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THE CONTRIBUTION OF TEACHER FEEDBACK IN ENHANCING STUDENTS' COGNITIVE SKILLS IN SECONDARY EDUCATION: A REVIEW OF RESEARCH, PROPOSALS, AND FUTURE DIRECTIONS

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Abstract:
Feedback is essential for helping students identify their weaknesses and improve their performance, ultimately reducing the gap between their current abilities and desired goals. To be effective, feedback should be immediate, clear, and offer actionable suggestions for improvement. In secondary education, feedback aims to foster autonomy, responsibility, and self-regulation skills, preparing learners for their future paths. Skills can be categorized into cognitive and non-cognitive types, the latter including personal, social, and strategic skills. This research analyzed thirty-three studies published in the last decade using the PRISMA 2020 methodology to assess the impact of feedback on the non-cognitive skills of secondary education students. The research concluded that teacher feedback positively influences several areas: a) Personal development, as it enhances self-regulation, self-esteem, resilience, and emotional management; b) Social development, as it encourages extroversion and boosts social intelligence, improving students' ability to navigate social interactions; c) The development of mindset and attitudes, enhancing student motivation and responsibility; d) Cultural development, by increasing cultural awareness and contributing to a more active social identity; e) Learning strategies, as it improves critical thinking, creativity, and written argumentation skills.

Keywords: teacher feedback, non-cognitive skills, primary education, student's performance

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1. Introduction

Feedback involves providing information to learners to enhance their performance and help them achieve their learning goals (Brookhart, 2017). Its primary purpose is to guide students in revising their thoughts and actions to improve their learning outcomes while also fostering the development of cognitive, non-cognitive, socio-emotional, and metacognitive skills (Hattie & Timperley, 2007). Socio-emotional skills specifically include understanding and managing emotions, building positive relationships, making responsible decisions, and effectively responding to social challenges (Goleman, 2006; Conley, 2015). These skills are essential for personal development, educational success, and overall adaptability in life (Rimm-Kaufman & Pianta, 2015).

A review of the international literature reveals that few studies have focused on how different types of feedback affect the development of cognitive skills (Black & Wiliam, 1998; Pekrun *et al.*, 2005; Dweck, 2006; Hulleman & Harackiewicz, 2009; Yeager & Dweck, 2012). Systematic reviews and meta-analyses have typically examined the impact of feedback in two main areas: a) teacher performance (Shute, 2008; Jonsson, 2013; Liu & Brown, 2015; Chen, 2016; Baliram & Youde, 2018) and b) students' cognitive and non-cognitive skills (Hattie & Timperley, 2007; Laici & Pentucci, 2019; Haughney *et al.*, 2020; Wisniewski *et al.*, 2020; Jensen *et al.*, 2021; Hahn *et al.*, 2021). Additionally, some studies explore the relationship between non-cognitive skills and academic performance (Smithers *et al.*, 2018), assessment and self-assessment (Li *et al.*, 2021; Badrun, 2024), interventions in higher education (Frantz *et al.*, 2022), school climate (Zynuddin *et al.*, 2023), and motivation in writing (Cen & Zheng, 2024). Despite the significant contributions of these studies to our understanding of the effects of feedback, there has yet to be a focused investigation into how feedback affects specific non-cognitive domains of student performance in secondary education. This includes areas such as personal, social, and cultural development, as well as the development of mindsets, attitudes, and learning strategies. This is the central aim of the present study.

2. The impact of teacher feedback on the development of non-cognitive skills in secondary education: a theoretical perspective

Feedback in education plays a crucial role in informing students about their performance (Hattie & Timperley, 2007). This information can be provided by teachers, peers, self-assessments, or automated systems (Brookhart, 2017). The primary goal of feedback is to enhance learning by helping students identify their weaknesses, improve in areas where they struggle, and bridge the gap between their current performance and their desired goals (Hattie, 2009). For feedback to be effective, it must meet several criteria: a) It should be given immediately after the completion of a task to ensure its relevance (Shute, 2008), b) It must accurately identify strengths and weaknesses, avoiding vague statements (Brookhart, 2017), c) It should include specific suggestions for improvement (Hattie & Gan, 2011), d) It must combine positive reinforcement with constructive information to

encourage further effort (Brookhart, 2017), e) It should be tailored to the needs and learning styles of each student (Nicol & Macfarlane-Dick, 2006), f) It must be presented in a way that is understandable to the learners (Sadler, 1989). Researchers have identified several types of feedback: a) Formative feedback is provided continuously during the learning process to enhance and adapt students' strategies (Sadler, 1989), b) Summative feedback is given after completing a task and assesses overall performance, usually represented by a score (Hattie, 2009), c) Descriptive feedback offers detailed information about specific aspects of performance, including interpretations of correct and incorrect responses and suggestions for improvement (Brookhart, 2017), d) Evaluative feedback provides judgments about the quality of work through scores (Hattie & Timperley, 2007), e) Peer feedback encourages collaborative learning, enabling students to assess their work through the perspectives of others (Hattie, 2009), f) Self-feedback promotes self-assessment and self-regulation, fostering independent learning skills (Nicol & Macfarlane-Dick, 2006). International literature suggests several strategies for effective feedback: a) Rubrics and checklists provide clear criteria for expectations and help students achieve their goals (Brookhart, 2017), b) Written feedback offers guidance for improvement while highlighting strengths (Hattie & Gan, 2011), c) Oral feedback is more personal and can facilitate better understanding (Brookhart, 2017), d) Interactive feedback using technology engages students and provides immediate responses (Shute, 2008). In secondary education, feedback tends to be more detailed than in primary education, focusing on improving skills such as independence, responsibility, and self-regulation (Hattie, 2009; Brookhart, 2017). It aims to help students identify gaps in their knowledge and develop higher-order thinking skills (Sadler, 1989). Feedback also includes guidance to prepare students for future academic and professional endeavors, acting as a gateway to higher education (Brookhart, 2017).

Skills can be categorized into cognitive and non-cognitive skills. Cognitive skills involve the ability to understand complex ideas, adapt to new environments, learn from experiences, and overcome challenges (Green, 2011). These skills are associated with mental abilities such as reading, writing, and arithmetic (Green, 2011). On the other hand, non-cognitive skills encompass behaviors, attitudes, and characteristics that, while not directly related to cognitive intelligence, are essential for academic success and personal development. These skills are socially cultivated patterns that can be continuously enhanced and provide added value (Borghans *et al.*, 2008). The concept of non-cognitive skills was introduced by Bowles and Gintis (1976), who emphasized the significance of factors not measured by cognitive tests, such as attitudes and motivation, in achieving success in the labor market. Subsequent research has validated the importance of non-cognitive skills in enhancing academic performance, achieving long-term success, fostering socio-emotional development, and promoting mental health (Heckman *et al.*, 2006; Duckworth *et al.*, 2007; Borghans *et al.*, 2008). To incorporate non-cognitive skills into the curriculum, a holistic approach to education that goes beyond traditional academic subjects is necessary. Effective strategies include: a) Social-Emotional Learning (SEL) programs, which focus on self-awareness, self-management, and social skills

(Durlak *et al.*, 2011), b) Project-based learning, which encourages critical thinking and collaboration, c) Extracurricular activities that enhance teamwork and leadership skills (Durlak *et al.*, 2011), and d) Assessments using specific tools to provide insights into students' non-cognitive development (Duckworth & Yeager, 2015).

Non-cognitive skills are typically divided into several categories, including intrapersonal, interpersonal, social, cultural, attitudes, and mindsets (Blair & Raver, 2015). The personal development of a learner encompasses several key areas: a) Self-regulation: This involves managing one's emotions and impulses; b) Self-efficacy: This refers to the belief in one's ability to complete complex tasks; c) Growth mindset: The idea that abilities can be developed through effort; d) Time management: The organization and planning of activities; e) Adaptability: The ability to be flexible in new situations; f) Resilience: The capacity to overcome disappointments and challenges (Schoon, 2006; Duckworth & Kern, 2011; Duckworth, 2016). In terms of social development, relevant skills include: a) Communication: The ability to express oneself effectively and listen to others; b) Collaboration: The capacity to work in groups and respect different viewpoints; c) Empathy: A skill that strengthens interpersonal relationships; d) Conflict resolution: The ability to peacefully resolve differences (Goleman, 2006; Gutman & Schoon, 2013). The development of an attitudinal mindset in learners involves: a) Motivation: The internal drive to achieve goals; b) Responsibility: Taking ownership of one's actions; c) Integrity: Adhering to ethical principles (Deci & Ryan, 1985). Cultural development for learners consists of: a) Cultural awareness: Understanding and appreciating cultural differences, respecting diversity, and promoting inclusion; b) Active social role: Participation in community activities and an understanding of civic responsibilities (Dweck, 2006). Finally, the development of learning strategies includes: a) Critical thinking: Analyzing situations and adopting logical, evidence-based strategies for evaluation and creative problem-solving; b) Creativity: Generating ideas and engaging in innovative thinking; c) Metacognition: Awareness and understanding of one's own thinking processes (Gutman & Schoon, 2013).

In secondary education, emphasizing grades and higher academic standards requires students to demonstrate greater intrinsic motivation, self-efficacy, and independent learning (Evans *et al.*, 2018). As students transition to more autonomous learning environments, they encounter new structural demands that necessitate the development of stronger self-management skills. This includes navigating higher academic standards, establishing new relationships with teachers, and adapting to evolving teacher expectations while experiencing reduced autonomy (Evans *et al.*, 2018). Non-cognitive skills are crucial for secondary school students as they: a) enhance academic success, social interactions, and emotional intelligence (Blair & Raver, 2015); b) aid in time management, goal setting, and maintaining focus on studies, which leads to better performance (Johnson & Johnson, 1989; Goleman, 2006); and c) improve communication, teamwork, and empathy, all of which are essential for building relationships and resolving conflicts (Johnson & Johnson, 1989; Goleman, 2006).

3. Previous research - Contribution of this review

Black and Wiliam (1998) emphasized the significance of formative assessment and timely feedback in enhancing student learning. They argued that teachers can help develop both cognitive and non-cognitive skills by providing feedback that highlights effective strategies and areas needing improvement. Similarly, Pekrun *et al.* (2005) created a framework for understanding academic emotions and their impact on learning, pointing out that effective feedback can shape students' emotional responses and non-cognitive skills. Dweck (2006) discusses the relationship between feedback and a growth mindset, stressing that the belief in the potential for improvement through effort affects students' attitudes toward challenges.

Hattie and Timperley (2007) conducted a meta-analysis of 12 studies to examine the different types of feedback and their effects on both cognitive and non-cognitive learning outcomes. They concluded that feedback should be timely, specific, and focused on the task at hand. Shute (2008), in her analysis of 180 sources, emphasized the importance of accuracy, a non-judgmental approach, supportive interactions, and appropriate timing for effective formative feedback. Hulleman and Harackiewicz (2009) found that feedback acknowledging students' efforts and linked to improved performance can enhance their interest and motivation in science. Yeager and Dweck (2012) noted the relationship between having a growth mindset and students' persistence in overcoming challenges. Furthermore, Jonsson (2013), through a review of 103 studies, reaffirmed the significance of feedback for higher education students, highlighting the impact of strategies and academic discourse on its effectiveness.

Liu and Brown (2015) analyzed the effectiveness of corrective feedback in second-language writing by reviewing 32 published studies and 12 doctoral theses. They noted several research limitations, such as a lack of clarity in research frameworks and methodological weaknesses, which make it challenging to compare results. Similarly, Chen (2016) examined peer feedback in English writing classes through a comparative review of 20 articles published between 1990 and 2010. This study revealed both positive and negative effects, along with implications for pedagogy. Furthermore, Baliram and Youde (2018) showed the positive impact of feedback on academic performance through a meta-analysis of eight empirical studies. In another study, Smithers *et al.* (2018) explored the relationship between non-cognitive skills in childhood and various outcomes, including academic achievement and cognitive, psychosocial, and language skills, based on 14 empirical studies. They found that non-cognitive skills were linked to improved outcomes, although some bias might exist in the studies. Parallel to this, Laici and Pentucci (2019) emphasized the importance of feedback frequency in university classrooms, highlighting the advantages of active teaching methods that enhance learning and foster genuine dialogue between students and teachers.

Haughney *et al.* (2020) analyzed 70 empirical studies in higher education, focusing on the gaps between perceived and actual feedback implementation. They concluded that positivity, specificity, timeliness, and active student participation are critical for effective

feedback. In a meta-analysis of 435 studies, Wisniewski *et al.* (2020) found a moderate effect of feedback on learning, with greater effectiveness observed in cognitive and motor skills. Additionally, Jensen *et al.* (2021), in a critical review of 17 studies, noted a growing recognition of feedback practices that prioritize students. Lastly, Hahn *et al.* (2021), in their analysis of 125 studies on the use of automatic grading and feedback, identified advantages such as the ability to accommodate more students without increasing the number of teachers, improved learning experiences, and reduced feedback time. However, they also highlighted disadvantages, including the potential to discourage innovative responses and the tendency for students to focus more on obtaining correct answers rather than understanding concepts.

Li *et al.* (2021) conducted a study that reviewed 19 empirical studies and demonstrated the impact of peer assessment on non-cognitive learning outcomes, particularly in learning strategies and academic attitudes. Meanwhile, Frantz *et al.* (2022) performed a systematic review of eleven studies, which highlighted the distinction between non-cognitive skills and factors, as well as their complex interactions. Additionally, Zynuddin *et al.* (2023) confirmed the relationship between school climate and the development of non-cognitive skills through a systematic review of sixty-five articles. Badrun (2024), in a systematic review of twenty-seven empirical studies, emphasized the significance of self-assessment and peer assessment in enhancing student motivation. Finally, Cen and Zheng (2024) conducted a meta-analysis of 13 quantitative studies focused on the effect of feedback on motivation for writing in a second language and concluded that feedback from multiple sources more effectively enhances students' motivation.

Although the previous reviews provided valuable insights into various types of feedback—such as their usage, effectiveness, and both positive and negative effects—none exclusively addressed the impact of feedback on non-cognitive domains of performance in secondary education. This analysis aims to fill that gap by examining research focused on how feedback influences specific categories of non-cognitive skills among secondary education learners. These categories include: a) Personal development (self-regulation, self-efficacy, growth mindset, time management, adaptability, resilience), b) Social development (communication, collaboration, empathy, conflict resolution), c) Cultural development (cultural awareness, active social role), d) Attitudinal development (motivation, responsibility, integrity), e) Learning strategy development (critical thinking, creativity, metacognition).

4. Purpose of research - Research questions – Methodology

The primary aim of this research is to examine the contribution of teacher feedback to the development of non-cognitive skills among secondary education learners. This investigation will be conducted through a literature review of studies published from 2014 to 2024. The objective is to draw insightful conclusions, identify existing gaps, and formulate suggestions for further research. More specifically, this literature review seeks

to answer the following research questions: a) To what extent does feedback contribute to the personal development of learners? b) To what extent does feedback enhance the social development of learners? c) To what extent does feedback influence the development of attitude-based mindsets in learners? d) To what extent does feedback contribute to the cultural development of learners? e) To what extent does feedback assist in the development of learning strategies among learners? Additionally, the sub-questions will examine the contexts in which the studies were conducted, the characteristics and sample sizes of the research participants, the types of data collected, and the research methods employed. The review will be methodologically based on the PRISMA 2020 statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) by Page *et al.* (2021). This updated guideline replaces the previous version from 2009 and includes new reporting guidance throughout the stages of identification, screening, eligibility assessment, and final selection of studies. Figure 1 illustrates the flow chart of this process, along with the number of studies at each stage.

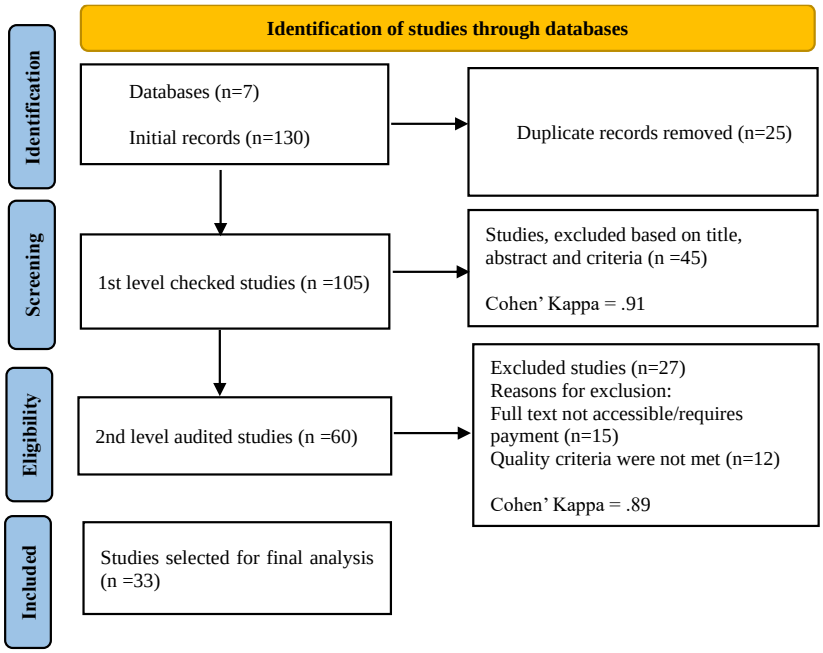

Figure 1: Flowchart of the literature review
following PRISMA 2020 guidelines (Page *et al.*, 2021)

The keywords and phrases used in the research included: "Feedback" AND "Non-Cognitive Skills," "Feedback" AND "Non-Cognitive Outcomes of Student Performance," or "Teacher Feedback" AND "Non-Cognitive Outcomes," or "Feedback" AND "Non-Cognitive Skills of Student Performance," or "Teacher Feedback" AND "Non-Cognitive Skills," and "Feedback" AND "Soft Skills." Additionally, the term "social-emotional skills" was employed. To identify more studies, various subcategories of non-cognitive skills were included, such as self-regulation, self-efficacy, growth mindset, time management, adaptability, resilience, communication, collaboration, empathy, conflict resolution, motivation, responsibility, integrity, cultural awareness, active social role,

critical thinking, creativity, and metacognition. To narrow the search to secondary education, terms such as “high school,” “secondary education,” “senior,” and “schools” were used. The search was primarily conducted using English terms, as most literature in the field is published in English.

This analysis was conducted across seven databases: Scopus, IEEEXplore, SAGE Journals, ScienceDirect, SpringerLink, ResearchGate, and Google Scholar. The aim of this phase was to expand the search scope beyond previous systematic reviews in this field. To achieve this, Scopus and IEEEXplore—two of the largest databases with a broad range of topics—were included. Additionally, the search was extended to ScienceDirect and SpringerLink, which offer relevant sections in the social sciences and humanities. SAGE Journals and ResearchGate were also utilized. Although Google Scholar was included, it is important to note that it has limitations in its search capabilities.

The search of the specified databases yielded a total of 130 studies. After removing 25 duplicates, 105 studies advanced to the first-level screening phase, during which their titles and abstracts were evaluated based on predefined criteria (see Table 1). To ensure consistency in the evaluation process, a small set of common studies was assessed, and Cohen's kappa coefficient of agreement was calculated (refer to Figure 1). As a result of this screening, 45 studies were excluded.

Table 1: Inclusion/exclusion criteria for studies in the review

Inclusion criteria	**Exclusion criteria**
Studies written in English and Greek.	Studies written in a language other than English and not available for translation.
Application in the field of education.	Not related to application in the field of education.
Reference to the effect of feedback on the non-cognitive skills of learners in secondary education.	Not related to the effect of feedback on non-cognitive skills of learners in secondary education.
The summary reports some information.	Reviews/theoretical studies
Publication year from 2014-2024	

A total of 60 studies were sent for the second-level review, during which their main texts were evaluated. Out of these, 15 studies needed adjustments to be accessible, leading to their exclusion. The quality of the remaining 45 studies was assessed based on the following criteria: a) Does the study clearly describe the context of the impact of feedback on students’ non-cognitive skills in secondary education? (This includes considerations such as the cognitive field and type of study.); b) Is the methodological design of the study adequately detailed? (This refers to the type of data collected and the sample of participants.); c) Is the description of the methods and data collection tools used in the study clear?

As a result of this evaluation, 33 studies were selected for the systematic review, as they met all three criteria. Additionally, the internal consistency of the assessment was verified through the calculation of Cohen's kappa coefficient of agreement (see Figure 1).

5. Results

The following tables summarize the studies identified during the literature review regarding the impact of teacher feedback on various categories of non-cognitive skills among secondary education students. For each study, we have recorded the researcher(s), the time and location of the study, the study's purpose, its type, sample size, the subject of focus, and its main findings. This information is organized by category of non-cognitive skills to clarify the relationship between feedback and the development of skills such as personal, social, and cultural development, the enhancement of learning strategies, and the formation of attitudinal mindsets.

Tables 2, 3, 4, and 5 reflect the findings on how teacher feedback contributes to students' personal development in secondary education. Specifically, Table 2 highlights the results regarding the impact of teacher feedback on learners' self-regulation.

Table 2: Results of teacher feedback on learners' self-regulation in secondary education

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Harks, Rakoczy, Hattie, Besser & Klieme (2014) Germany	Comparison of two types of written feedback: process-oriented and grade-oriented, on achievement, interest, self-evaluation, and changes in motivation.	- Experimental - Upper Secondary School - 146 students - Mathematics	Process-oriented feedback was viewed as more beneficial than grade-oriented feedback, significantly enhancing student engagement, achievement, and motivation.
Bondarenko (2017) Russia	Analyzing the impact of feedback and emotions on self-regulation and academic performance.	- Experimental - Lower Secondary School - 88 students - All the subjects, - Digital Media	Feedback is crucial for motivating students and achieving their goals, particularly for those with low or medium self-regulation abilities.
Bondarenko & Morosanova (2017) Russia	It examines how students with high and low levels of conscious self-regulation, as well as differing goal-achievement strategies, utilize structured feedback purposefully to enhance their grades.	- Experimental - Lower Secondary School - 103 students - All the subjects - Digital Media	Feedback is crucial in achieving learning goals, as it strengthens all students, particularly those with low self-regulation.
Vattøy (2020) Norway	An exploration of teachers' views on feedback's effects on self-regulation, language skills, and self-efficacy.	- Qualitative (interviews) - Lower Secondary School - 10 teachers	Teachers emphasize the crucial role of feedback in enhancing students' self-

		- English as a Foreign language	regulation and self-efficacy, viewing grades as obstacles to learning.
Sherafati, Largani & Amini (2020) Iran	Examining the impact of teacher feedback on students' writing skills and motivation.	- Experimental - Upper Secondary School - 60 students - English as a Foreign language - Digital Media	There has been a notable improvement in writing skills and an increase in learners' motivation.
Zhang, Dai, Pi & Yang (2022) China	Exploring how various types of feedback in a flipped classroom can enhance self-regulated learning skills, performance, and learning satisfaction.	- Mixed (experimental, questionnaire) - Upper Secondary School - 31 students - All the subjects	All types of teacher feedback improved students' learning performance and self-regulated learning skills, but did not enhance their learning satisfaction.
Sherafati, & Mahmoudi, Largani (2023) Iran	It examines how implementing feedback in writing lessons impacts students' writing performance, self-regulation, and self-efficacy.	- Experimental - Upper Secondary School - 42 students (all male) - English as a Foreign language - Digital Media	The performance of the experimental group on the writing test, as well as in self-regulation and self-efficacy measures, showed significant improvement.
Yong & Sokumaran (2023) Singapore	Examining the effect of various types of teacher feedback on students' self-regulated learning in a special educational needs context.	- Mixed (experimental, interviews) - Lower Secondary School - 45 students (30 male, 15 female) - Language	Various types of feedback, including corrective and differentiated feedback, improved students' self-regulated learning.
Asper, Faria, Serra & Galvão (2024) Portugal	Examining the role of peer feedback in enhancing student learning through peer assessment.	- Mixed (interviews, questionnaire) - Lower Secondary School - 20 students - All the subjects	Feedback enhanced student performance and was crucial for personal growth and autonomy, impacting self-regulation, motivation, responsibility, and resilience.

Next, Table 3 displays the results showing how teacher feedback impacts students' self-efficacy.

Table 3: Results of the impact of teacher feedback on the self-efficacy of secondary education learners

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Vattøy (2020) Norway	Investigating teachers' beliefs about the effects of feedback on self-regulation, language skills, and self-efficacy.	- Qualitative (interviews) - Lower Secondary School - 10 teachers - English as a foreign language	Teachers emphasize the crucial role of feedback in enhancing students' self-regulation and self-efficacy, viewing grades as an obstacle to learning.
Sherafati, Largani & Amini (2020) Iran	Investigating the effectiveness of teacher feedback on students' writing abilities and motivation.	- Experimental - Upper Secondary School - 60 students - English as a foreign language - Digital Media	There has been a significant improvement in writing skills and an increase in learner motivation.
Lestari, Saleh, Mujiyanto, & Yusuf (2020) Indonesia	This study examines the reading scores of a second-grade class in a public school and their relationship to students' self-efficacy.	- Mixed - Upper Secondary School - 34 students (6 male, 28 female) - All the subjects	Encouraging students and providing constructive feedback improves their self-efficacy and the quality of teaching and learning activities.
Zarrinabadi & Rezazadeh (2023) Iran	Analyzing the impact of feedback on writing motivation, self-efficacy in writing, and writing anxiety.	- Experimental - Upper Secondary School - 210 students (all female) - English as a second language	The groups that received feedback significantly improved their writing self-efficacy and motivation while also reducing writing anxiety.
Sherafati, & Mahmoudi Largani (2023) Iran	It examined how feedback implementation in writing lessons influenced students' writing performance, self-regulation, and self-efficacy.	- Experimental - Upper Secondary School - 42 students (all male) - English as a foreign language - Digital Media	The experimental group showed significant improvements in their performance on the writing test, as well as in self-regulation and self-efficacy scales.
Anderson, Chaparro, Smolkowski & Cameron (2023) USA	An investigation into a formative writing assessment exercise using feedback and grading rubric to enhance analytical skills and the personal meaning-making process in argument writing.	- Experimental Upper Secondary School - 270 students - Language - Digital Media	The implementation of the intervention improved both students' written argumentation skills and their self-efficacy.
Liao, Zhang, Wang & Luo (2024) China	Creating a visual reporting tool with artificial intelligence capabilities, utilizing feedback and conducting an empirical study to assess its effectiveness.	- Experimental - Upper Secondary School - 125 students - Biology	A significant interaction effect between intervention and time on learning performance and increased student self-efficacy was identified.

		- Digital Media	
Rulida, Cano & Andrin (2024) Philippines	Examining the relationship between non-cognitive skills and academic performance in students.	- Quantitative (questionnaire) - Upper Secondary School - 302 students (124 male, 178 female) - All the subjects	Giving feedback improves students' performance, increases their persistence, and boosts their self-confidence.

Table 4 displays the results of teacher feedback's impact on students' time management.

Table 4: Results of teacher feedback's effect on students' time management in secondary education

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Wilson & Czik (2016) USA	Examining the impact of feedback through PEG Writing® and Google on student motivation and writing quality.	- Experimental - Upper Secondary School - 110 students - Language - Digital Media	Giving feedback led to improved writing skills, enhanced student motivation, and time savings.
Oladipo & Oladejo (2020) Nigeria	Exploring the relationship between non-demographic teacher characteristics and student work ethic in learning outcomes.	- Quantitative (questionnaires) -Lower and Upper secondary school - 300 students - All the subjects	There is a significant relationship between teacher interactions, the frequency of feedback, the number of study hours, and student learning outcomes.
Liao, Zhang, Wang & Luo (2024) China	Development of an artificial intelligence-enabled visual reporting tool utilizing feedback and implementing an empirical study to evaluate its effectiveness.	- Experimental - Upper Secondary School - 125 students - Biology - Digital Media	A significant interaction effect between the intervention and time on learning performance and increased student self-efficacy was identified.

In conclusion, the research on learners' personal development, Table 5 illustrates the impact of teacher feedback on learners' resilience and persistence.

Table 5: Results of the impact of teacher feedback on students' resilience and persistence in secondary education

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Harks, Rakoczy, Hattie, Besser & Klieme (2014) Germany	Comparison of two types of written feedback: process-oriented and grade-oriented, on achievement, interest, self-assessment, and motivation changes.	- Experimental - Upper Secondary School - 146 students - Mathematics	Process-oriented feedback was found to be more valuable than grade-oriented feedback. This type of feedback positively influenced changes, achievement, student interest, and motivation.
Yildirim & Yildirim (2019) Turkey	Examining the impact of perceived feedback on students' self-confidence and anxiety levels.	- Quantitative (questionnaires) - Lower Secondary School - 4.848 students (2.376 male, 2,472 female) - Mathematics	Perceived feedback was positively related to mathematics self-concept and negatively related to mathematics anxiety, indicating an indirect effect.
Aben, Timmermans, Dingyloudi, Lara & Strijbos (2022) Netherlands	Examining how feedback absorption is connected to intrapersonal and interpersonal factors.	- Experimental - Upper Secondary School - 160 students - Language	Error tolerance was linked to feedback tolerance, and the feedback provider's perceived language skills positively influenced students' acceptance of feedback.
Zarrinabadi & Rezazadeh (2023) Iran	Investigating how feedback impacts writing motivation, self-efficacy in writing, and writing anxiety.	- Experimental - Upper Secondary School - 210 students (all female) - English as a second language	The groups that received feedback showed significant improvements in self-efficacy, writing motivation, and a reduction in writing anxiety.
Ye, Wang & Pan (2023) China	Examining the effect of feedback on adolescents' non-cognitive skills as assessed by a personality scale.	- Quantitative (questionnaires) - Upper Secondary School - 19.847 students - All the subjects	Feedback had a positive impact on extraversion, agreeableness, openness, and conscientiousness, while also significantly moderating neuroticism.
Asper, Faria, Serra & Galvão (2024) Portugal	Examining the role of peer feedback in enhancing student learning through peer assessment.	- Mixed (interviews, questionnaires) - Lower Secondary School - 20 students - All the subjects	Peer feedback enhanced student performance and played a vital role in personal development and autonomy, impacting self-regulation, motivation, responsibility, and resilience.
Rulida, Cano & Andrin (2024) Philippines	Examining the relationship between non-cognitive skills and academic performance in students.	- Quantitative (questionnaires) - Upper Secondary School - 302 students (124 male, 178 female)	Giving feedback improves students' performance, persistence, and self-confidence.

		- All the subjects	
Ng, Tan & Leung (2024) Hong-Kong	Examining the impact of self-regulated learning through feedback provided via the ChatGPT application on students' self-regulation.	- Experimental - Upper Secondary School - 74 students (41 male, 33 female) - Language - Digital Media	The intervention effectively improved students' scientific knowledge, behavioral engagement, and motivation, while reducing anxiety and enhancing learning performance.

Table 6 presents the findings on the role of teacher feedback in promoting learners' social development.

Table 6. Impact of Teacher Feedback on Learners' Social Development in Secondary Education

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Ye, Wang & Pan (2023) China	Analysis of how feedback affects adolescents' non-cognitive skills, as measured by a personality scale.	- Quantitative (questionnaire) - Upper Secondary School - 19.847 students - All the subjects	Feedback positively influenced extraversion, agreeableness, openness, and conscientiousness, significantly moderating neuroticism.
Hussain, S., Ahmed, Ahmad, Ghani & Ahmad (2023) Egypt	Investigate the impact of positive teaching behaviors and feedback on students' social intelligence.	- Quantitative (questionnaire) - Upper Secondary School - 452 students - All the subjects	Positive teaching behaviors and feedback from teachers enhanced students' social intelligence.

Tables 7 and 8 present results that emphasize the importance of teacher feedback in shaping attitudes and mindsets in secondary school students. This feedback plays a significant role in enhancing students' motivation and sense of responsibility. Due to the extensive number of research studies, Table 7 includes those that employed experimental methods, while Table 8 showcases studies that utilized quantitative, qualitative, or mixed research approaches.

Table 7: Results of the impact of teacher feedback on improving students' motivation and responsibility in secondary education (experimental methods)

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Harks, Rakoczy, Hattie, Besser & Klieme (2014) Germany	A comparison of two types of written feedback: process-oriented and grade-oriented on changes in achievement, interest, self-assessment, and motivation.	- Experimental - Upper Secondary School - 146 students - Mathematics	Process-oriented feedback was considered more valuable than grade-oriented feedback. This type of feedback positively influenced changes in student achievement, interest, and motivation.
Erturan-Ilker (2014) Turkey	Examining the impact of positive and negative teacher feedback on students' perceived motivational climate and performance goals.	- Experimental - Upper Secondary School - 47 students - Physical Education	Achievement goals for mastery and performance approaches increased. Perceptions of mastery motivation rose, while performance-avoidance motivation decreased.
Wilson & Czik (2016) USA	Exploring the influence of providing feedback through PEG Writing® and GoogleDocs on students' motivation and writing quality.	- Experimental - Upper Secondary School - 110 students - Language - Digital Media	Feedback led to improved writing skills, greater learner motivation, and more efficient use of time.
Bondarenko (2017) Russia	Examining the effects of feedback and positive and negative emotions on the self-regulation of experimental tasks and academic achievement.	- Experimental - Lower Secondary School - 88 students - All the subjects - Digital Media	Feedback is crucial for enhancing motivation and achieving goals, particularly for students with low to medium self-regulation skills.
Sherafati, Largani & Amini (2020) Iran	Investigating the effectiveness of teacher feedback on students' writing abilities and motivation.	- Experimental - Upper Secondary School - 60 students - English as a Foreign language - Digital Media	There has been a significant improvement in writing skills and an increase in the motivation of learners.
Zarrinabadi & Rezazadeh (2023) Iran	Investigating how feedback influences writing motivation, self-efficacy in writing, and writing anxiety.	- Experimental - Upper Secondary School - 210 students (all female) - English as a Second language	The groups that received feedback showed significant improvements in writing self-efficacy, motivation, and a reduction in writing anxiety.

Steiss, Tate, Graham, Cruz, Hebert, Wang & Olson (2024) USA	This study explored ChatGPT's capacity to offer formative feedback and compared the quality of feedback from humans and artificial intelligence.	- Experimental - Lower Secondary School - 200 students - Language - Digital Media	Using artificial intelligence to provide feedback enhances writing instruction, increases student motivation, and helps teachers manage large classes more effectively.
Ng, Tan & Leung (2024) Hong-Kong	Examining the impact of self-regulated learning with feedback from the ChatGPT application on students' self-regulation.	- Experimental - Upper Secondary School - 74 students (41 male, 33 female) - Language - Digital Media	The intervention significantly improved students' scientific knowledge, engagement, and motivation, while also reducing anxiety and enhancing learning performance.

Table 8: Results of teacher feedback on enhancing students' motivation and responsibility in secondary education (qualitative and mixed methods)

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Zeichner (2018) Israel	This study explores how different types of feedback affect student coping variables, specifically sense of threat and challenge, self-efficacy, and academic achievement.	- Mixed - Upper Secondary School - 171 students - All the subjects - Digital Media	The groups that received non-cognitive feedback demonstrated increased motivation, a stronger sense of challenge, and better achievement compared to the group that only received content feedback.
Kutluca, Tum & Mut (2020) Turkey	The exploration of the learning process is enhanced by incorporating diverse teaching methods and feedback, particularly in the area of mathematical reasoning.	- Qualitative - Lower Secondary School - 23 students (13 male, 10 female) - Mathematics	This learning environment has increased student participation, facilitated practical and enduring learning experiences, encouraged the use of mathematical reasoning skills, and fostered a positive attitude toward the lessons.
Suharyanti & Fauziati (2020) Indonesia	The investigation examined how different types of corrective feedback in teaching retelling writing influenced students' motivation to write retelling texts.	- Qualitative (interviews) - Lower Secondary School - 20 students - English as a Foreign language - Digital Media	Various forms of corrective feedback have distinct impacts on students, leading to differences in their motivation. Overall, the provision of corrective feedback has been shown to enhance students' motivation for writing retelling texts.
Ha, Murray & Riazi (2021)	Investigating students' perceptions of verbal corrective feedback and how	- Mixed (questionnaire, interviews)	Students expressed optimism about the provision of verbal corrective feedback.

Vietnam	individual differences influence these perceptions.	- Lower Secondary School - 250 students - English as a Foreign language	Female students were more positively inclined and motivated compared to male students.
Escultura & Mejico (2023) Philippines	Examining how audio feedback in online assessments impacts students' motivation.	- Mixed (experimental, interviews) - Upper Secondary School - 49 students - Language - Digital Media	There was no significant difference in academic motivation among students before and after the implementation of audio feedback on their online assessments, indicating consistently high levels of academic motivation throughout the experiment.
Asper, Faria, Serra & Galvão (2024) Portugal	Examining the role of peer feedback in enhancing student learning during peer assessment.	- Mixed (interviews, questionnaire) - Lower Secondary School - 20 students - All the subjects	Peer feedback enhanced student performance and played a key role in personal development and autonomy, affecting self-regulation, motivation, responsibility, and resilience.
Sandal & Sperle (2024) Norway	Examining assessment experiences and practices from the students' perspective.	- Qualitative (interviews) - Upper Secondary School - 20 students - Mathematics	Students receive primarily summative feedback regarding their achievement through grades. Providing constructive feedback boosts motivation and promotes higher achievement.

Finally, Tables 9 and 10 present results about the impact of teacher feedback on two important areas: the cultural development of learners and the fostering of a learning strategy mindset.

Table 9: Results of the impact of educational feedback on the cultural development of secondary school students

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Ye, Wang & Pan (2023) China	An analysis of how feedback impacts an adolescent's non-cognitive skills, as measured by a personality scale.	- Quantitative (questionnaire) - Upper Secondary School - 19.847 students - All the subjects	Feedback positively influenced extraversion, agreeableness, openness, and conscientiousness, significantly reducing their neuroticism.
Hussain, S., Ahmed, Ahmad, Ghani & Ahmad (2023) Egypt	Examine how positive teaching behaviors and the provision of feedback impact students' social intelligence.	- Quantitative (questionnaire) - Upper Secondary School - 452 students - All the subjects	Positive teaching behaviors and the provision of feedback by teachers improved students' social intelligence.

Table 10: Results of the impact of educational feedback on the development of learning strategies mindset in secondary school student

Researchers **Year** **Country**	**Purpose of research**	**Type of research** **Sample size** **Subject**	**Results**
Demirbilek (2015) Turkey	Investigating students' real-world experiences and perceptions of using Facebook and Wiki environments as tools for peer feedback.	- Mixed (questionnaire, interviews) - Upper Secondary School - 51 students - All the subjects - Digital Media	Feedback on Wiki and Facebook enhanced students' critical thinking skills and improved the quality of their work.
Wilson & Czik (2016) USA	Examining the impact of feedback using PEG Writing® and Google Docs on students' motivation and writing quality.	- Experimental - Upper Secondary School - 110 students - Language - Digital Media	Giving feedback led to improved writing skills, higher student motivation, and time savings.
Kutluca, Tum & Mut (2020) Turkey	Using various teaching methods and feedback enhances the exploration of mathematical reasoning.	Qualitative - Lower Secondary School - 23 students (13 male, 10 female) - Mathematics	The learning environment enhanced student participation, provided practical and lasting knowledge, encouraged the use of mathematical reasoning skills, and

			cultivated a positive attitude towards the lessons.
Lui & Andrade (2022) USA	Examine how students comprehend and utilize formative feedback for future steps.	- Mixed - Lower Secondary School - 93 students (41 male, 52 female) - Language	Students tend to have positive emotions and judgments about teacher feedback and make controlled attributions. Their emotions, judgments, meaning-making, and attributions are all connected to the feedback received.
Chi & Wang (2023) China	It examines how feedback from teachers and peers impacted students' practical scientific inquiry skills over time.	- Experimental - Lower Secondary School - 188 students - All the subjects	Both feedback forms greatly enhance students' practical scientific inquiry skills, fostering a positive culture.
Anderson, Chaparro, Smolkowski & Cameron (2023) USA	An examination of a formative writing assessment exercise utilizing feedback and a grading rubric to evaluate analytical skills and the personal meaning-making process in argument writing.	- Experimental - Upper Secondary School - 270 students - Language - Digital Media	The implementation of the intervention improved both students' written argumentation skills and their self-efficacy.

All selected studies were sourced from journal articles. The majority of these studies were published in the years 2023 (n=8), 2024 (n=7), and 2020 (n=6), followed by 2022 (n=3) and 2017 (n=2). One study included data from the years 2014, 2015, 2016, 2018, 2019, and 2021. Geographically, more than half of the studies were conducted in Asia (n=19, 57.7%), followed by Europe (n=8, 24.1%), America (n=4, 12.1%), and Africa (n=2, 6.1%). The studies were predominantly located in Turkey (n=4), the USA (n=4), China (n=4), and Iran (n=3). Other countries represented include Indonesia (n=2), Germany (n=2), Russia (n=2), the Philippines (n=2), and Norway (n=2). Additionally, there was one study recorded for each of the following countries: Israel, Nigeria, Vietnam, the Netherlands, Egypt, Singapore, Portugal, and Hong Kong. In terms of study types, the majority were experimental (n=14, 42.4%), followed by mixed-methods (n=9, 27.3%), quantitative (n=6, 18.2%), and qualitative studies (n=4, 12.1%).

In the sample, most studies included between 101 and 500 participants (n=15, 45.4%). This was followed by studies with sample sizes of 31 to 50 participants (n=6, 18.2%), 51 to 100 participants (n=5, 15.1%), and 11 to 30 participants (n=4, 12.1%). Additionally, two studies had sample sizes larger than 500 participants (n=2, 6.1%), while one study included just 1 to 10 participants (n=1, 3.0%). In terms of study types, experimental studies had participant ranges from 42 to 270; mixed methods studies involved 20 to 250 participants; quantitative studies ranged from 300 to 19,847 participants; and qualitative studies included 10 to 23 participants.

Figure 2: Results of the contribution of feedback to students' non-cognitive skills in secondary education

The data analysis indicated that the impact of feedback on the non-cognitive skills of secondary education learners has primarily been studied across all subjects, accounting for 36.3% of the total (n=12). The next most researched areas were the humanities, particularly in the subjects of Language (27.3%, n=9), English as a foreign language (15.3%, n=5), and English as a second language (3%, n=2). Additionally, some research was found in Mathematics (12.1%, n=4) and the subjects of Biology (3%, n=1) and Physical Education (3%, n=1). Regarding the demographic distribution of survey participants, twenty-four out of thirty-three surveys (72.7%) did not provide information on the gender composition of their sample. The remaining nine surveys (27.3%) included details about the proportions of men and women. Notably, two surveys focused exclusively on either men or women. Furthermore, thirteen surveys (39.4%) incorporated online, digital, and electronic media and tools. Figure 2 illustrates the contribution of feedback to learners' personal development in secondary education.

6. Discussion of the research results

From 2014 to 2024, research on the contribution of teacher feedback to the non-cognitive skills of secondary school students in Greece is nonexistent compared to the international landscape (n=33). The majority of studies are located in Asia (n=19), followed by Europe (n=8), with fewer studies in America (n=4) and Africa (n=2). Among the countries, Turkey, the USA, and China each recorded the most research (n=4), followed by Iran (n=3). Most research adopted an experimental design (n=14), followed by mixed methods (n=9), quantitative (n=6), and qualitative approaches (n=4). The sample sizes across the studies varied, with the majority including between 101 and 500 participants (n=15). Some studies had samples of 31 to 50 participants (n=5) and 11 to 30 participants (n=4). In experimental studies, sample sizes ranged from 42 to 270 participants. In mixed-method studies, the sizes varied from 20 to 250 participants, while quantitative studies had sample sizes ranging from 300 to 19,847 participants. Regarding the subjects covered, most studies addressed all subjects combined (n=12), followed by Language (n=9), English as a foreign or second language (n=6), and Mathematics (n=4). There were also studies focusing on Biology (n=1) and Physical Education (n=1). Additionally, thirteen studies incorporated online, digital, or electronic media. Notably, twenty-four studies did not provide information on the gender distribution of participants, while two studies exclusively included either men or women in their samples.

Research on the impact of teacher feedback on the personal development of secondary school students reveals a variety of important and insightful findings. Most studies indicate that offering diverse types of feedback positively influences students' self-regulation and empowers those who typically demonstrate lower levels of conscious self-regulation (Harks *et al.*, 2014; Bondarenko, 2017; Bondarenko & Morosanova, 2017; Vattøy, 2020; Sherafati *et al.*, 2020; Zhang *et al.*, 2022; Sherafati *et al.*, 2023; Yong & Sokumaran, 2023; Asper *et al.*, 2024). These findings are consistent with previous research in this area (Black & Wiliam, 1998; Hattie & Timperley, 2007). Furthermore, numerous

studies highlight the significant benefits of teacher feedback in enhancing students' sense of self-esteem and self-efficacy (Vattøy, 2020; Sherafati *et al.*, 2020; Lestari *et al.*, 2020; Zarrinabadi & Rezazadeh, 2023; Sherafati *et al.*, 2023; Anderson *et al.*, 2023; Liao *et al.*, 2024; Rulida *et al.*, 2024). These findings align with key earlier research, including studies by Jonsson (2013), Wisniewski *et al.* (2020), and Haughney *et al.* (2020).

An exciting finding from the literature is the recognition of the significant impact of teacher feedback on enhancing students' resilience (Harks *et al.*, 2014; Yildirim & Yildirim, 2019; Aben *et al.*, 2022; Zarrinabadi & Rezazadeh, 2023; Ye *et al.*, 2023; Asper *et al.*, 2024; Ng *et al.*, 2024; Rulida *et al.*, 2024). These findings align with previous research in the same area (Black & Wiliam, 1998; Pekrun *et al.*, 2005; Yeager & Dweck, 2012; Smithers *et al.*, 2018). Feedback is also a critical factor in fostering a positive mindset and improving students' time management skills (Wilson & Czik, 2016; Oladipo & Oladejo, 2020; Liao *et al.*, 2024). Additionally, it plays a vital role in enhancing students' resilience and perseverance (Harks *et al.*, 2014; Aben *et al.*, 2022; Asper *et al.*, 2024; Rulida *et al.*, 2024). These results reinforce the theories and conclusions drawn from important earlier studies (Hattie & Timperley, 2007; Hahn *et al.*, 2021; Dweck, 2006; Yeager & Dweck, 2012).

Numerous studies have highlighted the various benefits of feedback in enhancing learners' emotional intelligence. Key aspects of this enhancement include improved understanding and management of emotions, greater self-awareness, and increased empathy (Harks *et al.*, 2014; Zeichner, 2018; Yildirim & Yildirim, 2019; Kutluca *et al.*, 2020; Aben *et al.*, 2022; Zhang *et al.*, 2022; Lui & Andrade, 2022; Ye *et al.*, 2023; Chen *et al.*, 2024). These findings are consistent with earlier theoretical frameworks (Black & Wiliam, 1998; Pekrun *et al.*, 2005; Hattie & Timperley, 2007; Li *et al.*, 2021). However, it is important to note that one study indicated that teacher feedback did not significantly impact students' learning satisfaction (Zhang *et al.*, 2022). This underscores the necessity of considering the approach and manner in which feedback is delivered within the learning environment.

In the realm of students' social development, two studies revealed the positive effects of feedback on students' extraversion, enhancing their ability to communicate and interact (Ye *et al.*, 2023; Hussain *et al.*, 2023). Feedback also improved students' social intelligence, which encouraged their capacity to understand and manage social situations (Hussain *et al.*, 2023). These findings align with the research by Laici and Pentucci (2019), who reported similar positive effects of feedback on students' social development. However, it is notable that no studies were found that specifically examined the effects of feedback on promoting cooperation and resolving conflicts among students.

Research on the development of attitude mindsets in learners indicates that various types of feedback—such as teacher feedback, peer feedback, non-cognitive feedback, and electronic feedback through artificial intelligence—significantly influence students' motivation. This impact is especially evident among students with low to moderate self-regulation skills (Harks *et al.*, 2014; Erturan-Ilker, 2014; Wilson & Czik, 2016; Bondarenko, 2017; Zeichner, 2018; Kutluca *et al.*, 2020; Sherafati *et al.*, 2020; Suharyanti & Fauziati, 2020; Ha *et al.*, 2021; Zarrinabadi & Rezazadeh, 2023; Steiss *et al.*,

2024; Asper *et al.*, 2024; Ng *et al.*, 2024; Sandal & Sperle, 2024). These findings align with similar studies (Hulleman & Harackiewicz, 2009; Dweck, 2006; Yeager & Dweck, 2012; Badrun, 2024; Cen & Zheng, 2024). However, one study reported no significant change in students' motivation before and after the implementation of audio feedback in their online assessments (Escultura & Mejico, 2023). Additionally, another study highlighted the positive impact of teacher feedback on enhancing students' sense of responsibility (Asper *et al.*, 2024), which is consistent with findings from Hattie and Timperley (2007). Notably, there have been no studies examining the effect of teacher feedback on students' integrity.

In the cultural development of learners, a limited number of studies have shown that providing feedback plays a significant role in its improvement. Specifically, a positive effect was recorded on various aspects of cultural awareness, such as the transparency and conscientiousness of learners (Ye *et al.*, 2023; Asper *et al.*, 2024). Furthermore, feedback significantly strengthened learners' active social role while promoting their social intelligence (Hussain *et al.*, 2023). These findings align with the conclusions of more recent research (Eriksson *et al.*, 2020; Gálvez-López, 2023).

Research highlights the critical role of feedback in developing students' learning strategies and enhancing their critical skills. Specifically, studies have shown that feedback significantly improves students' critical thinking abilities, allowing them to analyze, evaluate, and interpret information with greater accuracy and depth (Demirbilek, 2015; Lui & Andrade, 2022; Chi & Wang, 2023; Anderson *et al.*, 2023). Additionally, feedback serves as a catalyst for creativity, enabling learners to generate original ideas and solve problems in innovative ways (Wilson & Czik, 2016; Kutluca *et al.*, 2020; Lui & Andrade, 2022; Chi & Wang, 2023). Moreover, feedback contributes to enhancing written argumentation by equipping students with tools to present evidence-based and persuasive opinions (Anderson *et al.*, 2023). It particularly strengthens their ability to conduct practical scientific research, fostering a connection between theory and practice and supporting the development of investigative thinking (Chi & Wang, 2023). These findings align with both previous and recent research, confirming the ongoing significance of feedback as an educational support tool (Black & Wiliam, 1998; London, 2014; Hattie & Clarke, 2019). However, it is important to note that no research has examined the effect of feedback on learners' metacognitive skills.

7. Conclusions - Suggestions for further research

Teacher feedback plays a crucial role in the overall personal development of students in secondary education, as indicated by a wide range of studies. Research particularly shows that providing feedback in various forms significantly enhances students' self-regulation, which helps develop their organizational and internal control skills. Students with low levels of self-regulation benefit the most, demonstrating that feedback can serve as a supportive and empowering mechanism. This finding aligns with previous research.

Additionally, feedback boosts self-esteem and self-efficacy, both of which are vital for students' psychological well-being.

An exciting finding is the link between feedback and enhanced mental resilience. Feedback equips students with the tools to confront challenges positively, fostering resilience. Additionally, it contributes to the development of a positive mindset and effective time management strategies, which help students meet the demands of their educational environment. These benefits are closely associated with improved persistence and resilience among students, reinforcing theoretical approaches that emphasize the importance of continuous feedback in the learning process.

Furthermore, feedback is crucial for developing emotional intelligence and improving self-awareness, empathy, and emotional management skills. Students who receive ongoing and high-quality feedback are better equipped to understand their emotions, and their interpersonal communication skills tend to improve. While these findings are consistent with earlier theoretical frameworks, some research indicates that feedback, when not implemented effectively, may not significantly enhance learning satisfaction.

Research on social development indicates that feedback plays a significant role in promoting extraversion and enhancing social intelligence. This improvement boosts students' ability to understand and manage social interactions, particularly in their communication skills and their effectiveness in interacting with peers and teachers. However, there is a notable lack of studies examining how feedback influences collaboration and conflict resolution, highlighting a gap in the existing literature.

Developing learner mindsets and attitudes is one of the most extensively studied areas in feedback research. Most studies indicate that various types of feedback can positively impact student motivation, particularly for those with low or medium levels of self-regulation. This underscores the importance of tailoring feedback to meet the needs of each student. However, there are some contradictory findings. For instance, one study found that implementing audio feedback on online assessments did not significantly improve student motivation. This suggests that the method and content of feedback, as well as its effective integration into educational practices, are crucial. Additionally, research has shown that feedback plays an important role in enhancing student responsibility. This effect aligns with the conclusions of previous studies, reinforcing the idea that feedback can help shape positive behaviors and attitudes. However, there is a notable lack of research on how feedback contributes to the development of students' integrity. This gap in the literature indicates a need for further investigation, as integrity is a fundamental value for personal and social development.

Cultural development is a key area where feedback has a significant impact. It improves students' cultural awareness, transparency, and sense of responsibility, while also helping to shape a more active social identity. These insights align with recent studies that highlight the importance of the cultural dimension in contemporary educational practices.

Feedback enhances essential skills such as critical thinking, creativity, and written argumentation within learning strategies. Through feedback, students improve their ability to analyze, evaluate, and interpret information while also gaining important scientific research tools. These skills not only support their academic progress but also help them apply theoretical concepts to practical situations. However, the impact of feedback on metacognition remains underexplored, indicating a need for further research in this area.

Feedback is an essential and invaluable educational support tool that positively impacts the learning process in multiple ways. To maximize its effectiveness, it is crucial to focus on the quality of feedback and tailor it to meet the individual needs of students. While existing research highlights the benefits of feedback, there are still significant gaps in the literature. Specifically, the effects of feedback on fostering cooperation, resolving conflicts, developing students' moral integrity, and enhancing metacognitive skills have not been thoroughly explored. These areas provide important opportunities for future research. Additionally, it would be beneficial to investigate how teacher feedback influences the development of non-cognitive skills in primary education. Such studies could deepen our understanding of how feedback contributes to the holistic development of learners.

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