



## Online Peer Assessment on Student Learning Outcomes: A Narrative Review

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### ABSTRACT

**Background:** In recent years, “peer assessment” has been one of the most important educational strategies that researchers and teachers have used to improve the students’ writing skills, motivation, and learning in various fields. This review study was conducted with the aim of online peer assessment on the students’ learning outcomes.

**Methods:** In this narrative review research, through keywords related to online peer assessment on the outcome of students’ learning, the studies conducted in Persian or English languages and written in full text from 2013 to 2023 were searched in reliable scientific databases such as Science Direct, PubMed, Scopus, Google Scholar, SID, and Magiran. The studies that were not in line with the purpose of the research or were published in the form of a letter to the editor were excluded from the study. From the 44 searched articles, 12 were related to online peer evaluation on the students’ learning outcomes and selected.

**Results:** Evaluation in online environments can be more important than that in traditional classrooms. The use of peer assessment in online learning environments has many advantages, including increasing the timeliness of feedback, providing learning opportunities for the provider and receiver of the feedback, humanizing this environment, and building community. By involving students in the peer evaluation process, meaningful interaction with peers and with the content of the discussed writings increases, which in turn increases the students’ and instructors’ satisfaction with the course. If peer evaluation is used effectively, it has the potential to increase the quality of discourse/discussion and, as a result, the quality of learning in the online environment.

**Conclusion:** Online assessment by peers is effective on the students’ learning outcomes. However, more studies are recommended to be conducted to determine different aspects and challenges of this intervention.

**Keywords:** Peer assessment, Learning outcome, Online, Students

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## Introduction

With the emergence of new phenomena in information technology and their impact on ways of living, the process of education, which is one of the fundamental pillars of societies, has been transformed. The existence of very wide communication networks, including the Internet and advanced educational tools and facilities, educational methods have also evolved, making it possible for a wide range of students of science and knowledge in different parts of the world and from far distances to be covered by distance education networks and be educated with methods other than traditional methods (1).

In recent years, information and communication technologies have been widely used in higher education to improve academic writing skills (2, 3), professional learning (3, 4), and peer feedback support (3, 5, 6). In a study conducted in 2008, researchers found that assessment by peers was very similar to assessment by professors, and peer assessment was suggested as an alternative method that could be used in higher education settings (7). Peer assessment is often done face-to-face; however, the idea of online peer assessment has recently been proposed, where learners rate their peers, give feedback, and complete individual assignments through online collaboration (8). In peer assessment, learners can improve their performance by completing assignments and receiving feedback from others while participating in online peer assessment (9). In this process, students assume the role of the author and reviewer simultaneously, complete assignments, inspect and learn from each other, make suggestions, receive feedback, and make adjustments to their work. Falchikov and Goldfinch (2000) conducted a meta-analysis of 48 quantitative studies on peer assessment that compared the scores obtained by peers and teachers. In this study, it has been shown that students are generally able to make reliable judgments (10).

On the other hand, the learning outcome is what the learner is expected to know or understand or be able to demonstrate at

the end of the learning period. Learning outcomes are a combination of knowledge, skills, abilities, attitudes, and understanding that a person will achieve as a result of his/her successful participation in a specific set of higher education experiences (11). One of the background elements affecting the efficiency and consequences of the students' learning is the structure and learning environment of the course (12). In many researches that evaluated the relationship between the perception of the learning environment and the efficiency and consequences of learning, it was found that the perception of the learning environment could have profound effects on the efficiency and consequences of the students' learning (11).

Most of the foreign studies related to online peer evaluation have investigated the quality of peer feedback independent of its consequences such as specialized learning (4). Considering the importance and necessity of online peer assessment for students and emphasizing the importance of examining this new educational method in the era of the Corona pandemic, which is likely to have a clear impact on the students' learning, we aimed to conduct a review of peer-to-peer online assessment of student learning outcomes.

## Methods

The current research is a narrative review of studies that have been published in Persian and English-language scientific journals inside or outside the country in the years 2013-2023. To search for studies from databases and information banks such as Science Direct, PubMed, Scopus, Google Scholar, SID, and Magiran, we used the keywords peer assessment, online assessment, learning outcomes, and students. Persian articles were searched using the keywords peer assessment, online assessment, learning outcome, and students. The articles that contained the mentioned keywords in their titles or abstracts were selected from 44 articles searched in scientific databases, and 12 interventional, descriptive, case, and review articles that met the appropriate criteria for inclusion in

the study were selected. Their findings were analyzed. The process of selecting articles is shown in Figure 1.

The inclusion criteria were: 1- The study should investigate online peer evaluation on the outcome of the students' learning in research and education, 2- The studies should be in the Persian and English languages with full text that, be published between 2013 and 2023, and examine online peer evaluation of the students' learning outcomes, and 3- Keywords or their equivalents are present in the title or abstract of the article. Exclusion criteria were the articles that were not in line with the research objective and studies whose full text was not available or were published as a letter to the editor. From these studies, information about researchers, year of publication, place of study, the research community, type of study, and their results were extracted.

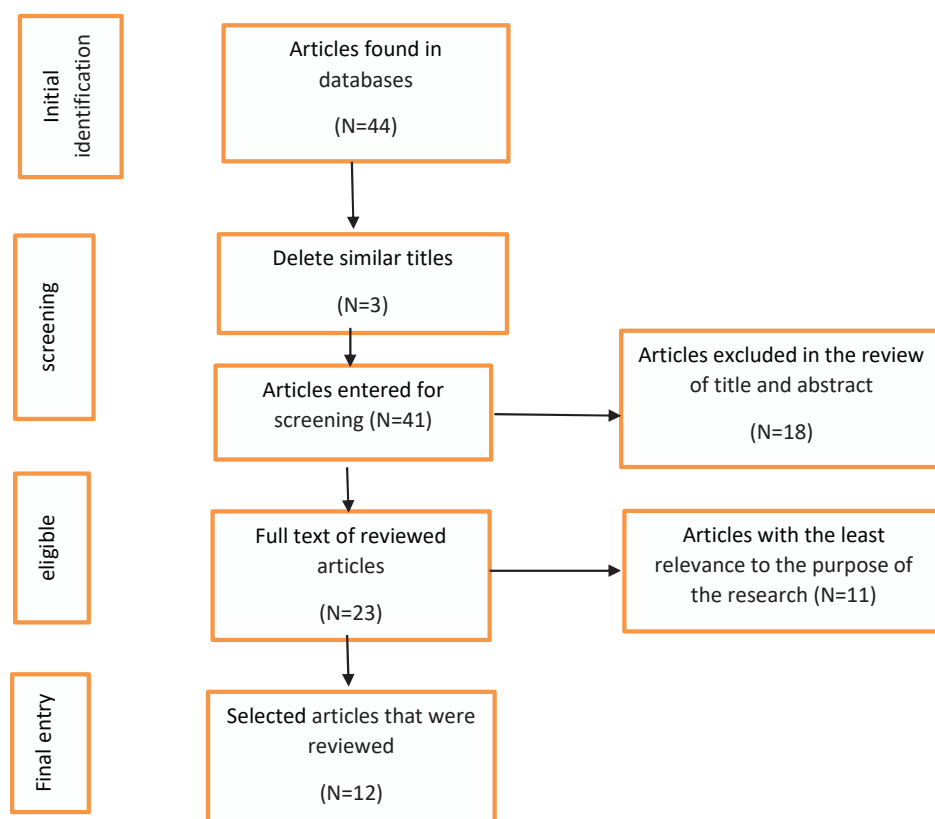
Since all the studies searched in this research were not homogeneous, the combination of their results was avoided quantitatively. Data analysis was done in the form of a comprehensive review of articles,

qualitative summaries, and conclusions.

After applying the entry criteria, we read the full text of the articles and a summary including the title of the article, name of the main researcher, year of publication, study population, and methodology; then, the results of the study were prepared. To check the quality of the articles, we used the PRISMA guidelines, which are used to review systematic review studies (Figure 1).

## Results

In this study, 12 articles related to online peer evaluation on student learning outcomes in research and education were selected, and their results were discussed. Among the reviewed articles, 5 were published in the Persian language and 7 in the English language. Regarding the research environment, three studies were conducted in America, one in England, one in Holland, one in Taiwan, one in Italy, and 5 in Iran. In terms of the study type, there were two review studies, nine experimental studies, and one case study. The results of the studies are listed separately in Table 1.



**Figure 1:** The process of reviewing articles

**Table 1:** Summary of the study results

Author, year, country	Title	Type of study	Research community	Results
Latifi et al., 2021, Iran (13)	Peer feedback support, peer advancement and their combination on the peer learning process, argumentative essay quality, and dedicated learning	Two-factor experimental design	86 undergraduate students of Kharazmi University	Students in the three experimental conditions (peer feedback, peer promotion, and their combination) benefitted more than students in the control group (without any support) in terms of peer learning, processes, argumentative essay quality, and specific learning.
Latifi et al., 2019, Iran (14).	The effect of reasoning training in the environment of online peer feedback on the learning process and consequences of students in the field of educational sciences.	A pre-test and post-test design with an alternative control group	40 undergraduate students of educational sciences, Kharazmi University	The results showed that a combination of argumentative writing training and peer feedback increased the quality of short essays and the quality of argumentative feedback, as well as the amount of specialized learning of students. In addition, there was a positive and significant correlation between the learning process and the outcome of students' peer feedback.
Latifi et al., 2019, Iran, (15).	The effects of online peer feedback in three non-written, written and directed ways on argumentative essay writing, quality of argumentative feedback and specific learning in the field of educational sciences	A pilot project	52 undergraduate students of Khwarazmi University, Tehran	It showed that students in online feedback condition by written peer had better performance in argumentative essay writing, quality of argumentative feedback and dedicated learning than the other two modes.
Hoffman et al., 2019, USA (16)	The effect of peer assessment training on reflective writing knowledge and skills	A quasi-experimental control group	387 students	The results showed that there was no significant increase in the students' awareness when they participated in peer assessment training. A comparison of matched participant samples showed that after controlling for the existing writing skills, students participating in the peer assessment group were scored significantly lower on the written assignments than the teacher assessments.
Double et al., 2019, England (17).	The effect of peer assessment on students' academic performance	Metaanalysis	54 studies from experimental and quasi-experimental studies	The effectiveness of peer review in a wide range of fields is remarkably strong. These findings support peer assessment as a constructive practice and suggest several implications for using peer assessment in the classroom.

Nowrozi et al., 2018, Iran, (18)	the effect of online peer feedback and epistemological beliefs on students' reasoning-based learning	A pre-test and post-test plan	42 undergraduate students from Wachenin University in the Netherlands	Argumentative peer feedback improves argumentative essay writing and personalized learning. In addition, peer feedback changes the attitudes. However, the findings did not prove any effect of epistemic beliefs on reasoning-based learning. This was widely opposed to the hypothesis that reasoning-based learning is related to the students' epistemic beliefs.
Huisman et al., 2018, Netherlands (19)	The effect of formative peer feedback on the academic writing of higher education students	a review	Results of 24 quantitative studies	The nature of peer feedback significantly moderated the effect of peer feedback on student writing improvement, while only a theoretically plausible, though nonsignificant, moderating pattern was found for the number of peers students engaged with. Second, this study shows that the number of well-controlled studies on the impact of peer feedback on writing is still few, indicating the need for more quantitative and methodologically sound research in this area.
Amendola et al., 2018, Italy (20)	Online peer assessment to improve student learning outcomes and soft skills	Online trial method using e-learning platform	54 Italian and International students	Comparisons between teacher-reported scores and student reports before and after peer assessment provide evidence that student learning has improved significantly. In addition, students at different levels of achievement generally show positive perceptions of their peer assessment experience.
Liu et al., 2018, USA (21)	Student learning outcomes in mandatory and voluntary online peer assessment	Experimental	39 people in the volunteer group and 31 people in the forced group	The results showed that the score of the volunteer group in the final assignment of the course was significantly higher than the compulsory group, while there was no significant difference in the increase of the final assignment score.
Nowrozi and Muller, 2017, Iran, (4)	Investigating the effects of digital learning module with online peer feedback in a guided way on students' specific learning and changing their attitudes in the field of biotechnology and molecular life sciences	Pre-test-post-test plan	203 undergraduate students of Wageningen University in the Netherlands	The results of the study suggest that the module (a digital module with the aim of examining different types of views and pros and cons on the topic of "genetically modified organisms") can be used to foster specific learning and change the students' attitudes. In addition, this module was positively evaluated in terms of the students' motivation and satisfaction with the learning experience.

Crowe et al., 2015, USA (22)	The effect of students' revision in class on students' learning outcomes	A quasi-experimental design	44 students	Results showed that in-class peer review did not improve the final grades or final performance on student learning outcomes, nor did it affect performance differences between drafts and final assignments that measured the students' learning goals. In addition, it was time-consuming to deliver course content in class in sections that used in-class peer review.
Liu and Lee, 2013, Northern Taiwan (23)	Using peer feedback to improve learning through online peer assessment	Case study method	12 university graduate students	The results showed that the quality of feedback improved from the first peer assessment to the second assessment. However, the amount of advanced feedback was reduced. Although the students adjusted their homework according to the feedback, they did not fully accept the criticism. Students valued specific feedback more than grades.

## Discussion

The results of the studies showed that online assessment by peers was effective on the students' learning outcomes. One of the possible reasons for the impact of online peer assessment on the students' learning outcomes is the collection of study data online. Online assessment has become an effective tool to support collaboration, reflection, and professional development, as well as to overcome the barriers of time and space, offering learners additional time to reflect on the topic of discussion (2). According to Balaji and Chakrabarti (2010), online discussion consists of an e-learning platform that allows the students to post messages on discussion topics, interact, and receive feedback from other students and instructors and find a deeper understanding of the subject under study (24). Another reason why groups perform better after feedback is that in online sharing networks, no data is lost because the students' written messages are stored online and can be retrieved and reviewed at any time. The findings of the present study support Bouhami's (2016) study that investigated the effect of using social media to improve vocabulary knowledge for second-year EFL

students of the English Department at Mila University. The results showed that the use of social media was effective in learning and teaching vocabulary and integrating them into the life of language learners, which can help them improve their vocabulary knowledge (25). In addition, according to the results obtained in this study, Khan, Lyza and Fahim (2016) conducted a study on the role of social media in the development of English language vocabulary at the university level. It was found that social media played an important role in the development of English language vocabulary at the university level (26). The findings of the present study are consistent with the detailed investigation of the effects of social networks by Khansarian Dehkordi and Ameri Golestan (2016) on the vocabulary acquisition of Iranian English language learners. The results of the independent t-test on the students' grades after feedback showed that the participants of the experimental group performed better than the control group (27). The findings of this study are in contrast with those of Dehghan and Rezvani (2017), who conducted a study to investigate the use of a specific social network program, namely WhatsApp, in teaching

new vocabulary in a foreign language and comparing these results with traditional vocabulary teaching methods. The results did not show a significant difference between the technology-based and traditional groups (28). The impact of online peer feedback on the student learning outcomes may lie in the fact that participants may find peer-provided assessment more useful and usable compared to teacher-provided assessment, and when they were alone, they were independent in learning the lessons given. Finally, it may be hypothesized that the nature of explicit intervention, students' feedback, their focus on assignments, their willingness to engage in work together, and other factors have influenced the results (29, 30). Peer assessment followed by qualified and justified arguments and justifications helps students to gain different and diverse perspectives on the topic during peer feedback processes. Such training is essential to enhance the quality of peer feedback during peer review activities. Likewise, learners develop self-assessment skills to respond to peer feedback. In addition, peer argumentative analysis can lead to better reflection on the content and understanding of the study topic. Such justifications, clarifications, and expansion of educational materials during peer learning processes can explain why students in experimental conditions perform better than students in the control group conditions without support in terms of their domain-specific learning (31, 32). However, most studies have shown that peer group membership is related to liking and enjoying the educational environment and to changes in the study goals over time (33, 34). The contribution of peer relationships in academic progress can be interpreted with three reasons. First, students' interactions and positive relationships with each other provide important opportunities to motivate and facilitate positive motivational and academic results (35). Second, social activity in small groups, in which competent students teach less skilled peers' specific strategies and standards to produce useful performance. Third, at the core of positive relationships

and interactions with peers, social support is provided. These supports can perform a wide range of functions, such as promoting self-efficacy and academic motivation, as well as facilitating the development of social skills and psychological well-being (32). However, there are still few studies on peer relationships and their role on learning outcomes during online education. Therefore, it is suggested that further studies should be conducted in this field.

## Conclusion

Peer assessment offers global classrooms an opportunity to assess the students' learning. Only a handful of studies in the world have been conducted on online peer review. Most of these studies have also focused on the quality of peer assessment independent of its consequences such as students' specific learning.

## Ethical Considerations

This research has been approved at the Ministry of Education Office in Bushehr Province.

## Authors' Contribution

MM, NA, SK, EM, MS collected and organized the data, designed and analyzed the study, wrote the first draft, and updated the data throughout the study period. MM, NA, MS were responsible for this paper; they developed the concepts and methodology for the study, supervised and assessed the study stages including data collection and analysis, and participated in coordinating the study and reviewing the paper throughout the study period. The authors have critically reviewed this paper and approved the final version submitted.

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