Exploring Students' Perceived Learning Outcomes and Satisfaction in a Supported Online Peer Feedback Module

Nafiseh Taghizadeh Kerman
Ferdowsi University, Iran, https://orcid.org/0000-0003-0046-0077

Seyyed Kazem Banihashem
Wageningen University and Research, The Netherlands; The Open Universiteit, The Netherlands,
https://orcid.org/0000-0002-9978-3783

Omid Noroozi
Wageningen University and Research, The Netherlands
https://orcid.org/0000-0002-0622-289X

Abstract: The aim of this study was to explore how students perceive their learning outcomes and satisfaction during an online peer feedback activity in the context of argumentative essays. In this study, 135 undergraduate students participated. A module called "*Argumentative Essay Writing*" was developed and embedded into the course on the Brightspace platform. In this module, students wrote an argumentative essay for the first session, and they provided peer feedback based on the guidelines for the second session. In the third session, students revised their essays based on the received feedback. In the end, students were asked to fill out a survey about their perceived learning outcomes and satisfaction. The results showed that students perceived domain-specific or general learning outcomes and learning satisfaction were high. These insights could guide educators and institutions in developing more effective online learning strategies, ultimately fostering improved student learning outcomes and satisfaction in the digital age.

Keywords: Learning outcomes, learning satisfaction, online learning environment, peer feedback

Citation: Taghizadeh Kerman, N., Banihashem, S. K., & Noroozi, O. (2023). Exploring Students' Perceived Learning Outcomes and Satisfaction in a Supported Online Peer Feedback Module. In M. Demirbilek, M. S. Ozturk, & M. Unal (Eds.), *Proceedings of ICSES 2023-- International Conference on Studies in Education and Social Sciences* (pp.748-756), Antalya, Türkiye. ISTES Organization

Introduction

The integration of technology in education especially for feedback purposes has shown great potential to support feedback (Akbari et al., 2023; Banihashem et al., 2022). One paramount advantage lies in the expeditious delivery of feedback. Digital platforms empower educators to swiftly assess and respond to student

performances, fostering a real-time interaction crucial for effective learning. Beyond speed, technology allows for tailored feedback, accommodating diverse learning styles. Adaptive learning tools analyze individual progress, delivering personalized guidance that aligns with students' unique needs and preferences (Banihashem et al., 2022). Accessibility and flexibility are elevated through the incorporation of digital feedback mechanisms. Students can engage with feedback at their own pace and from any location, transcending the constraints of traditional classrooms. This proves particularly valuable in the realm of remote and online learning, where flexibility becomes paramount.

The collaborative dimension is accentuated as technology facilitates peer feedback systems. Virtual platforms enable students to review and comment on each other's work, fostering a collaborative spirit and providing varied perspectives. This not only refines the quality of feedback but also nurtures critical thinking and communication skills. Educational technology's impact extends to the realm of data-driven insights. Analytical tools offer educators a panoramic view of student performance, unveiling patterns and identifying areas of strength and weakness. This wealth of data empowers educators to fine-tune their instructional strategies, tailoring approaches to meet the evolving needs of their students (Banihashem et al., 2022).

In the context of peer feedback, the utilization of online peer feedback as an effective instructional strategy in education, particularly in large class settings, is rapidly gaining attention due to the heavy workload faced by educators when providing individualized feedback (Noroozi & De Waver, 2023; Noroozi et al., 2022; 2023). Previous research has consistently demonstrated the positive impact of employing peer feedback in higher education on various aspects of students' learning processes and outcomes (Gielen et al., 2010; Valero Haro et al., 2022, 2023), enhancement of argumentative writing skills (Latifi & Hatami, 2021; Latifi, Noroozi, & Talaee, 2021, 2023; Latifi et al., 2021; Taghizadeh Kerman et al., 2022a, 2022b, 2023a, 2023b), and overall satisfaction with the learning experience (Taghizadeh Kerman et al., 2022b; Noroozi et al., 2022). Nonetheless, within the specific context of argumentative essay writing, there exists a gap in the literature where further investigation is warranted.

The design and development of modules incorporating peer feedback, offering students engaging learning opportunities, present a promising approach to motivate students to integrate such digital learning modules into their regular coursework. Receiving feedback from peers who share similar motivational needs and engaging in reciprocal feedback constitute critical components of the learning process (Bayerlein, 2014; Crisp, 2007).

Effective feedback serves as a tool for helping students acknowledge the disparity between their current status and their desired goals, while also offering guidance on what areas need improvement and how to effect those improvements (Noroozi et al., 2023). The incorporation of peer feedback is identified as a pivotal element in the learning process. This approach is particularly impactful when students sharing similar motivational needs engage in reciprocal feedback. Such an exchange not only builds a sense of community among learners but also addresses individual learning goals.

Effective feedback, as emphasized by Noroozi et al. (2023), serves as a valuable tool in the educational toolkit. It acts as a mirror, allowing students to reflect on the gap between their current status and their desired objectives. Furthermore, it offers actionable insights by providing guidance on specific areas that require improvement and suggesting ways to effect those improvements. In essence, these feedback-rich modules not only motivate students but also empower them with the knowledge and direction needed to enhance their overall academic performance.

Despite the existing literature emphasizing the significance of feedback for learning and the attributes of high-quality feedback (Bayerlein, 2014; DeNisi & Kluger, 2000), students in collaborative settings often encounter challenges in providing high-quality feedback (Bayat et al., 2022; Noroozi et al., 2016; 2020; 2022). This may not always result in effective learning outcomes. Therefore, there is a clear need for additional support to facilitate students' willingness to provide critical yet constructive feedback in digital learning modules with a high level of satisfaction. Current literature also falls short in addressing how students perceive their learning outcomes and satisfaction with online peer feedback activities. This gap in the literature leaves unexplored insights into students' perceptions of learning and satisfaction when engaging in online peer feedback activities.
The purpose of this study is to investigate how students perceive their learning outcomes in two sections including perceptions of obtaining domain-specific knowledge and domain-general knowledge, as well as their satisfaction with the supported online peer feedback activities in the context of argumentative essay writing. The following research questions are formulated based on this purpose:

1. How do students perceive their learning outcomes in terms of domain-specific knowledge in their supported online peer feedback activities in the context of argumentative essay writing?
2. How do students perceive their learning outcomes in terms of domain-general knowledge in their supported online peer feedback activities in the context of argumentative essay writing?
3. How do students perceive their satisfaction with their supported online peer feedback activities in the context of argumentative essay writing?

Method

Participants

This experimental study is part of a larger project conducted at Wageningen University and Research in the Netherlands during the academic year 2020-2021. The participants included 135 undergraduate students who had enrolled in an environmental science course. However, data from only 101 students who completed the module were included in this study. Of the participants, approximately 69% were female (N = 70), and about 31% were male (N = 31). The mean age of the participants was 20 years.

Procedure

To run this study, a course module called "*Argumentative Essay Writing*" was designed and embedded in the

course within the Brightspace platform. The module was followed by the students in three consecutive weeks and for each week they were asked to complete specific task. In the first week, students were provided with introductory instructions on how to write an argumentative essay, they were asked to fill out an online survey about their demographic data, and write an argumentative essay on one of the three provided topics. In the second week, students were asked to review two of their peers' argumentative essays and provide comments on them (30 to 50 words for each element) on peers' essay performance based on the given criteria embedded in the FeedbackFruits app within the Brightspace platform. In the third week, students were asked to revise their essays according to the two review sets they received from their learning peers and submit the revised version of the essay on the platform. At the end of the module, students filled out the surveys regarding learning satisfaction and perceived learning outcomes.

Measurements and Analysis

A questionnaire designed by Noroozi et al., (2022) was designed to assess students' learning satisfaction with the learning experiences. This questionnaire consisted of two main sections and 11 items in total on a five-point Likert scale ranging from "*almost never true = 1," "rarely true = 2," "occasionally true = 3," "often true = 4"* through to *"almost always true = 5*." The first section (5 items) assessed students' perceived effects of the domain-specific learning outcomes. The second section (6 items) assessed students' perceived effects of the domain-general learning outcomes. The reliability coefficient was high for all two scales of this instrument (Cronbach $\alpha = 0.84$ and 0.84). Descriptive analysis was used to answer the research questions.

Results

RQ1. How do students perceive their learning outcomes in terms of domain-specific knowledge in their supported online peer feedback activities in the context of argumentative essay writing?

The average score for students' perceived effects on domain-specific learning outcomes was sufficiently high (3.58). The results of this study showed that students had a high perception of domain-specific learning outcomes (see Table 1).

Table 1. Students' perceived domain-specific learning outcomes

Perceived effects on the domain-specific learning outcomes	Mean	SD
The module was useful for learning about different perspectives on the controversial issue	3.46	0.84
The module broadened my knowledge on the topic	3.73	0.90
The module deepened my knowledge on the topic	3.62	0.96
The module helped me learn pros and cons of various arguments for and against the topic	3.59	0.94
I am satisfied with my learning with this module	3.53	0.84

RQ2: How do students perceive their learning outcomes in terms of domain-general knowledge in their supported online peer feedback activities in the context of argumentative essay writing?

The average score for students' perceived effects on domain-general learning outcomes was 3.43. The results indicated that students had a high perception of domain-general learning outcomes (see Table 2).

Table 2. Students' perceived domain-general learning outcomes

Perceived effects on the domain-general learning outcomes	Mean	SD
The module helped me learn how to elaborate on various pros and cons of the topic	3.40	0.98
The module helped me learn how to defend and support my opinion on the topic	3.41	1.06
The module helped me learn how to integrate various perspectives on the topic	3.26	0.92
The module helped me learn how to write a structured argumentative essay	3.36	0.98
The module helped me learn how to offer argumentative peer feedback	3.84	0.93
The module helped me learn essential elements of a sound argumentative essay	3.31	0.95

RQ3: How do students perceive their satisfaction with their supported online peer feedback activities in the context of argumentative essay writing?

The average score for students' learning satisfaction was 3.65. The results indicated that students' learning satisfaction was high.

Discussion and Implications for Practice

The results of this study indicate that students were able to attain both domain-specific and domain-general learning following the implementation of a digital learning module. This finding aligns with previous research emphasizing the positive benefits of various representational tools, such as textual and graphical content in digital learning modules, on students' learning and knowledge acquisition (Latifi et al., 2023; Vale Haro et al., 2023). The step-by-step instructions and recommendations provided within the digital learning module appeared to assist students in acquiring prior knowledge about the pros and cons of the contentious topic, enabling them to elaborate on it during the peer feedback process.

The digital learning module was designed to facilitate deep cognitive processing for learning and to uncover complementary knowledge from the two other group members based on their awareness of each other's specialized expertise (Noroozi et al., 2016; Schellens et al., 2007). In this study, students benefited from their partners' knowledge and skills by reviewing the feedback on the topic provided by two other group members. Assessing and providing feedback on their peers' argumentative essays enhanced students' awareness of the topic (see Latifi & Hatami, 2021; Latifi, Noroozi, & Talaee, 2021, 2023; Latifi et al., 2021). As evidenced by the post-test assessment of their perceived domain-specific and domain-general learning, students' knowledge awareness improved, and the importance of group knowledge awareness in fostering knowledge construction was evident (Noroozi, 2018, 2022; Noroozi & Hatami, 2019; Taghizadeh Kerman et al., 2023).

Students found the digital module, with its textual and graphical representations of information and supported

peer feedback, to be highly valuable in creating well-structured argumentative essays and developing domain-specific expertise. Engaging with a digital module for learning and knowledge sharing proved to be a challenging yet enjoyable experience for undergraduate students. It encouraged them to deepen their understanding of the topic, express agreement or disagreement with the arguments of their peers, and incorporate multiple perspectives through the supported peer feedback throughout the module. The digital module appeared to provide students with a safe and respectful learning environment where they could practice argumentation, critical thinking, and reasoning skills. Students quickly grasped the many functions of this digital module, as evident from their survey responses. Overall, the module's user-friendliness, design, and supported peer feedback had a positive impact on students' perceived domain-specific and domain-general learning, as well as their satisfaction. Last but not least, for future research we suggest employing new technological innovations such as Artificial Intelligence and learning analytics (Banihashem et al., 2023) for supporting online peer feedback activities. It would be also interesting to explore the role of culture in such online settings to understand the extent to which the outcomes of this study can be applied in different cultural settings (see Ranjbaran et al., 2023)

Conclusion

In summary, this research delved into the impact of different elements within the digital learning module, with a specific focus on peer feedback, on key dependent variables. These variables included perceived domain-specific learning, perceived domain-general learning, and overall learning satisfaction. The outcomes of this study significantly contribute to advancing our comprehension of the efficacy of peer feedback modules within online learning environments, with a particular emphasis on learner satisfaction and perceived learning, as highlighted by Taghizadeh Kerman et al. (2022a).

The study revealed that peer feedback modules play a crucial role not only in enhancing learning satisfaction but also in influencing broader aspects of overall learning effectiveness, as underscored by the insights from Noroozi et al. (2023). The significant influence of peer feedback emerged as a common thread across various dimensions, emphasizing its multifaceted impact on the online learning experience. This research sheds light on the importance of incorporating peer feedback strategies within digital learning modules to optimize learner satisfaction and enrich the learning experience in both domain-specific and domain-general contexts.

References

Akbari, M., Danesh, M., Rezvani, A., Javadi, N., Banihashem, S. K., & Noroozi, O. (2023). The role of students' relational identity and autotelic experience for their innovative and continuous use of e-learning. *Education and Information Technologies*, *28*(2), 1911-1934. https://doi.org/10.1007/s10639-022-11272-5

Banihashem, S. K., Dehghanzadeh, H., Clark, D., Noroozi, O., & Biemans, H. J. (2023). Learning analytics for

online game-Based learning: a systematic literature review. *Behaviour & Information Technology*, 1-28. https://doi.org/10.1080/0144929X.2023.2255301

Banihashem, S. K., Noroozi, O., van Ginkel, S., Macfadyen, L. P., & Biemans, H. J. (2022). A systematic review of the role of learning analytics in enhancing feedback practices in higher education. *Educational Research Review*, 100489. https://doi.org/10.1016/j.edurev.2022.100489

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*, *115*(6), 349-358. https://doi.org/10.1080/00220671.2022.2155602

Bayerlein, L. (2014). Students' feedback preferences: how do students react to timely and automatically generated assessment feedback? *Assessment & Evaluation in Higher Education*, *39*(8), 916-931. https://doi.org/10.1080/02602938.2013.870531

Crisp, B. R. (2007). Is it worth the effort? How feedback influences students' subsequent submission of assessable work. *Assessment & Evaluation in Higher Education*, *32*(5), 571-581. https://doi.org/10.1080/02602930601116912

DeNisi, A. S., & Kluger, A. N. (2000). Feedback effectiveness: Can 360-degree appraisals be improved? *Academy of Management Perspectives*, *14*(1), 129-139. https://doi.org/10.5465/AME.2000.2909845

Gielen, S., Peeters, E., Dochy, F., Onghena, P., & Struyven, K. (2010). Improving the effectiveness of peer feedback for learning. *Learning and instruction*, *20*(4), 304-315. https://doi.org/10.1016/j.learninstruc.2009.08.007

Latifi, S., & Noroozi, O. (2021). Supporting argumentative essay writing through an online supported peer-review script. *Innovations in Education and Teaching International, 58*(5), 501-511. https://doi.org/10.1080/14703297.2021.1961097.

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. https://doi.org/10.1111/bjet.13054.

Latifi, S., Noroozi, O., Hatami, J., & Biemans, H. J. A. (2021). How does online peer feedback improve argumentative essay writing and learning?. *Innovations in Education and Teaching International, 58*(2), 195-206. https://doi.org/10.1080/14703297.2019.1687005.

Latifi, S., Noroozi, O., & Talaee, E. (2023). Worked example or scripting? Fostering students' online argumentative peer feedback, essay writing and learning. *Interactive Learning Environments, 31*(2), 655-669. https://doi.org/10.1080/10494820.2020.1799032.

Noroozi, O. (2018). Considering students' epistemic beliefs to facilitate their argumentative discourse and attitudinal change with a digital dialogue game. *Innovations in Education and Teaching International, 55(3), 357-365.* https://doi.org/10.1080/14703297.2016.1208112.

Noroozi, O. (2022). The role of students' epistemic beliefs for their argumentation performance in higher education. *Innovations in Education and Teaching International.1-12.* https://doi.org/10.1080/14703297.2022.2092188.

Noroozi, O. & De Wever, B. (Eds.). (2023). *The Power of Peer Learning: Fostering Students' Learning Processes and Outcomes*. Cham: Springer International Publishing.

https://link.springer.com/book/10.1007/978-3-031-29411-2.

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*. https://doi.org/10.1080/14703297.2018.1431143

Noroozi, O., Banihashem, S. K., & Biemans, H. J. (2022). Online supported peer feedback tool for argumentative essay writing: does course domain knowledge matter?. In *Proceedings of the 15th International Conference on Computer-Supported Collaborative Learning-CSCL 2022*, pp. 356-358. International Society of the Learning Sciences.

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. (2022). Gender differences in students' argumentative essay writing, peer review performance and uptake in online learning environments. *Interactive Learning Environments*, 1-15. https://doi.org/10.1080/10494820.2022.2034887

Noroozi, O., Biemans, H., & Mulder, M. (2016). Relations between scripted online peer feedback processes and quality of written argumentative essay. *The Internet and Higher Education*, *31*, 20-31. https://doi.org/10.1016/j.iheduc.2016.05.002

Noroozi, O., Hatami, J., Bayat, A., van Ginkel, S., Biemans, H. J., & Mulder, M. (2020). Students' online argumentative peer feedback, essay writing, and content learning: Does gender matter?. *Interactive Learning Environments*, *28*(6), 698-712. https://doi.org/10.1080/10494820.2018.1543200

Noroozi, O., Taghizadeh Kerman, N., Banihashem, S. K., & Biemans, H. A. J. (2022). The Role of Students' Perceived Motivation and Perceived Fairness of Peer Feedback for Learning Satisfaction in Online Learning Environments. *Proceedings of International Conference on Research in Education and Science (ICRES)*, Antalya, TURKEY. ISTES Organization.

Ranjbaran, F., Babaee, M., Parvaneh Akhteh Khaneh, M., Gohari, M., Daneshvar Ghorbani, B., Taghizadeh Kerman, N., Banihashem, S.K., & Noroozi, O. (2023). Students' argumentation performance in online learning environments: Bridging culture and gender. *International Journal of Technology in Education, 6*(3), 434-454. https://doi.org/10.46328/ijte.460.

Schellens, T., Van Keer, H., De Wever, B., & Valcke, M. (2007). Scripting by assigning roles: Does it improve knowledge construction in asynchronous discussion groups? *International Journal of Computer-Supported Collaborative Learning*, *2*, 225-246. https://doi.org/10.1007/s11412-007-9016-2

Taghizadeh Kerman, N., Banihashem, S. K., Karami, M., van Ginkel, S., & Noroozi, O. (2023a). Online peer feedback in higher education: A synthesis of the literature. *Education and Information Technologies*. https://doi.org/10.1007/s10639-023-12273-8.

Taghizadeh Kerman, N., Banihashem, S. K., & Noroozi, O. (2023b). The relationship among students' attitude towards peer feedback, peer feedback performance, and uptake. In *The Power of Peer Learning: Fostering Students' Learning Processes and Outcomes* (pp. 347-371). Cham: Springer International

Publishing. https://doi.org/10.1007/978-3-031-29411-2_16

Taghizadeh Kerman, N., Banihashem, S. K., Noroozi, O., & Biemans, H. A. J. (2022b). The effects of students' perceived usefulness and trustworthiness of peer feedback on learning satisfaction in online learning environments. *Proceedings of 8th International Conference on Higher Education Advances (HEAd'22)* (pp. 263-271), Valencia, Spain.

Taghizadeh Kerman, N., Noroozi, O., Banihashem, S. K., Karami, M., & Biemans, H. J. (2022a). Online peer feedback patterns of success and failure in argumentative essay writing. *Interactive Learning Environments*, 1-13. https://doi.org/10.1080/10494820.2022.2093914

Valero Haro, A, Noroozi, O., Biemans, H. J. A., & Mulder, M. (2022). Argumentation Competence: Students' argumentation knowledge, behavior and attitude and their relationships with domain-specific knowledge acquisition. *Journal of Constructivist Psychology, 35*(1),123-145. https://doi.org/10.1080/10720537.2020.1734995.

Valero Haro, A., Noroozi, O., Biemans, H. J., Mulder, M., & Banihashem, S. K. (2023). How does the type of online peer feedback influence feedback quality, argumentative essay writing quality, and domain-specific learning?. *Interactive Learning Environments*, 1-20. https://doi.org/10.1080/10494820.2023.2215822