

## The effects of students' perceived usefulness and trustworthiness of peer feedback on learning satisfaction in online learning environments

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### **Abstract**

*In this study, students' perceived usefulness and trustworthiness of peer feedback on learning satisfaction in the online learning environment were investigated using a pre-test and post-test research design at Wageningen University and Research. In total, 135 undergraduate students participated in this study. Students' peer feedback performance was observed in argumentative essay writing. A module called "Argumentative Essay Writing" was designed and students were asked to write an essay, provide peer feedback on peers' essays, and revise their essay based on the received feedback. Then students were asked to fill out the learning satisfaction and the attitude award to peer feedback surveys. The results showed that students' perceived usefulness and trustworthiness of peer feedback affect their learning satisfaction. This study adds to our understanding of the importance of the perceived usefulness and trustworthiness of peer feedback in online learning environments, particularly in the context of argumentative essay writing.*

**Keywords:** *learning satisfaction; online peer feedback; perceived usefulness; perceived trustworthiness.*

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## **1. Introduction**

In recent years, educators have shown interest in using peer feedback as an effective learning strategy in online learning environments (Ching & Hsu, 2013; Shahali Zadeh et al., 2016). Peer feedback as a formative assessment tool (Tai et al., 2015), where students may use the feedback to enhance their work, may reduce some of the fears associated with giving negative feedback to peers. Using a positive criticism technique (Burgess et al., 2013) that provides a uniform format for constructive feedback could also help to alleviate some of the tensions that come with negative peer feedback. A review of the prior studies reveals that using peer feedback in higher education has brought benefits to students' learning (e.g., Noroozi et al., 2018; Reinholz, 2018), professional skills (e.g. Brill, 2016; Lowell & Ashby, 2018), improvements in writing performance (e.g., Huisman et al., 2018; Latifi et al., 2019, 2021), and learning satisfaction (e.g., Donia et al., 2021). Despite the benefits of online peer feedback, its application in higher education also faces some challenges. There has been some concern identified with regard to how students receive and use feedback (e.g., Noroozi & Hatami, 2019). According to studies, students prefer instructor feedback more than peer feedback (Kaufman & Schunn, 2011). This could be due to students' lack of trust in peers' competence in providing good feedback (Misiejuk et al., 2021). As a result, a lack of students' trustworthiness of feedback or not knowing useful feedback may be issued with students' learning and satisfaction with the learning process. Therefore, this study seeks to answer the following questions to address this issue:

1. To what extent students' perceived usefulness of peer feedback affects their learning satisfaction in online learning environments?
2. To what extent students' perceived trustworthiness of peer feedback affects their learning satisfaction in online learning environments?

## **2. Method**

### ***2.1 Study Design***

This experimental study is a part of a bigger project that took place at Wageningen University and Research. As a part of a bigger project, for this study, one course from the environmental science domain was selected and a module called "Argumentative Essay Writing" was designed and embedded in the course at the Brightspace platform. The module was followed by the students in three consecutive weeks and for each week they were requested to complete a specific task. In the first week, students were asked to write an argumentative essay on one of the three provided controversial topics including (a) the long-term impacts of Covid-19 on the environment, (b) the role of private actors in funding local and global biodiversity, and (c) bans on the use of single-use plastics. In the second week, students were invited to provide feedback on the argumentative essays of two peers based on specific given criteria. In the

third week, students were asked to revise their original argumentative essay based on the two received feedback sets provided by their peers.

## **2.2 Participants**

Although 135 undergraduate students took part in this study, only 79 individuals completed the module. About 69 percent of participants ( $N = 70$ ) were female, whereas 31 percent ( $N = 31$ ) were male. Participants were told about the research setup of the courses in order to comply with ethical standards. This study also received ethical approval from the Social Sciences Ethics Committee at Wageningen University and Research.

## **2.3 Measurements**

### **2.3.1 Measurement of students' attitude towards peer feedback**

The authors developed a questionnaire with a 19-item to measure students' attitude towards peer feedback. This questionnaire have been five-point Likert scale ranging from "strongly disagree = 1," "disagree = 2," "neutral = 3," "agree = 4" through to "strongly agree = 5." This questionnaire entails four main sections including perceived usefulness of peer feedback, perceived motivation/enjoyment of peer feedback, perceived trustworthiness of peer feedback, and perceived fairness of peer feedback. The reliability coefficient was high for all four scales of this instrument (Cronbach  $\alpha = 0.82, 0.80, 0.76,$  and  $0.84$ ).

### **2.3.2 Measurement of students' learning satisfaction**

A questionnaire designed by Mahdizadeh (2007) was adopted to assess students' Learning satisfaction with the learning experiences. According to the nature and objectives of the research, changes were made to this questionnaire. This questionnaire consisted of four main sections and 24 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 third section (4 items) collected information on students' opinions on the ease of use of the module. The last section (8 items) assessed students' satisfaction with the learning task of the module. The reliability coefficient was high for all four scales of this instrument (Cronbach  $\alpha = 0.84, 0.84, 0.83,$  and  $0.76$ ).

## **2.4 Analysis**

Descriptive analysis was used to investigate the students' perceived usefulness and trustworthiness of peer feedback and students' learning satisfaction. Also, the Simple Linear Regression test was used to answer the research questions. It was determined that the data were normally distributed ( $p > 0.05$ ) after assessing the scores using the Kolmogorov-Smirnov tests.

### 3. Results

**RQ1: To what extent students' perceived usefulness of peer feedback affects their learning satisfaction in online learning environments?**

The descriptive statistics for the survey are presented in Table 1. Over 50% of students reported that peer feedback helps them in writing an argumentative essay and improving the structure essay. The average score of students' perceived usefulness of peer feedback was 3.64 (SD=0.67). The results showed that students' perceived usefulness of peer feedback affects their learning satisfaction ( $F(1, 77) = 13.30, p < 0.01, R^2=0.14$ ).

**Table1. The affect students' perceived usefulness of peer feedback (n = 79)<sup>a</sup>**

Item	Mean	SD	Agreement no. (%) <sup>b</sup>	Disagreement no. (%) <sup>c</sup>	Neutral no. (%)
Peer feedback was helpful for argumentative essay writing	3.96	0.85	62 (78.48)	5 (6.32)	12 (15.18)
Peer feedback was as valuable as teacher's feedback	3.12	0.92	32 (40.50)	22 (27.84)	26 (32.91)
Peer feedback helped me to better structure my argumentative essay	3.59	1.03	51 (64.55)	12 (15.18)	16 (20.25)
I learnt when I provided feedback to my peers' argumentative essays	3.83	0.74	60 (75.94)	5 (6.32)	14 (17.72)
I learnt when I received feedback from my peers on my argumentative essay	3.72	0.86	56 (70.88)	7 (8.86)	16 (20.25)

<sup>a</sup> Based on a 5-point Likert scale (Strongly disagree, disagree, neutral, agree, and strongly agree)

<sup>b</sup> Agreement = Agree, and strongly agree

<sup>c</sup> Disagreement = Strongly disagree, disagree

**RQ2: To what extent students' perceived trustworthiness of peer feedback affects their learning satisfaction in online learning environments?**

The descriptive statistics for the survey are presented in Table 2. Over 40% of students agreed that their peers are competent enough to provide reliable and constructive feedback. The average score of students' perceived trustworthiness of peer feedback was 3.56 (SD=0.61). The results showed that students' perceived trustworthiness of peer feedback affects learning satisfaction ( $F(1, 77) = 12.26, p < 0.01, R^2=0.13$ ).

**Table 2. The affect students' perceived trustworthiness of peer feedback (n = 79)<sup>a</sup>**

Item	Mean	SD	Agreement no. (%) <sup>b</sup>	Disagreement no. (%) <sup>c</sup>	Neutral no. (%)
I think my peers had enough knowledge to provide reliable feedback on my argumentative essay	3.50	0.88	41 (51.89)	8 (10.12)	30 (37.97)
My peers evaluated my argumentative essay appropriately	3.75	0.78	57 (72.15)	7 (8.86)	15 (18.98)
I was willing to have my argumentative essay reviewed by learning peers	4.10	0.77	68 (86.07)	3 (3.79)	8 (10.12)
My learning peers were able to identify the mistakes and errors in my argumentative essay	3.65	0.86	52 (65.82)	7 (8.86)	20 (19.80)
I trusted my learning peers as much as teachers when it comes to feedback on my argumentative essay	3.80	0.97	20 (25.31)	31 (39.24)	28 (35.44)

<sup>a</sup> based on a 5-point Likert scale (Strongly disagree, disagree, neutral, agree, and strongly agree)

<sup>b</sup> Agreement = agree, and strongly agree

<sup>c</sup> Disagreement = strongly disagree, disagree

#### 4. Discussion

Our findings showed that learning satisfaction is affected by students' perceived usefulness and trustworthiness of peer feedback. According to students' responses and survey data in this study, the majority of participants saw peer feedback as a useful learning experience and agree that engaging in peer feedback activities benefits them. Participants said that for peer feedback to be helpful, their peers' competence and their own perceived competence, as well as a safe and trustworthy setting were all necessary. According to the findings of various studies, peer feedback has an impact on students' satisfaction with peer feedback and their attitude towards peer feedback (Liu et al., 2001; Noroozi & Mulder, 2017; Saito & Fujita, 2016; Venables & Summit, 2003). The findings of this study showed that students' satisfaction with learning depends on their attitudes towards peer feedback. If students trust their peers' feedback and find it useful in their learning process, they will be satisfied with their learning process. Students who perceived peer feedback useful were more likely to accept it by acknowledging their mistakes, indicating that they want to change their material, and/or appreciating the effectiveness of the peer feedback (Misiejuk et al., 2021; Noroozi et

al., 2016). Several factors, such as the learner's self-confidence, previous training, and peer feedback experiences, as well as interpersonal relationships among peers, all contribute to the creation of this trusting environment (Bok et al., 2013; Eva et al., 2011). To enhance cohesiveness and optimal group performance, one method to build a trusting environment is to have students work together for an extended amount of time (Farland et al., 2013).

Despite the fact that the majority of participants in this study trust their peers' competency in providing them with meaningful feedback, some of the participants cited a lack of confidence and skepticism about peers' competency as the primary reasons for their unwillingness to participate in peer feedback practices. In previous studies (Burgess et al., 2013), the issue of competency was discussed, and training in peer feedback techniques was indicated as one viable way to enhance student confidence (Gielen et al., 2010; Prins et al., 2006). Students valued expert feedback more than peer feedback, which is consistent with the findings of other studies (Tai et al., 2015). As a result, in addition to peer feedback skills training, instruction on how students participate in cognitive processes such as critical thinking and self-assessment (Topping, 2016), while reviewing their peers' work may help to promote a positive attitude towards peer feedback. More research on peer feedback perceptions and responses to various aspects of peer feedback implementation is required. Learner attributes such as knowledge of the activity's goals, capacity to apply feedback criteria, and evaluation of the strengths and shortcomings of feedback (Sluijsmans et al., 2002) are all critical drivers of a peer feedback activity's success or failure. Future research could explore the impact of peer feedback activities on the skills and characteristics of students.

## **5. Conclusion**

To summarize, students' perceptions and attitudes towards peer feedback demonstrated that perceived peer competence, perceived usefulness, and peer interrelationship are significant parts of a successful peer feedback activity and students' learning satisfaction. Then, educators who use peer feedback in classes should be aware of time management and other visible concerns with group dynamics, as well as create a trustworthy environment in which students can exchange feedback in a formative way. To address the issue of student competency, educators should involve students in the development of feedback criteria (Orsmond et al., 2006) and include those criteria in a feedback template (Gielen et al., 2010) for effective feedback exchange.

## References

- Barnard, R., de Luca, R., & Li, J. (2015). First-year undergraduate students' perceptions of lecturer and peer feedback: a New Zealand action research project. *Studies in Higher Education, 40*(5), 933–944. <https://doi.org/10.1080/03075079.2014.881343>
- Bok, H. G. J., Teunissen, P. W., Spruijt, A., Fokkema, J. P. I., van Beukelen, P., Jaarsma, D. A. D. C., & van der Vleuten, C. P. M. (2013). Clarifying students' feedback-seeking behaviour in clinical clerkships. *Medical Education, 47*(3), 282–291. <https://doi.org/10.1111/MEDU.12054>
- Brill, J. M. (2016). Investigating peer review as a systemic pedagogy for developing the design knowledge, skills, and dispositions of novice instructional design students. *Educational Technology Research and Development, 64*(4), 681–705. <https://doi.org/10.1007/s11423-015-9421-6>
- Burgess, A. W., Roberts, C., Black, K. I., & Mellis, C. (2013). Senior medical student perceived ability and experience in giving peer feedback in formative long case examinations. *BMC Medical Education, 13*(1), 1–5. <https://doi.org/10.1186/1472-6920-13-79/FIGURES/1>
- Ching, Y. H., & Hsu, Y. C. (2013). Peer feedback to facilitate project-based learning in an online environment. *International Review of Research in Open and Distance Learning, 14*(5), 258–276. <https://doi.org/10.19173/irrodl.v14i5.1524>
- Donia, M. B. L., Mach, M., O'Neill, T. A., & Brutus, S. (2021). Student satisfaction with use of an online peer feedback system. *Academy of Management Annual Meeting Proceedings*, <https://doi.org/10.1080/02602938.2021.1912286>
- Eva, K. W., Armson, H., Holmboe, E., Lockyer, J., Loney, E., Mann, K., Sargeant, J., Eva, K. W., Armson, H., Lockyer, Á. J., Holmboe, E., Loney, E., Mann, Á. K., & Sargeant, Á. J. (2011). Factors influencing responsiveness to feedback: on the interplay between fear, confidence, and reasoning processes. *Advances in Health Sciences Education 2011 17:1, 17*(1), 15–26. <https://doi.org/10.1007/S10459-011-9290-7>
- Farland, M. Z., Sicut, B. L., Franks, A. S., Pater, K. S., Medina, M. S., & Persky, A. M. (2013). Best Practices for Implementing Team-Based Learning in Pharmacy Education. *American Journal of Pharmaceutical Education, 77*(8). <https://doi.org/10.5688/AJPE778177>
- 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>
- 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>
- Kaufman, J. H., & Schunn, C. D. (2011). Students' perceptions about peer assessment for writing: Their origin and impact on revision work. In *Instructional Science* (Vol. 39, Issue 3, pp. 387–406). Springer. <https://doi.org/10.1007/s11251-010-9133-6>
- Latifi, S., Noroozi, O., Hatami, J., & Biemans, H. J. A. (2019). 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., & Talaei, 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>
- Liu, E. Z. F., Lin, S. S. J., Chiu, C. H., & Yuan, S. M. (2001). Web-based peer review: The learner as both adapter and reviewer. *IEEE Transactions on Education*, 44(3), 246–251. <https://doi.org/10.1109/13.940995>
- Lowell, V. L., & Ashby, I. V. (2018). Supporting the development of collaboration and feedback skills in instructional designers. *Journal of Computing in Higher Education*, 30(1), 72–92. <https://doi.org/10.1007/s12528-018-9170-8>
- Mahdizadeh, H. (2007). *Student collaboration and learning: Knowledge construction and participation in an asynchronous computer-supported collaborative learning environment in higher education*.
- Misiejuk, K., Wasson, B., & Egelandsdal, K. (2021). Using learning analytics to understand student perceptions of peer feedback. *Computers in Human Behavior*, 117. <https://doi.org/10.1016/j.chb.2020.106658>
- Nelson, G. L., & Carson, J. G. (1998). ESL students' perceptions of effectiveness in peer response groups. *Journal of Second Language Writing*, 7(2), 113–131. [https://doi.org/10.1016/S1060-3743\(98\)90010-8](https://doi.org/10.1016/S1060-3743(98)90010-8)
- Noroozi, O., Biemans, H., & Mulder, M. (2016). Relations between scripted online peer feedback processes and quality of written argumentative essay. *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., & Mulder, M. (2017). Design and evaluation of a digital module with guided peer feedback for student learning biotechnology and molecular life sciences, attitudinal change, and satisfaction. *Biochemistry and Molecular Biology Education*, 45(1), 31–39. <https://doi.org/10.1002/bmb.20981>
- Orsmond, P., Merry, S., & Reiling, K. (2006). The Importance of Marking Criteria in the Use of Peer Assessment. *Assessment & Evaluation in Higher Education*, 21(3), 239–250. <https://doi.org/10.1080/0260293960210304>
- Prins, F. J., Sluijsmans, D. M. A., & Kirschner, P. A. (2006). Feedback for General Practitioners in Training: Quality, Styles, and Preferences. *Advances in Health Sciences Education 2006 11:3*, 11(3), 289–303. <https://doi.org/10.1007/S10459-005-3250-Z>
- Reinholz, D. L. (2018). Design of Feedback Forms and Support. *International Journal for the Scholarship of Teaching and Learning*, 12(2). <https://doi.org/10.20429/ijstol.2018.120210>
- Saito, H., & Fujita, T. (2016). Characteristics and user acceptance of peer rating in EFL writing classrooms: *Language Teaching Research*, 8(1), 31–54. <https://doi.org/10.1191/1362168804LR133OA>

- Shahali Zadeh, M., Dehghani, S., Banihashem, S. K., & Rahimi, A. (2016). Designing and implementation of blending of problem solving instructional model with constructivism's principles and the study of its effect on Learning and creative thinking. *Journal of Innovation and Creativity in Human Science*, 5(3), 83-117.
- Sluijsmans, D. M. A., Brand-Gruwel, S., van Merriënboer, J. J. G., & Bastiaens, T. J. (2002). The training of peer assessment skills to promote the development of reflection skills in teacher education. *Studies in Educational Evaluation*, 29(1), 23-42. [https://doi.org/10.1016/S0191-491X\(03\)90003-4](https://doi.org/10.1016/S0191-491X(03)90003-4)
- Tai, J. H. M., Canny, B. J., Haines, T. P., & Molloy, E. K. (2015). The role of peer-assisted learning in building evaluative judgement: opportunities in clinical medical education. *Advances in Health Sciences Education* 2015 21:3, 21(3), 659-676. <https://doi.org/10.1007/S10459-015-9659-0>
- Topping, K. (2016). Peer Assessment Between Students in Colleges and Universities: *Review of Educational Research*, 68(3), 249-276. <https://doi.org/10.3102/00346543068003249>
- Tsui, A. B. M., & Ng, M. (2000). Do Secondary L2 Writers Benefit from Peer Comments? *Journal of Second Language Writing*, 9(2), 147-170. [https://doi.org/10.1016/S1060-3743\(00\)00022-9](https://doi.org/10.1016/S1060-3743(00)00022-9)
- Venables, A., & Summit, R. (2003). Enhancing scientific essay writing using peer assessment. *Innovations in Education and Teaching International*, 40(3), 281-290. <https://doi.org/10.1080/1470329032000103816>
- Yang, Y. F. (2016). Transforming and constructing academic knowledge through online peer feedback in summary writing. *Computer Assisted Language Learning*, 29(4), 683-702. <https://doi.org/10.1080/09588221.2015.1016440>