J., & Molloy, E. K. (2014). A study of medical students' peer learning on clinical placements: What they have taught themselves to do. *Journal of Peer Learning, 7(*6), 57–80.

Topping, K. J. (2009). Peer assessment. *Theory into Practice,* 48(1), 20-27.

Van Gennip, N. A. E., Segers, M. S. R., & Tillema, H. H. (2010). Peer assessment as a collaborative learning activity: The role of interpersonal variables and conceptions. *Learning and Instruction*, 20(4), 280-290.

Wanner, T., & Palmer, E. (2018). Formative self-and peer assessment for improved student learning: the crucial factors of design, teacher participation and feedback. *Assessment & Evaluation in Higher Education*, *43*(7), 1032–1047.

Zhang, F., Schunn, C.D. & Baikadi, A. Charting the routes to revision: An interplay of writing goals, peer comments, and self-reflections from peer reviews. *Instr Sci 45*, 679–707. https://doi.org/10.1007/s11251-017-9420-6