A SYSTEMATIC REVIEW OF FEEDBACK MECHANISMS IN DISTANCE EDUCATION: EXPLORING SOURCES, TYPES, AIMS, FORMS, AND OUTCOMES

Firat KIZILTEPE
ORCID: 0009-0003-4317-2259
Faculty of Education
Gazi University
Ankara, TURKIYE

Busra TAVASLI
ORCID: 0000-0001-8835-7538
Faculty of Education
Gazi University
Ankara, TURKIYE

Batuhan CICIKLER
ORCID: 0000-0001-9613-895X
Management Information Systems
Ostim Technical University
Ankara, TURKIYE

Dr. Sercin KARATAS
ORCID: 0000-0002-1731-0676
Gazi Faculty of Education
Gazi University
Ankara, TURKIYE

Received: 19/02/2025 **Accepted:** 21/04/2025

ABSTRACT

Feedback plays a critical role in learning; however, its structure and implementation in distance education differ significantly from traditional educational practices due to the unique nature of online environments. This necessitates a systematic investigation into feedback mechanisms in distance education. This systematic review aims to explore the literature on feedback in distance education, focusing on the types, purposes, and timing of feedback, as well as their implementation and impact on students. We conducted a systematic search of relevant databases on May 5, 2024, without applying a publication year restriction, thereby including all eligible studies published up to that date in accordance with PRISMA guidelines. After applying inclusion and exclusion criteria, we included 91 studies and subjected them to content analysis. Existing literature guided the categorization of feedback, examining three dimensions: feedback types, purposes, and timing. Automated systems emerged as the most common source of feedback. Formative feedback was the predominant type, evaluation was the primary purpose, and academic performance was the most frequently measured outcome. Findings highlight the emphasis on feedback's role in 1 improving student learning outcomes, engagement, and instructional practices. This review synthesizes key findings on feedback mechanisms in distance education, focusing on their critical role in enhancing learning outcomes. It underscores the need for innovative feedback strategies that balance personalization and scalability to address diverse learner needs across contexts. Future research should explore adaptive feedback approaches to ensure inclusivity and effectiveness in distance education settings.

Keywords: Distance education, feedback, online learning, PRISMA, online response, online feedback.

INTRODUCTION

Driven by advances such as AI-powered adaptive learning systems and big data analytics, distance education has revolutionized learning by enabling more personalized interactions between students and instructors. A critical component of this evolution is the development of advanced feedback mechanisms that analyze students' learning processes in detail and provide personalized feedback. Feedback has emerged as a central focus in contemporary educational research due to its significant impact on evaluating students' academic performance, increasing motivation, and assessing the quality of the teaching process (Moore & Kersley, 1996). The rapid growth of distance education, driven by technological innovation and unforeseen global challenges, highlights a crucial need for innovative and impactful feedback systems.

Hattie and Timperley (2007, p. 102) conceptualize feedback as: "information provided by a source/agent (e.g., instructor, peer, book, parent, self, experience) regarding aspects of one's performance or understanding. A teacher or parent can provide corrective information, a peer can provide an alternative strategy, a book can provide information to clarify ideas, a parent can encourage, and a learner can look up the answer to evaluate the correctness of a response." In this framework, feedback is understood as a "consequence" of performance. The authors articulated that the primary function of feedback is to address and reduce the gaps between an individual's current understanding and performance and their goals. Effective feedback should address three key questions posed by either a teacher or a student: Where am I going? (goals); How am I doing? (process made towards the goal); and where to next? (activities needed to be taken to make better progress). These questions align with the concepts of feed-up, feedback, and feed-forward.

There are various types of feedback, but the common types of feedback most often discussed in the literature are acknowledgment, informative, formative, immediate, delayed, and corrective. Acknowledgment feedback covers an acknowledgment of an action (Kielty, 2004). For example, a message sent by an instructor confirming that a student's assignment has been received could be called acknowledgment feedback. This type of feedback is especially crucial in distance education as learners often worry about their submissions. Informative feedback provides information or evaluation such as answering students' questions and posting grades (Graham, Cagiltay, Craner, Lim, & Duffy, 2000); whereas formative feedback, which covers that feedback consistently informs students about their performance weaknesses to help them achieve learning goals (Shute, 2008). This type of feedback addresses the accuracy of the student's response to an assignment and offers guidance for improvement (Azevedo & Bernard, 1995; Cohen, 1985; Kulhavy, 1977). Immediate feedback focuses on feedback timing, which is given to a learner as quickly as possible during instruction or evaluation (Dempsey & Wager, 1988). Delayed feedback is similar to immediate feedback as both of them are related to the timing of feedback. This is given after a specified delay during instruction or evaluation (Dempsey & Wager, 1988) which could be hours, weeks, or even months. Corrective feedback is used to correct the student's work (Mory, 1992). It includes comments or suggestions on assignments, quizzes, and exams, informing students if their answers are correct and providing detailed information for improvement (Kielty, 2004). According to Dempsey, Driscoll, and Swindell (1993), corrective feedback can be applied in five ways:

- No feedback: Learners answer without knowing if they are correct.
- Simple verification feedback: Learners are only told if their answer is correct.
- Correct response feedback: Learners are given the correct answer.
- Elaborated feedback: Reasons why the answer is correct are provided.
- Try-again feedback: Learners are given another chance when their answer is incorrect.

In traditional classroom settings, feedback is often immediate and personal, facilitating a direct and dynamic interaction between educators and students. However, in distance education environments, where physical separation can hinder spontaneous communication, the role of structured and systematic feedback becomes even more pivotal (Jurs & Spehte, 2021). Therefore, feedback mechanisms in distance education have been extensively studied for their role in improving learning performance and the learning process (Chen, Wang, Fang, & Zuo, 2023; Ypsilandis, 2002).

Dalipi, Zdravkova, & Ahlgren (2021) explored the use of sentiment analysis to evaluate student feedback in MOOCs and organized the literature into six key areas: MOOC content evaluation, feedback contradiction detection, sentiment analysis effectiveness, social network posts, understanding course performance and

dropout rates, and MOOC design model evaluation. Even though their study is notable for being one of the first systematic reviews in this field at the time of its publication, it does not address the feedback mechanisms and their dimensions specifically within the context of distance education MOOCs, differing from the focus of the current study.

A different systematic review (Cavalcanti et al., 2021) that aimed to explore whether automatic feedback enhances student performance in distance education, the purpose of such feedback in online environments, its support for educators, and the techniques used for generating it found that most studies showed positive outcomes from automatic feedback but lacked investigation into cause-and-effect relationships, with some reporting negative impacts. It also noted weak theoretical foundations and limited focus on educators' needs. While authors provided in-depth knowledge on automatic feedback, this study aims to address a wider range of feedback types, investigating the dynamics of feedback mechanisms in distance education.

From another perspective, Jensen, Bearman, & Boud (2021) examined how online learning researchers conceptualize the role of feedback in teaching and learning, and how these conceptualizations influence research questions and feedback practices. Through qualitative data analysis, they identified six dominant metaphors describing feedback and revealed underlying assumptions about the role of feedback in education for both educators and learners. The paper argued that a more deliberate use of metaphors is crucial for advancing feedback research. Their study provides valuable insights into how feedback is conceptualized and used in online education.

Although there is a growing body of research on feedback in distance education, most of the studies have focused on limited aspects of feedback mechanisms and explored feedback's impact on students' achievement, self-regulation skills development, and sentiment analysis but relatively little research has been carried out on comprehensive and systematic analysis of feedback mechanisms including types and sources of feedback, primary aims, forms of feedback in distance education environments. Therefore, this study aims to address this research gap by systematically reviewing and synthesizing the existing literature on feedback mechanisms and practices in distance education. To this end, by examining a diverse range of studies, this research seeks to understand how feedback is currently implemented in distance education practices and the impact it has on measured outcomes in the literature while identifying the best practices, broadening the discussion on the field and providing suggestions for follow-up studies striving to investigate the effectiveness of distance education practices.

PURPOSE OF THE STUDY

This study seeks to answer the following main research question: "What is the scope of research investigating feedback mechanisms within distance education published up to the year 2024?" The following sub-questions were also formulated to guide the analysis:

- Who are the primary sources of feedback in distance education?
- What types of feedback are most prevalent in distance education?
- What is the primary aims of providing feedback in distance education?
- What forms of feedback delivery are most commonly utilized in distance education?
- What outcomes are most commonly measured to assess the effectiveness of feedback in distance education?

METHOD

In this study, a systematic literature review was conducted to investigate the current scope of studies focusing on feedback in distance education by following the framework developed by Arksey and O'Malley (2005). The data collection and analysis process were carried out following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (Moher et al., 2009). As mentioned by Page et al. (2020), PRISMA is a set of guidelines that are designed to improve the reporting of systematic reviews and meta-analyses. It aims to ensure transparent and thorough reporting of these reviews, enabling users to evaluate their reliability and applicability.

Identifying Relevant Studies

A comprehensive search strategy was employed to identify studies on feedback in distance education. The search was conducted on May 5, 2024, and included all eligible peer-reviewed studies published up to that date, without applying any publication year restrictions. The Web of Science Core Collection (WOS) and SCOPUS were selected as the primary databases due to their provision of peer-reviewed and high-quality articles. Initially, draft search terms were created and used to perform searches in online databases. The results obtained were analyzed for contextual relevance, and adjustments were made to the search terms to access more pertinent studies. Ultimately, the following search term was used to access articles published in peer-reviewed journals. During the search process, filters were applied for variables such as publication language and document type to ensure the focus was on studies directly relevant to the topic. This approach facilitated the exclusion of irrelevant studies and streamlined the analysis process.

Search Term used in SCOPUS:

TITLE ((blended OR distance OR online OR open OR virtual OR "web-based" OR "internet based" OR mobile OR remote OR digital OR "M-" OR "E-") PRE/0 (course OR education OR learn* OR teach* OR instruc*) AND (feedback)) OR TITLE (mooc* AND feedback)

Search Term used in Web of Science:

TI=((distance OR online OR open OR virtual OR "web-based" OR "internet based" OR mobile OR remote OR digital OR "M-" OR "E-") NEAR/0 (course* OR education OR learn* OR teach* OR instruc*) AND feedback) OR TI=(mooc* AND feedback)

Study Selection

The eligibility of the studies obtained from the database search for inclusion in this study was assessed based on the criteria presented in Table 1.

Table 1. Eligibility criteria used for the analysis of the studies

Criteria	Inclusion	Exclusion
Study Focus	Studies that explicitly examine feedback mechanisms within distance education environments. This includes research on how feedback is delivered during instructional processes and how students engage with and respond to such feedback.	Studies that broadly explore e-learning, online education, or educational technology without a specific focus on feedback mechanisms. This excludes general surveys on student satisfaction, preferences for content delivery, or other aspects not directly related to feedback processes.
Language	English	Non-English studies
Publication Type	Peer-Reviewed Journal Articles	Conference papers, presentations, reports, books, theses, and dissertations.
Study Design	Empirical Studies	Grey literature, systematic reviews, literature reviews, theoretical papers, and opinion pieces.
Settings	Educational Settings	Non-educational settings

The selection process for the studies obtained from the database search was conducted using the Rayyan platform, which allows multiple researchers to manage the selection process on the same review. Repeatability and transparency are vital in systematic reviews (Levac, Colquhoun, & O'Brien 2010). Therefore, a preliminary trial of the selection process is recommended to ensure the consistency of the strategy used by the review team (Peters et al., 2020). After uploading all data obtained from the database search to Rayyan, the first 10 articles were reviewed in blind peer-review mode to assess whether the inclusion and exclusion criteria were functioning correctly in line with the research objectives. On the basis of the results of the first review, several adjustments were made to unclear criteria among researchers to increase the process's clarity.

The selection process of the studies was conducted in two stages. First, the titles and abstracts of all retrieved articles were evaluated by the researchers based on the eligibility criteria. For studies where decisions could not be made from the title and abstract screening, a full-text review was conducted to determine inclusion based on the eligibility criteria. Throughout this process, any uncertainties were resolved through consensus among the researchers.

To test whether the researchers applied the eligibility criteria consistently during the inclusion and exclusion process, Fleiss' Kappa calculation was performed. Fleiss' Kappa is a statistical method used to measure agreement among three or more raters (Fleiss, 1971). The analysis resulted in a Fleiss' Kappa value of 0.65, indicating a high level of agreement among the three raters and that their decisions were largely consistent.

Charting the Data

A data table (see Appendix A) was created and predefined variables, including sources of feedback, types of feedback, primary aims of feedback, forms of feedback, and the outcomes measured in each included study were used to categorize the data. The charted data were then used to inform the discussion by highlighting areas of consistency and divergence across studies, thereby supporting a comprehensive understanding of feedback practices in distance education. This method ensured transparency in data organization and enhanced the reliability of the findings presented.

FINDINGS

Included Studies

As shown in Figure 1, a total of 472 journal articles were identified through searches conducted on the Web of Science (WOS) and SCOPUS databases using relevant keywords. Once duplicates (n=183) were removed, 289 studies were left for the title and abstract screening process. During the title and abstract screening, 183 studies that did not meet the eligibility criteria were excluded. The remaining 106 studies underwent full-text evaluation to determine their inclusion in the study. 15 studies were excluded for various reasons such as the focus of the study being out of scope. Ultimately, 91 studies were included for thematic content analysis.

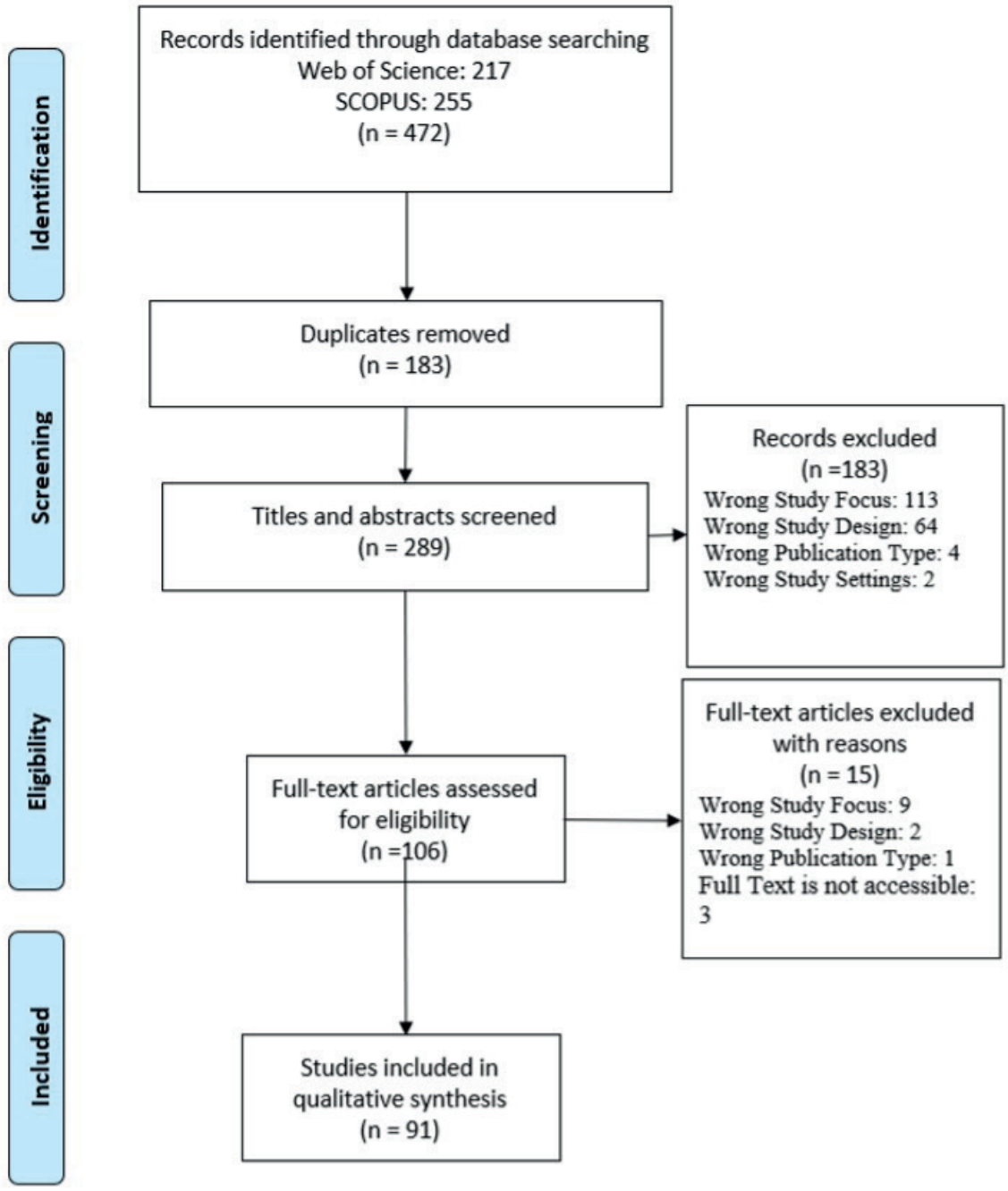

Figure 1. PRISMA Flow Diagram

Characteristics of Studies

Since the aim of our study is to highlight the research gap by systematically reviewing the existing literature of feedback mechanisms in distance education research, it is important to emphasise the characteristics of the studies examined, which methods are used more frequently in feedback studies in distance education, what kind of sample groups are focused on, and which educational levels are focused on.

Study Design

The included studies were analyzed based on their research designs, and the results are presented in Table 2.

Table 2. Distribution of included studies by study design

Study Design	Study ID	f
Experimental	1, 8, 9, 12, 13, 16, 17, 18, 19, 20, 21, 22, 25, 28, 29, 31, 32, 33, 35, 36, 45, 44, 50, 56, 57, 60, 62, 63, 64, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 83, 86, 88, 89	42
Design-based	2, 3, 4, 5, 6, 14, 16, 21, 22, 24, 34, 36, 43, 51, 53, 54, 55, 65, 67, 71, 85	20
Mixed-method	10, 26, 27, 37, 38, 39, 45, 58, 60, 66, 68, 74, 76, 77, 82, 84, 87	17
Other	7, 11, 23, 30, 48, 49, 54, 59, 75, 91, 89, 91	12

In this sense, a significant proportion of studies employed experimental design, with 42 studies (46.1%) focusing on controlling for variable effects through comparisons between experimental and control groups. Design-based research, which constituted 20 studies (21.9%), concentrated on the development and evaluation of methods within real-world contexts. Mixed methods, used in 17 studies (18.6%), and other methodologies, applied in 12 studies (13.1%), were also represented, though less frequently.

Sample Size

The sample sizes of the studies included in this research are given in Table 3. Accordingly, the majority of studies utilized a medium sample size, with 32 studies (35.1%) falling within the range of 31-100 participants. Studies with sample sizes ranging from 101-300 participants were also common, totaling 25 studies (27.4%). Studies with sample sizes of 301-1000 participants accounted for 10 studies (10.9%), while those with unspecified sample sizes made up 9 studies (9.8%). Studies with sample sizes of 11-30 participants represented 4 studies (4.3%).

Table 3. Distribution of included studies by sample size

Sample Size	Study ID	f
1-10	8, 84	2
11-30	5, 13, 23, 37, 48, 65, 66, 89	9
31-100	1, 6, 19, 22, 26, 27, 28, 30, 31, 33, 35, 45, 49, 50, 54, 58, 59, 60, 61, 63, 70, 71, 76, 83, 90, 82, 75, 85, 86, 88, 91	32
101-300	7, 12, 16, 20, 21, 24, 25, 32, 34, 38, 39, 52, 56, 55, 68, 69, 72, 78, 73, 74, 79, 81, 87	25
301-1000	3, 9, 11, 18, 36, 44, 49, 64, 77, 80	10
1000 and above	17, 53, 74	3
Not specified	2, 4, 10, 15, 17, 34, 51, 67, 79, 78	10

Studies employing very small sample sizes (1-10 participants) and very large sample sizes (1000+ participants) were less frequent, representing 2 studies (2.1%) and 3 studies (3.2%), respectively. These results suggest that medium-sized samples were predominantly used in the research within this scope.

Sample Description

This section provides the distribution of studies examining feedback mechanisms in distance education, categorized by sample types (Table 4). Based on the data, the majority of the studies focused on undergraduate students, accounting for 60 studies (65.9%). Studies involving K-12 students comprised 15 studies (16.4%), while those focusing on instructors represented 11 studies (12%). Graduate students were the focus of 4 studies (4.3%), and other sample descriptions made up 4 studies (4.3%).

Table 4. Distribution of included studies by sample description

Sample Description	Study ID	f
K-12 Student	4, 8, 20, 50, 55, 58, 59, 63, 64, 72, 83, 91, 75, 86, 88	15
Graduate Student	22, 23, 28, 68	4
Undergraduate Student	1, 5, 6, 7, 9, 10, 11, 12, 13, 16, 18, 19, 21, 24, 25, 26, 27, 28, 30, 31, 32, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 47, 49, 51, 52, 53, 54, 58, 59, 61, 63, 66, 67, 70, 74, 65, 76, 77, 79, 80, 81, 82, 74, 78, 90, 91, 85, 84, 100, 89, 91	60
Instructor	3, 17, 14, 23, 50, 60, 71, 73, 87, 83, 91	11
Other	2, 15, 36, 64	4

These results suggest that the majority of research on feedback mechanisms in distance education was conducted with undergraduate students, with K-12 students and instructors also being significant participants.

Educational Settings

The authors also analysed the distribution of the educational settings of the included studies in order to examine the various dimensions of feedback mechanisms (Table 5). In terms of educational settings, the majority of the studies were conducted in higher education environments, with 77 studies (84.6%). Studies conducted in K-12 settings comprised 8 studies (8.7%), while studies carried out in other contexts, such as public education, adult education, and in-service training, made up 6 studies (6.5%).

Table 5. Distribution of included studies by educational settings

Educational Settings	Study ID	f
Higher Education	1, 2, 3, 4, 7, 9, 10, 11, 12, 13, 15, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 76, 78, 80, 81, 83, 84, 85, 86, 87, 88, 89, 90, 91	77
K-12	5, 6, 16, 44, 75, 77, 79, 82	8
Other	8, 14, 20, 32, 50, 64	6

These results indicate that higher education settings were predominantly the focus of research on feedback mechanisms in distance education.

Feedback Source

In response to the research question "Who are the primary sources of feedback in distance education?", the analysis of the included studies revealed four distinct categories of feedback sources, as presented in Table 6.

Table 6. Distribution of included studies by feedback source

Feedback Source	Study ID	f
Instructors	3, 7, 10, 13, 17, 19, 21, 26, 27, 28, 30, 37, 38, 40, 41, 42, 45, 46, 48, 49, 51, 56, 57, 62, 66, 67, 68, 71, 72, 73, 77, 78, 80, 81, 82, 85, 86, 89, 90, 91	40
Peers	1, 12, 19, 22, 23, 30, 39, 41, 48, 51, 52, 53, 58, 61, 68, 69, 70, 84	18
Automated system	2, 4, 5, 6, 8, 9, 11, 14, 15, 16, 17, 18, 20, 24, 25, 29, 31, 32, 33, 34, 35, 36, 43, 44, 45, 47, 50, 54, 55, 59, 60, 63, 64, 65, 74, 75, 76, 79, 81, 87, 88	41
Other	70, 83	2

The majority of the studies focused on automated systems, accounting for 41 studies (45%). Studies involving instructors comprised 40 studies (43.9%), while those examining peer feedback represented 18 studies (19.7%). Studies focusing on other feedback sources, such as public or informal sources, made up only 2 studies (2.1%). These results suggest that automated systems and instructor-based feedback were predominantly the focus of research on feedback mechanisms in distance education.

A closer examination reveals that studies involving automated systems were predominantly experimental or design-based and largely conducted in higher education contexts. Similarly, instructor-based feedback studies were mostly situated in higher education and frequently employed experimental or mixed methods. While formative feedback for reinforcement was common in studies on automated systems, instructor-based studies more often emphasized evaluative feedback. These patterns highlight a concentration of research in higher education and suggest limited exploration of feedback mechanisms at the K–12 level.

Feedback Type

To address the research question "What types of feedback are most prevalent in distance education?" the included studies were classified according to the types of feedback they examined. The distribution of feedback types is presented in Table 7.

Table 7. Distribution of included studies by feedback type

Feedback Type	Study ID	f
Acknowledgment	36, 66	2
Informative	2, 4, 7, 15, 25, 39, 43, 46, 62, 71, 81, 91	12
Formative	1, 2, 3, 5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 20, 21, 22, 23, 27, 28, 29, 33, 37, 38, 40, 41, 42, 45, 48, 49, 50, 52, 53, 55, 56, 58, 60, 61, 63, 64, 67, 69, 72, 75, 77, 80, 82, 83, 85, 86, 88, 90	51
Immediate	2, 47, 79	3
Corrective	10, 26, 30, 31, 35, 39, 43, 44, 51, 62, 65, 71, 73, 76, 81, 84	16
Other	30, 32, 35, 39, 54, 70, 73, 87	13
Not specified	12, 19, 24, 34, 57, 59, 68, 74, 78, 89	10

The analysis of feedback types across the reviewed studies reveals that the formative type of feedback is primarily focused, with 51 studies (56%) examining this category. Corrective feedback is the next most frequently studied, appearing in 16 studies (17.5%), followed by informative feedback in 12 studies (13.1%). In contrast, immediate feedback is sparsely covered, with only 3 studies (3.2%) addressing it, and acknowledgment feedback appears even less frequently, with only 2 studies (2.1%). Additionally, the delayed feedback type is absent from the reviewed literature. Other feedback types, not classified within the main categories of this review, are discussed in 13 studies (14.2%). These findings highlight a significant concentration on formative feedback in the current literature while indicating a gap in research on Delayed feedback, which remains unexplored in this context.

Feedback Aim

The research question "What are the primary aims of providing feedback in distance education?" is explored through a thematic analysis of the pedagogical purposes attributed to feedback in the included studies. An examination of the distribution of feedback aims in the included studies (Table 8) revealed that the majority focused on evaluation, representing 44 studies (48.3%). The studies with reinforcement as the feedback aim comprised 37 studies (40.6%), whereas those that focused on motivation represented 17 studies (18.6%). The studies addressing other feedback aims made up 10 studies (10.9%).

Table 8. Distribution of Included Studies by Feedback Aim

Feedback Aim	Study ID	f
Motivation	3, 19, 22, 23, 31, 35, 36, 47, 50, 54, 56, 58, 66, 72, 80, 87	17
Evaluation	1, 5, 7, 8, 10, 11, 13, 15, 16, 19, 20, 21, 22, 25, 26, 27, 29, 30, 32, 35, 37, 39, 40, 42, 44, 46, 49, 51, 52, 55, 57, 60, 61, 63, 67, 69, 71, 72, 77, 79, 83, 84, 91	44
Reinforcement	2, 9, 10, 14, 15, 17, 18, 20, 26, 28, 30, 33, 36, 38, 39, 41, 43, 45, 46, 48, 53, 54, 62, 64, 65, 70, 71, 73, 75, 76, 81, 82, 85, 86, 87, 88, 90	37
Other	4, 6, 12, 24, 34, 59, 68, 74, 78, 89	10

These results suggest that evaluation and reinforcement were predominantly the focus of feedback in distance education contexts.

Feedback Form

In response to the research question "What forms of feedback delivery are most commonly utilized in distance education?" the reviewed studies were analysed based on the modalities through which feedback was provided. In terms of the distribution of feedback forms (Table 9), the majority of the studies utilized written feedback, accounting for 43 studies (47.2%). Mixed forms of feedback were employed in 20 studies (21.9%), while visual feedback was used in 12 studies (13.1%). Feedback categorized as "not specified" was observed in 12 studies (13.1%), and audio feedback was used in only 4 studies (4.3%).

Table 9. Distribution of included studies by feedback form

Form of Feedback	Study ID	f
Audio	12, 46, 56, 67	4
Written	3, 9, 11, 15, 18, 19, 20, 21, 23, 30, 32, 35, 39, 40, 44, 45, 48, 53, 54, 58, 60, 61, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 75, 76, 77, 79, 80, 81, 83, 85, 86, 88	61
Visual	4, 6, 16, 22, 25, 36, 47, 50, 51, 55, 90, 91	12
Mixed	8, 10, 13, 14, 17, 26, 27, 28, 29, 33, 37, 38, 41, 42, 43, 49, 52, 82, 87, 89	20
Not Specified	1, 2, 5, 7, 24, 31, 34, 57, 59, 74, 78, 84	12

These results indicate that written feedback is predominantly used in distance education contexts, with mixed and visual feedback also being notable approaches.

Outcome Measured

To address the final research question "*What outcomes are most commonly measured to assess the effectiveness of feedback in distance education*?" this section presents a thematic analysis of the included studies with a focus on the types of learning outcomes assessed. Identifying these outcomes is essential for understanding how the effectiveness of feedback is conceptualized and evaluated within the current literature. The distribution of the findings is summarised in Table 10.

Table 10. Distribution of included studies by outcomes measured

Variables	Study ID	f
Academic Performance	6, 7, 8, 9, 11, 13, 14, 15, 17, 18, 19, 20, 22, 23, 24, 25, 28, 29, 30, 31, 32, 33, 34, 35, 36, 42, 43, 44, 45, 48, 50, 52, 53, 54, 56, 57, 59, 60, 62, 64, 68, 70, 72, 73, 74, 75, 76, 77, 79, 81, 84, 85, 86, 87, 88	55
Student Satisfaction and Attitudes	1, 10, 12, 13, 15, 17, 20, 23, 25, 26, 27, 28, 37, 38, 42, 43, 47, 48, 51, 53, 56, 58, 67, 68, 70, 72, 75, 80, 76, 82, 87, 90	31
Engagement and Motivation	9, 12, 17, 18, 22, 23, 25, 26, 27, 30, 31, 32, 38, 42, 47, 51, 56, 59, 63, 66, 70, 72, 84, 85, 86, 87, 89	27
Effectiveness of Feedback and Instructional Design	8, 16, 24, 31, 37, 40, 43, 46, 49, 54, 55, 58, 59, 60, 61, 62, 63, 65, 66, 69, 71, 74, 79, 81, 82, 85, 86, 88, 91	29
Other	2, 3, 4, 5, 21, 39, 41, 48, 78, 83	10

The most common outcome measured in the studies analyzed was academic performance, which was investigated in 55 of the 91 studies included (60.4%). Student satisfaction and attitudes were evaluated in 31 studies (34%). Engagement and motivation were investigated in 27 studies (29.6%). The effectiveness of feedback and instructional design was measured in 29 studies (31.8%). Other outcomes were measured in 10 studies (10.9%). The distribution of studies across these themes highlights the multifaceted nature of educational research, with a notable concentration on academic performance, student satisfaction, engagement, and the effectiveness of feedback and instructional design. This analysis underscores the comprehensive efforts to enhance educational practices and outcomes.

DISCUSSION

The findings of this systematic review provide a nuanced examination of feedback mechanisms in distance education, uncovering valuable insights into how feedback influences student engagement, learning outcomes, and instructional efficacy. By analyzing 91 studies, this review contributes to a broader understanding of feedback processes in distance education, highlighting key themes that reinforce and expand upon existing educational theories.

In examining the types of feedback most commonly discussed in distance education research, a significant emphasis on formative feedback emerged. Of the 91 included studies, 52 highlighted formative feedback as serving a dual role—both developmental and regulatory. Formative feedback is characterized by its iterative nature, allowing students to receive continuous feedback that guides their improvement over time, fostering self-regulation and promoting learning (Nicol & Macfarlane-Dick, 2006; Shute, 2008). This continuous interaction between feedback and student response aligns with theories of metacognition and self-directed learning, where formative feedback serves as a scaffold to build higher-order thinking and problem-solving skills (Hattie & Timperley, 2007). Research consistently shows that formative feedback enhances metacognitive awareness, a key component in distance education where learners are often required to self-manage their progress (Gikandi, Morrow, & Davis, 2011). Furthermore, the efficacy of formative feedback in distance education hinges on the timing and specificity of the feedback provided, a requirement that demands responsive teacher training to ensure that online educa tors are equipped to deliver actionable, constructive feedback (Jensen, Bearman, & Boud, 2021). In particular, recent studies highlight the importance of real-time formative feedback for fostering active learning and reducing feelings of isolation, which can undermine student engagement in digital classrooms (Borup, West & Thomas, 2015).

In exploring how feedback is most commonly delivered in distance education, multimedia feedback was found to be particularly prominent. A total of 39 studies examined the use of audio, video, or visual annotations, emphasizing their value in enhancing the social and emotional dimensions of instructor-learner interaction, particularly in asynchronous environments where textual feedback may fail to convey tone or nuance (Ice et al., 2010; Schwartz & White, 2000). Studies suggest that audio feedback, by capturing vocal inflections, allows instructors to convey encouragement or urgency, fostering a sense of connection that written feedback may lack (Borup, West, & Thomas, 2012). The ability of audio feedback to promote deeper engagement aligns with socioemotional learning theories, which underscore

the importance of relational feedback in sustaining motivation and learner satisfaction (Borup et al., 2012). Video feedback, on the other hand, offers a richer medium that supports detailed explanations, enabling instructors to break down com plex concepts visually (Mathieson, 2012). Such feedback methods are particularly beneficial in online courses where nonverbal cues are absent, helping to bridge the communicative gap and reinforcing learning through visual and auditory channels (Hew & Cheung, 2013). These findings indicate that diverse feedback modalities can cater to different learner preferences, enhancing both engagement and comprehension in ways that text-based feedback alone cannot. Studies have also shown that multimedia feedback can improve cognitive engagement by facilitating better retention of information, which aligns with cognitive load theory, which posits those diverse sensory inputs support memory and comprehension (Sweller, 1994).

In considering the sources from which feedback is most commonly provided in distance education, automated feedback (AF) systems emerged as a major focus. Their increasing prevalence is closely aligned with recent advancements in artificial intelligence and adaptive learning technologies (Gikandi et al., 2011; Narciss, 2013). By providing immediate and often continuous feedback, AF systems support learner engagement and reduce response times, a critical factor in maintaining motivation and minimizing frustration in self-paced learning environments (Demszky, Liu, Hill, Jurafsky, & Piech, 2024; Yildiz & Gonen, 2024). Studies have shown that AF systems are particularly effective for basic learning competencies, such as language mechanics, where immediate correction reinforces learning without the need for complex cognitive processing (Kayali & Balat, 2024). However, a major limitation of AF systems is their lack of personalized interaction, which restricts their capacity to foster higher-order thinking and problem-solving skills, which are typically nurtured through human interaction (Graham et al., 2000). Despite these limitations, the integration of AI in AF systems has shown promise in providing personalized feedback pathways and reducing instructor workloads, a balance that aligns well with the cognitive-affective theory of learning with media, which emphasizes the role of media in emotional and cognitive engagement (Mayer, 2009). Nonetheless, hybrid models 18 combining AF and instructor feedback may optimize outcomes, particularly in high enrollment online courses such as MOOCs, where scalability challenges persist (Dalipi, Zdravkova, & Ahlgren, 2021).

Instructor-provided feedback, while less prevalent, has emerged as essential in distance education because of its role in enhancing learning outcomes through personalized support. Students consistently reported high satisfaction with feedback that was detailed, specific, and provided promptly, highlighting the importance of person alization in fostering learner engagement and self-efficacy (Borup et al., 2015; Graham et al., 2000). In contrast to automated systems, instructor feedback supports the development of critical thinking by offering nuanced insights that address content organization, analytical reasoning, and conceptual depth (Shea & Bidjerano, 2010). However, large-scale courses, particularly massive open online courses (MOOCs), present scalability challenges that can limit the feasibility of personalized instructor feedback, often necessitating AF as a supplement or substitute (Dalipi et al., 2021). The preference among students for timely and constructive feedback underscores the need for feedback models that maintain quality while managing scalability, suggesting that tailored feedback solutions may be essential in balancing these demands in online education (Borup et al., 2015).

Peer feedback, which was evaluated in 18 studies, yielded varied outcomes regarding its efficacy in online education. While peer feedback can enhance collaborative learning and self-reflection by allowing students to critique and learn from each other, concerns regarding its reliability and the quality of feedback provided are common (Jurs & Spehte, 2021; Topping, 2009). These findings resonate with social constructivist theories, which emphasize learning as a collaborative process but also caution that peer feedback requires structured support to ensure that it meets academic standards (Van der Pol, Van den Berg, Admiraal & Simons, 2008). Research suggests that equipping students with 19 feedback training and clear assessment guidelines is crucial for maximizing the effectiveness of peer review, as unstructured peer feedback can lead to inconsistencies that undermine learning (Topping, 1998). Structured peer review processes are particularly critical in online environments, where peer interactions may be less frequent and may lack the immediacy of traditional classroom settings (Gikandi et al., 2011). Studies recommend implementing frameworks that guide students in providing constructive, meaningful feedback to peers, which can help create a supportive learning environment conducive to collaborative knowledge building (Jurs & Spehte, 2021).

The analysis of feedback aims in distance education revealed that evaluation and reinforcement were the two most commonly intended purposes across the reviewed studies. These findings indicate that feedback is primarily used either to assess learner performance or to support continued engagement and motivation. These aims align with traditional educational focuses on performance measurement and skill development, a central theme in educational psychology literature (Cohen, 1981). Evaluation feedback, particularly formative assessment, encourages skill mastery by helping learners understand their progress toward specific goals, a function that is crucial for self-regulated learning (Nicol & Macfarlane-Dick, 2006). Reinforcement feedback, which emphasizes positive reinforcement and corrective guidance, is essential in encouraging persistence and resilience, particularly in self-paced distance education, where students may lack external motivation (Deci & Ryan, 2000). Interestingly, few studies have examined motivational feedback, despite its critical role in sustaining long-term engagement and intrinsic motivation, especially in asynchronous settings (Pintrich & De Groot, 1990). Given the pivotal role of motivation in online learning, future research should explore how formative, process-oriented feedback can foster self-efficacy and a growth mindset, which have been linked to increased resilience and engagement in challenging learning environments.

The analysis of outcome measures used to evaluate feedback effectiveness indicated that academic performance was the most frequently assessed construct, appearing in 60.4% of the reviewed studies. This focus reflects the continued prioritization of measurable achievement indicators in educational research, particularly within technology-mediated learning environments (Shute, 2008; Hattie & Timperley, 2007). However, while academic performance remains a central metric, a substantial portion of the literature also considered affective and behavioral dimensions such as student satisfaction, engagement, and motivation. These outcomes, though less frequently emphasized, align with prior research highlighting the role of feedback in shaping learners' emotional responses and sustained participation in online settings (Nicol & Macfarlane-Dick, 2006; Espasa & Meneses, 2010). Notably, the effectiveness of feedback and instructional design was assessed in approximately one-third of the studies, indicating an increasing interest in evaluating not only learner outcomes but also the pedagogical processes that support them. Despite these efforts, relatively few studies explored long-term or higher-order outcomes such as self-regulated learning or knowledge transfer, suggesting the need for broader conceptual frameworks to capture the full impact of feedback mechanisms in distance education.

CONCLUSION

This systematic review has synthesized critical insights into feedback mechanisms in distance education, emphasizing their nuanced roles in enhancing student learning outcomes, engagement, and instructional practices. Through the analysis of 91 studies, this review reveals the complex and multifaceted nature of feedback in distance education, where the mechanisms of formative, summative, multimedia, automated, and peer feedback intersect with learner needs, instructional goals, and technological advancements. Formative feedback emerged as central to fostering self-regulation and metacognitive skills, supporting prior research that links iterative feedback with improved learner autonomy and engagement (Hattie & Timperley, 2007; Nicol & Macfarlane-Dick, 2006). However, a critical takeaway is the growing dependence on automated feedback systems to address scalability, particularly in large-scale online courses. Although these systems provide timely and continuous feedback that supports immediate learning needs, they often lack the depth and adaptability required to develop higher-order thinking, thereby underscoring the importance of hybrid feedback models that integrate personalized instructor insights for more robust learning experiences.

The findings of this review also highlight the transformative potential of multimedia feedback, where diverse formats—audio, video, and visual—enhance instructional communication by facilitating a richer conveyance of tone, nuance, and detailed explanations. Such modalities cater to varied learner preferences, supporting both cognitive and socioemotional engagement in ways that traditional text-based feedback cannot achieve (Borup et al., 2015; Ice, Curtis, Phillips & Wells, 2010). Nevertheless, critical gaps persist in literature, particularly regarding the impact of delayed feedback on learning retention and the role of peer feedback in fostering collaborative learning skills in online environments. Additionally, there is a significant need for motivational feedback strategies 21 that specifically address learner perseverance and self-efficacy, which are essential for student success in self-paced and asynchronous distance education.

Importantly, the majority of studies included in this review focus on higher education contexts, revealing a gap in our understanding of feedback practices and their impact within other educational settings, such as K-12 or adult education. Future research should address these contexts to uncover context-specific feedback dynamics and assess the generalizability of findings across educational levels. Furthermore, as distance education has expanded globally, driven by the demand for accessible, flexible learning solutions, innovative feedback strategies are needed to balance the demands of personalization and scalability. This challenge calls for further exploration of AI-enhanced feedback systems capable of adapting to diverse learner profiles while ensuring the quality and personalization that foster deep learning.

BIODATA and CONTACT ADDRESSES of AUTHORS

Firat KIZILTEPE is a National Education Specialist at the Ministry of National Education and currently a PhD student in the Department of Computer Education and Instructional Technology at Gazi University. He completed his undergraduate and first master's degree at Hacettepe University, and later received the prestigious Chevening Scholarship to pursue an MSc in Educational Leadership and Management at the University of East Anglia, UK. His early academic work examined online trolling behaviors, digital citizenship, and online safety education for children, reflecting his interest in supporting safe and conscious digital participation. Building on this foundation, his current research focuses on AI integration in education, the ethical and responsible use of AI, and personalized learning. As a national education specialist, he has actively contributed to large-scale initiatives in e-learning, instructional design, and digital content policies, and has co-authored national publications and book chapters on digital learning.

Firat KIZILTEPE
Department of Computer Education and Instructional Technologyi Gazi Faculty of Education
Address: Gazi Universitesi Rektorlugu, Emniyet, Bandirma Cad. No:6/1, 06560 Yenimahalle/Ankara Phone: +90 506 269 01 64
E-mail: 24810201001@gazi.edu.tr

Busra TAVASLI is an Information Technologies teacher at the Ministry of National Education of the Republic of Turkiye and a Ph.D. candidate in the Department of Computer Education and Instructional Technology at Gazi University. She completed her undergraduate studies in Computer Education and Instructional Technology and her master's degree in Educational Management. Throughout her eight-year teaching career, she has specialized in guiding K–12 students in computer science, project-based learning, and scientific research techniques. Her academic interests include technology integration in education, teacher professional development, and innovative instructional strategies for 21st-century skills.

Busra TAVASLI
Department of Computer Education and Instructional Technologyi Gazi Faculty of Education
Address: Gazi Universitesi Rektorlugu, Emniyet, Bandirma Cad. No:6/1, 06560 Yenimahalle/Ankara Phone: +90 537 242 08 80
E-mail: busra.tavasli@gazi.edu.tr

Batuhan CICIKLER received his Bachelor's degree in Computer and Instructional Technology Education (CEIT) from Ondokuz Mayis University in 2020 and completed his Master's degree at Ankara University with a thesis on adults' problem-solving skills in technology-enriched environments. His research focuses on the interaction between technology and society in educational contexts, particularly digital literacy, AI-mediated learning, and technology-driven behavioral patterns. He examines how technological determinism and solutionism shape educational practices, adult learning, and technology use, drawing on empirical and critical perspectives within the field of educational sciences.

Batuhan CICIKLER
Management Information Systems, Ostim Technical University
Address: OSTIM Teknik Universitesi OSTIM, 100. Yil Bulvari, 55/F, 06374 Yenimahalle/ANKARA Phone: +90 5314510088
E-mail: batuhan.cicikler@ostimteknik.edu.tr

Dr. Sercin KARATAS is a Professor at the Department of Computer Education and Instructional Technology, Gazi University in Turkiye. She obtained her PhD degree from Ankara University in Educational Technology. She has more than 25 years of experience focusing on the theory and applications of online learning. Her research areas include theories and applications of online learning, designing and developing content for online learning, instructional design, design principles for online learning, interaction in online learning, L(C)MS, creativity for (online) learning, gamification for learning, and generative artificial intelligence for learning. She has authored many national and international articles, reports, and book chapters on these issues. She is actively involved in Erasmus+ projects. In this field, she has conducted various courses, seminars, and training sessions both face-to-face and online, from pre-service to doctoral levels. She has also served as an instructor, researcher, and consultant in Scientific Research Projects. She was the Director of the Center of Distance Education at Gazi University in 2018-2019. She is the Vice Dean of Gazi Faculty of Education since 2024

Sercin KARATAS
Department of Computer Education and Instructional Technologyi Gazi Faculty of Education
Address: Gazi Universitesi Rektorlugu, Emniyet, Bandirma Cad. No:6/1, 06560 Yenimahalle/Ankara Phone: +90 533 651 50 13
E-mail: sercin@gazi.edu.tr

REFERENCES

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. International Journal of Social Research Methodology, 8(1), 19–32. https://doi.org/10.1080/1364557032000119616

Azevedo, R., & Bernard, R. M. (1995). A meta-analysis of the effects of feedback in computer-based instruction. Journal of Educational Computing Research, 13(2), 111–127. https://doi.org/10.2190/9LMD-3U28-3A0G-FTQ0

Borup, J., West, R. E., & Graham, C. R. (2012). Improving online social presence through asynchronous video. The Internet and Higher Education, 15(3), 195–203. https://doi.org/10.1016/j.iheduc.2011.11.001

Borup, J., West, R. E., & Thomas, R. (2015). The impact of text versus video communication on instructor feedback in blended courses. Educational Technology Research and Development, 63(2), 161–184. https://doi.org/10.1007/s11423-015-9367-8

Cavalcanti, A. P., Barbosa, A., Carvalho, R., Freitas, F., Tsai, Y. S., Gasevic, D., & Mello, R. F. (2021). Automatic feedback in online learning environments: A systematic literature review. Computers and Education: Artificial Intelligence, 2, 100027. https://doi.org/10.1016/j.caeai.2021.100027

Chen, J., Wang, R., Fang, B., & Zuo, C. (2023). Fine-grained aspect-based opinion mining on online course reviews for feedback analysis. Interactive Learning Environments, 1–16. https://doi.org/10.1080/10494820.2023.2198576

Cohen, P. A. (1981). Student ratings of instruction and student achievement: A meta-analysis of multisection validity studies. Review of Educational Research, 51(3), 281–309. https://doi.org/10.2307/1170209

Dalipi, F., Zdravkova, K., & Ahlgren, F. (2021). Sentiment analysis of students' feedback in MOOCs: A systematic literature review. Frontiers in Artificial Intelligence, 4, 728708. https://doi.org/10.3389/frai.2021.728708

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Dempsey, J. V., & Wager, S. U. (1988). A taxonomy for the timing of feedback in computer-based instruction. Educational Technology, 28(10), 20–25. http://www.jstor.org/stable/44427652

Dempsey, J. V., Driscoll, M. P., & Swindell, L. K. (1993). Text-based feedback. In J. V. Dempsey & G. C. Sales (Eds.), Interactive instruction and feedback (pp. 21–54). Englewood Cliffs, NJ: Educational Technology Publications.

Demszky, D., Liu, J., Hill, H. C., Jurafsky, D., & Piech, C. (2024). Can automated feedback improve teachers' uptake of student ideas? Evidence from a randomized controlled trial in a large-scale online course. Educational Evaluation and Policy Analysis, 46(3), 483–505. https://doi.org/10.3102/01623737231169270

Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. Psychological Bulletin, 76(5), 378–382. https://doi.org/10.1037/h0031619

Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. Computers & Education, 57(4), 2333–2351. https://doi.org/10.1016/j.compedu.2011.06.004

Graham, C., Cagiltay, K., Craner, J., Lim, B. R., & Duffy, T. M. (2000). Teaching in a web-based distance learning environment (Tech. Rep. No. 13-00). Center for Research on Learning and Technology.

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487

Hew, K. F., & Cheung, W. S. (2013). Use of Web 2.0 technologies in K–12 and higher education: The search for evidence-based practice. Educational Research Review, 9, 47–64. https://doi.org/10.1016/j.edurev.2012.08.001

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2010). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. Journal of Asynchronous Learning Networks, 11(2), 3–25. https://doi.org/10.24059/olj.v11i2.1724

Jensen, L. X., Bearman, M., & Boud, D. (2021). Understanding feedback in online learning – A critical review and metaphor analysis. Computers & Education, 173, 104271. https://doi.org/10.1016/j.compedu.2021.104271

Jurs, P., & Spehte, E. (2021). The role of feedback in the distance learning process. Journal of Teacher Education for Sustainability, 23(2), 91–105. https://doi.org/10.2478/jtes-2021-0019

Kayali, B., & Balat, S. (2024). Assessment, evaluation, and feedback in online education with artificial intelligence-supported tools. In AI algorithms and ChatGPT for student engagement in online learning (pp. 124–135). Hershey, PA: IGI Global.

Kielty, L. (2004). Feedback in distance learning: Do student perceptions of corrective feedback affect retention in distance learning [Master's thesis, University of South Florida].

Kulhavy, R. W. (1977). Feedback in written instruction. Review of Educational Research, 47(1), 211–232. https://doi.org/10.2307/1170128

Kulhavy, R. W., & Anderson, R. C. (1972). Delay-retention effect with multiple-choice tests. Journal of Educational Psychology, 63(5), 505–512.

Kulik, J. A., & Kulik, C. C. (1988). Timing of feedback and verbal learning. Review of Educational Research, 58(1), 79–97. https://doi.org/10.3102/00346543058001079

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the methodology. Implementation Science, 5(1), 69. https://doi.org/10.1186/1748-5908-5-69

Lu, J., & Law, N. (2012). Online peer assessment: Effects of cognitive and affective feedback. Instructional Science, 40(2), 257–275. https://doi.org/10.1007/s11251-011-9177-2

Mayer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge University Press.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLOS Medicine, 6(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Moore, M. G., & Kearsley, G. (1996). Distance education: A systems view. Wadsworth Publishing Company.

Mory, E. H. (1992). The use of informational feedback in instruction: Implications for future research. Educational Technology Research and Development, 40(3), 5–20. https://doi.org/10.1007/BF02296839

Narciss, S. (2013). Feedback strategies for interactive learning tasks. In J. Hattie & E. M. Anderman (Eds.), International handbook of student achievement (pp. 253–264). Routledge.

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. Studies in Higher Education, 31(2), 199–218. https://doi.org/10.1080/03075070600572090

Page, M. J., Moher, D., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: Updated guidance and exemplars for reporting systematic reviews. BMJ, 372, n160. https://doi.org/10.1136/bmj.n160

Peters, M. D. J., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., McInerney, P., Godfrey, C. M., & Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. JBI Evidence Synthesis, 18(10), 2119–2126. https://doi.org/10.11124/JBIES-20-00167

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. Journal of Educational Psychology, 82(1), 33–40.

Topping, K. J. (1998). Peer assessment between students in colleges and universities. Review of Educational Research, 68(3), 249–276. https://doi.org/10.3102/00346543068003249

Topping, K. J. (2009). Peer assessment. Theory into Practice, 48(1), 20–27. https://doi.org/10.1080/00405840802577569

Schwartz, F., & White, K. (2000). Making sense of it all: Giving and getting online course feedback. In K. W. White & B. H. Weight (Eds.), The online teaching guide: A handbook of attitudes, strategies, and techniques for the virtual classroom (pp. 57–72). Allyn & Bacon.

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a community of inquiry in online and blended learning environments. Computers & Education, 55(4), 1721–1731. https://doi.org/10.1016/j.compedu.2010.07.017

Shute, V. J. (2008). Focus on formative feedback. Review of Educational Research, 78(1), 153–189. https://doi.org/10.3102/0034654307313795

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. Learning and Instruction, 4(4), 295–312. https://doi.org/10.1016/0959-4752(94)90003-5

Van der Pol, J., Van den Berg, B. A., Admiraal, W. F., & Simons, P. R. J. (2008). The nature, reception, and use of online peer feedback in higher education. Computers & Education, 51(4), 1804–1817. https://doi.org/10.1016/j.compedu.2008.06.001

Wright, C. J., & Nuthall, G. (1970). Relationships between teacher behaviors and pupil achievement in three experimental elementary science lessons. American Educational Research Journal, 7(4), 477–491. https://doi.org/10.2307/1161831

Yildiz, H., & Gonen, S. I. K. (2024). Automated writing evaluation system for feedback in the digital world: An online learning opportunity for English as a foreign language students. Turkish Online Journal of Distance Education, 25(3), 183–206. https://doi.org/10.17718/tojde.1169727

Ypsilandis, G. S. (2002). Feedback in distance education. Computer Assisted Language Learning, 15(2), 167–181. https://doi.org/10.1076/call.15.2.167.8191