

Resistance to learning: reasons and remedies via a qualitative research synthesis

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ABSTRACT

This literature review aims to synthesize the factors behind resistance to learning and proposes evidence-based strategies to address them, drawing on two decades of peer-reviewed research. Using a systematic qualitative review, thematic analysis with MAXQDA software identified six categories of resistance causes: psychological, sociocultural, educational, personal, cognitive, and environmental. The study underscores the intricate relationship between individual and contextual influences on learning. It advocates for a comprehensive strategy that fosters growth mindsets, active learning, and emotional and cognitive support within inclusive environments. These approaches aim to meet diverse learner needs, enhancing engagement and effectiveness. The research underscores the critical role of adaptable, inclusive educational practices in reducing resistance and boosting success. Educators, policymakers, and designers are called for a united effort to foster a conducive learning environment by thoroughly understanding learning resistance complexities and evidence-based interventions. The novelty of this study lies in combining issues of learning resistance with research-based solutions in one scholarly piece. It provides valuable insights to enhance teaching and learning, emphasizing the importance of adaptive, inclusive, and supportive educational practices to mitigate resistance and achieve improved educational outcomes.

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1. INTRODUCTION

Resistance to learning refers to the reluctance or opposition individuals often display towards engaging with the learning process, extensively documented across various studies [1]. This reluctance arises from personal, emotional, cognitive, and environmental factors, complicating the phenomenon. Notably, cognitive dysfunctions, such as impairments in visuospatial and verbal learning/memory, are significant obstacles [2], [3], while environmental and contextual factors like living situations and past experiences affect self-regulation [4].

The indicators of resistance to learning range from passive behaviors like absenteeism and disinterest in coursework to overt resistance, impacting student and educator success in active learning environments [5], [6]. Identifying these indicators is essential for understanding resistance causes and developing effective mitigation strategies. For example, inconsistencies in e-learning activities reveal insights into the nature and influence of the learning environment on resistance levels [7].

Addressing resistance effectively requires interventions considering self-efficacy, innovation resistance, and stakeholder involvement in educational improvements [8]–[11]. Tailoring these interventions to the learners' psychological, sociocultural, academic, and environmental contexts enhances their efficacy. Strategies like reframing resistance as a diagnostic tool and considering the impact of sociocultural and environmental factors on learning processes are vital for a holistic approach [12]–[14].

Psychological, sociocultural, educational, personal, cognitive, and environmental factors influence resistance to learning [15]–[19]. By recognizing and addressing these elements, educators can develop strategies that adapt teaching methods, leverage leadership, and design interventions tailored to diverse learner needs [20], [21], thus mitigating resistance and promoting educational success.

This study synthesizes insights from related research to explore the multifaceted nature of learning resistance, categorizing underlying causes and proposing strategies for effective mitigation to improve educational outcomes. The central research question asks: What are the reasons for resistance to learning, and what evidence-based strategies can be employed to mitigate these challenges effectively? Through this inquiry, the study aims to provide a comprehensive understanding and actionable solutions to overcome resistance to learning.

2. RESEARCH METHOD

2.1. Methodology explained

The methodological choices of this study, including a systematic literature review, content analysis, and a qualitative approach, are integral to its objectives and the nature of the data analyzed. A systematic literature review is utilized for its structured method of compiling and synthesizing relevant studies, providing a broad, unbiased overview of resistance to learning [22]. Content analysis helps examine textual data through themes, codes, and subcodes, effectively identifying and quantifying patterns and relationships within the data to uncover the contexts and mechanisms behind learning resistance [23]. This method excels in distilling large volumes of qualitative data into more straightforward, interpretable forms while preserving the complexity of the content [24]. The qualitative nature of the study focuses on phenomena in their real-world settings to understand how individuals perceive and interpret their experiences. This interpretive approach uses detailed narrative data to reveal the diverse and intricate reasons behind resistance to learning, which quantitative methods may not capture [25]. These methodologies collectively deepen our understanding of the multifaceted nature of learning resistance, aiding in developing effective strategies to address it.

2.2. The analysis and synthesis process

In this study, the selection of sources was a critical step in ensuring the credibility and relevance of the analysis regarding factors inducing resistance to learning and strategies to address them. The methodology for selecting sources was meticulous and followed a series of predefined criteria. This was to ensure that only pertinent and high-quality journal articles were included.

2.2.1. Identification of initial source pool

The researchers began by identifying an initial pool of sources through database searches. They used keywords related to resistance to learning, educational psychology, sociocultural factors in education, and pedagogical strategies. Databases such as Scopus, PubMed, PsycINFO, ERIC, and Google Scholar were searched to ensure a comprehensive collection of potential articles.

2.2.2. Application of inclusion and exclusion criteria

Once the initial pool of articles was gathered, the researchers applied a set of inclusion and exclusion criteria to refine the selection. The inclusion criteria specified that the articles must be published in the English language; be published in peer-reviewed journals, ensuring the reliability of the findings; focus on resistance to learning, including psychological, sociocultural, personal, emotional, cognitive, neurological, and environmental factors; discuss strategies, interventions, or approaches to mitigate resistance to learning and; be published within a specific timeframe, typically the last two decades, to ensure the relevance of the data.

The exclusion criteria were as follows: The researchers removed articles that were not published in English, were not published in peer-reviewed journals, did not directly address resistance to learning or strategies to overcome it, were purely theoretical without empirical evidence, or were unavailable in full-text or accessible through the institution's subscriptions. This process reduced the initial pool of articles to approximately one-third.

2.2.3. Quality assessment

Following the application of inclusion and exclusion criteria, the remaining articles underwent a quality assessment process. This step involved evaluating the methodological rigor, the relevance of the findings to the research questions, and the impact of the studies based on citations and recognition in the field. Articles that did not meet the quality standards were excluded from further consideration.

2.2.4. Final selection

The final selection of sources was based on articles that passed the inclusion and exclusion criteria and the quality assessment process. This selection ensured a focused and relevant dataset for analysis. The chosen articles were believed to contribute significantly to understanding the factors bringing about resistance to learning and offering evidence-based strategies to address them.

2.2.5. Categorization and analysis

With the final set of articles selected, researchers categorized them based on central themes and sub-themes from the preliminary analysis. This allowed a detailed examination of the discussed factors and strategies, facilitating a nuanced understanding of resistance to learning. The meticulous selection process was crucial to the study's methodology, ensuring that only relevant, high-quality articles were included. This enabled the researchers to draw comprehensive and reliable conclusions about the contributing factors to learning resistance and effective mitigation strategies.

2.2.6. Qualitative analysis process

The MAXQDA software facilitated a comprehensive qualitative analysis, enabling researchers to systematically organize, analyze, and interpret qualitative data. The process to obtain results involved several stages, from data collection to analysis, coding, and reporting. Here is the outline of the MAXQDA qualitative analysis process;

Data collection and preparation: The initial step involved gathering relevant qualitative data from published journal articles about factors inducing resistance to learning and strategies to address them. Once collected, the data from these articles was prepared for analysis. This involved organizing the articles and ensuring all data was in a format compatible with MAXQDA.

Data importation into MAXQDA: the prepared data from the articles was imported into MAXQDA. The software's support for various data types made it versatile for analyzing qualitative research projects. Data was then organized within MAXQDA. Researchers created a project structure that categorized data sources according to a thematic focus on the articles' theoretical framework.

Initial engagement with the data: researchers began by familiarizing themselves with the articles' content, reading through texts, and noting initial impressions, themes, and patterns. Preliminary codes representing key concepts or themes were applied to data segments. These initial codes were often descriptive, capturing the essence of the data segment.

Coding and categorization: As researchers explored the data more deeply, they refined their codes, merging similar codes, subdividing broader codes, and discarding irrelevant ones. This iterative process helped in refining the data into significant themes and sub-themes. The codes were grouped into categories and themes that reflected the main research questions, including psychological and sociocultural factors.

Analysis and interpretation: MAXQDA's analytical tools explored the coded data, identified patterns, and established relationships between themes. Queries and visual tools helped identify the frequency of codes, compare themes across different articles, and visualize data relationships. The analysis aimed to interpret the data's meaning, understand how and why specific factors induced resistance to learning, and identify effective strategies to address them. This involved contextualizing findings within existing literature and theoretical frameworks.

Reporting: synthesis: the findings were synthesized into a coherent narrative, given in Table 1 (see in Appendix). This included detailing the main themes and sub-themes, the number of references supporting each theme, and the actual references from the analyzed articles. **Visualization:** MAXQDA offers various tools for data visualization, such as code matrices, code maps, and thematic networks, which were used to enhance the presentation of findings. **Documentation:** the final step involved compiling the analysis into a comprehensive academic article detailing the methodology, analysis process, findings, results, discussion, and conclusions. The report included references to the actual journal articles analyzed, ensuring transparency and reproducibility of the research. **Reflection:** throughout the analysis, researchers continually reflected on their findings, methodology, and the software's role in shaping their analysis. This reflective practice ensured the research remained grounded in the data and aligned with the study's objectives. **Iteration:** qualitative analysis is often an iterative process. Based on initial findings, researchers returned to earlier stages to refine their codes, revisit articles, and usually explore alternative interpretations.

Summary table: various factors contribute to resistance to learning across psychological, sociocultural, educational, personal, cognitive, and environmental dimensions, which are portrayed in Table 1, the summary table. It also offers diverse strategies to address these barriers, grounded in empirical research. The references span a broad temporal range and originate from various academic disciplines, highlighting the multidisciplinary nature of learning resistance and the multifaceted approaches required to overcome it. This analysis underscores the importance of a holistic and nuanced understanding of learning resistance and the need for adaptive, inclusive, and supportive educational practices.

2.3. Findings

The findings of the qualitative analysis are summarized in Table 1, which portrays a structured summary of qualitative research findings related to resistance to learning and strategies for overcoming these barriers. It categorizes the findings into central themes, codes, and sub-codes, then lists the references supporting these findings and the actual references. Here is a brief discussion of Table 1, which will depict each main theme, the factors contributing to resistance to learning identified within those themes, and the proposed ways to address these issues.

2.3.1. Psychological factors

Factors in play: The psychological barriers to learning identified include fear, anxiety, lack of confidence, stress, technophobia, fixed mindsets, and challenges specific to online learning. Nine references from 2012 to 2021 support these factors, indicating a broad consensus on learners' psychological hurdles. Such hurdles significantly obstruct learning by creating emotional blockages, reducing the capacity to absorb new information, and creating a negative attitude toward learning experiences.

Ways to address the barriers: Strategies to mitigate psychological barriers emphasize promoting growth mindsets, implementing active learning methods, understanding the psychological aspects of learning, encouraging resilience and intrinsic motivation, and creating supportive learning environments. These solutions are grounded in eight references from 2015 to 2023. They suggest a focus on empowering learners through mental framework adjustments and supportive educational practices.

2.3.2. Sociocultural factors

Factors in play: sociocultural influences on learning resistance include cultural and social influences, socioeconomic status, family influence, social norms, peer feedback, language barriers, culture, self-efficacy, and psychological needs. Eleven references from 2007 to 2022 highlight the complex interplay between learners' backgrounds and learning processes. They underscore the importance of understanding learners' sociocultural contexts.

Ways to address the barriers: the analysis suggests inclusive and adaptive teaching methods, family and community engagement, socioeconomic support programs, cultural sensitivity training for educators, promoting growth mindsets, and addressing language barriers as effective approaches to overcoming sociocultural barriers. Six references from 2011 to 2022 support these strategies. They indicate the importance of adaptive and inclusive educational practices that respect and leverage learners' diverse backgrounds.

2.3.3. Factors related to the educational environment

Factors in play: this theme identifies ambiguity in curriculum and teaching methods, workload concerns, challenges in the teaching environment, resistance to new teaching approaches, distance learning challenges, digital competencies, self-organization, and cultural resistance among staff as barriers. Five references from 2020 to 2021 suggest that the educational environment can be a significant source of learning resistance. This will particularly happen when the educational environment fails to align with learners' needs or adapt to evolving educational landscapes.

Ways to address the barriers: strategies for addressing these barriers include clarifying curriculum and teaching methods, managing workload, providing a supportive teaching environment, familiarizing with new approaches, supporting distance learning, enhancing digital competencies, and addressing cultural resistance. The five references indicate that educational design and delivery improvements significantly reduce learning resistance.

2.3.4. Personal and emotional factors

Factors in play: personal and emotional factors include student appraisals of the social environment, emotional design of learning materials, negative emotional states, impact on vocabulary learning and text comprehension, inflation of judgments of learning, external emotion-inducing methods, emotional presence in learning environments, and induced emotions in specific contexts. Nine references from 2012 to 2022

highlight the critical role of emotions in learning processes. They suggest that emotional factors may hinder or facilitate learning.

Ways to address the barriers: eight references support these strategies. They underscore the importance of emotional intelligence in learning. They propose solutions for enhancing the emotional design of learning materials, creating supportive learning environments, improving self-efficacy, promoting emotional intelligence and resilience, addressing past negative experiences, and positively utilizing external emotion-inducing methods.

2.3.5. Cognitive and neurological factors

Factors in play: this category includes dietary habits and cognitive function, hypercholesterolemia, oxidative stress, inhibition of CREB/Nrf2 signaling pathway, traumatic brain injury (TBI), neurogenesis in the dentate gyrus, neurodiversity, and cognitive overload as factors influencing resistance to learning. Eleven references from 2011 to 2022 explain this phenomenon. They suggest that cognitive and neurological health plays a fundamental role in learning capacity and resistance.

Ways to address the barriers: diet and nutrition education, managing oxidative stress, supporting neurological health, tailoring educational approaches to individual needs, reducing cognitive overload, and creating inclusive environments are suggested strategies. Seven references explain the ways to address cognitive and neurological factors. These resources collectively suggest a holistic approach to health and education.

2.3.6. Environmental and contextual factors

Factors in play: Contextual variations, implicit learning mechanisms, organizational culture and industry influences, environmental stressors, the physical learning environment, the digital divide, global events, and the psychosocial learning environment are identified as barriers. Eleven references from 1998 to 2022 demonstrate the wide range of external factors that affect learning. They highlight the need for adaptive and responsive educational strategies.

Ways to address the barriers: Proposed solutions include leveraging contextual variations, enhancing implicit learning, cultivating supportive organizational cultures, mitigating environmental stressors, optimizing the physical learning environment, bridging the digital divide, adapting to global events, and improving the psychosocial environment. Eleven references support these strategies. They emphasize the importance of a flexible and context-aware approach to education.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Psychological factors

Psychological barriers to learning encompass a range of factors that hinder students' ability to engage effectively in their educational journeys. These barriers, including fear, anxiety, lack of confidence, and resistance to new learning methods, significantly impact students' motivation, engagement, and overall academic performance. To systematically address this topic, we will first identify the critical psychological barriers in play and then outline strategies to mitigate their effects.

a. Factors in play

Psychological obstacles such as fear, anxiety, and lack of confidence often lead to self-censorship and a lack of motivation, hindering the learning process. Stress and technophobia further increase cognitive load and reduce the quality of the educational experience. Additionally, fixed mindsets contribute to heightened anxiety and a reluctance to engage in challenging tasks, limiting adaptability and learning outcomes.

- Fear, anxiety, and lack of confidence: common psychological obstacles such as fear, anxiety, lack of confidence, and fear of making mistakes lead to self-censorship and a lack of motivation, impeding the learning process [26]–[28].
- Stress and technophobia: stress and resistance to e-learning, including technophobia, increase cognitive load, reducing the quality of the educational experience [29].
- Fixed mindsets: Students with fixed mindsets may experience heightened anxiety, fear of failure, and a reluctance to engage in challenging tasks, limiting their adaptability and learning outcomes [30]–[33].
- Online learning challenges: psychological obstacles in online learning environments, especially during periods of crisis like the COVID-19 pandemic, include interaction, technology use, and time management [34].

b. Ways to address the barriers

Educators will promote growth mindsets by encouraging students to view failures as opportunities for learning and improvement, which enhances resilience and adaptability. Implementing active learning methods and reducing social and psychological barriers positively impact students' academic performance and engagement. Additionally, recognizing the importance of self-esteem, motivation, and attitudes toward learning is crucial for overcoming psychological barriers and promoting effective learning strategies.

- Promoting growth mindsets: educators foster growth mindsets by encouraging students to view failures as opportunities for learning and improvement, which enhance resilience and adaptability [35], [36].
- Active learning methods: implementing active learning methods and reducing social and psychological barriers positively impact students' academic performance and engagement [37].
- Understanding psychological aspects of learning: Recognizing the importance of self-esteem, motivation, and attitudes toward learning is crucial for overcoming psychological barriers and promoting effective learning strategies [38], [39].
- Encouraging resilience and intrinsic motivation: teachers play a critical role in addressing psychological barriers by promoting resilience in the face of failure and fostering intrinsic motivation among students [40], [41].
- Supportive learning environments: creating supportive learning environments that empower students to embrace challenges and learn from failures is essential for overcoming psychological barriers and improving academic outcomes [42].

In essence, psychological barriers to learning are multifaceted and significantly impact students' educational outcomes. Addressing these barriers requires a comprehensive approach that promotes growth mindsets, implements active learning strategies, and fosters supportive and inclusive learning environments. By adopting these strategies, educators help students overcome psychological obstacles, enhance their engagement, and achieve academic success.

3.1.2. Sociocultural factors

The impact of sociocultural factors on learning is profound and multifaceted, influencing learners' attitudes, behaviors, and overall engagement with educational processes. These factors, ranging from cultural backgrounds to socioeconomic status, shape the learning environment and affect educational outcomes across various disciplines. To methodically address this subject, we will first enumerate the sociocultural factors affecting learning and then discuss strategies for addressing these influences.

a. Factors in play

Resistance to learning often stems from cultural and social influences, which affect learners' behavior and choices within educational settings. Students' socioeconomic backgrounds shape their learning experiences and outcomes, influencing their engagement and access to educational resources. Additionally, family dynamics and the quality of home learning environments significantly impact children's learning processes and academic success.

- Cultural and social influences: learners' resistance to learning tasks stems from cultural and social influences, which affect their behavior and choices within educational settings [43], [44].
- Socioeconomic status: Students' socioeconomic background shapes learning experiences and outcomes, influencing engagement and access to educational resources [45], [46].
- Family influence and home learning environments: family dynamics and the quality of home learning environments significantly impact children's learning processes and academic success [47].
- Social norms and peer feedback: social norms and peer interactions influence learners' engagement, motivation, and response to feedback, affecting academic performance [48]–[50].
- Language barriers and acculturation: language barriers and the acculturation process among immigrants highlight the importance of sociocultural factors in language learning and integration into new cultural contexts [51], [97].
- Self-efficacy and psychological needs: the interrelation between sociocultural factors, self-efficacy, and the satisfaction of psychological needs influence students' achievement and engagement in learning [46], [52].

b. Ways to address the barriers

Recognizing the diversity of learners' backgrounds and adapting teaching methods to cater to varied sociocultural needs enhance engagement and learning outcomes. Engaging families and communities in the educational process bridges socioeconomic disparities and supports learners' academic and personal development. Additionally, implementing support programs that address the needs of students from lower socioeconomic backgrounds helps level the educational playing field and promote equitable learning opportunities.

- Inclusive and adaptive teaching methods: recognizing the diversity of learners' backgrounds and adapting teaching methods to cater to varied sociocultural needs enhance engagement and learning outcomes [53], [54].
- Family and community engagement: engaging families and communities in the educational process bridges socioeconomic disparities and supports learners' academic and personal development [47].
- Socioeconomic support programs: implementing support programs that address the needs of students from lower socioeconomic backgrounds helps level the educational playing field and promote equitable learning opportunities [46].
- Cultural sensitivity training for educators: educators trained in cultural sensitivity improve their understanding and support of students from diverse cultural backgrounds, facilitating a more inclusive learning environment [51], [97].
- Promoting growth mindsets: encouraging growth mindsets among students mitigates the negative impacts of socioeconomic status and other sociocultural barriers on learning engagement [46].
- Addressing language barriers: implementing language support programs and fostering an environment that values linguistic diversity support language learners and facilitate their integration into new cultural and educational contexts [97].

The interaction between sociocultural factors significantly influences learning attitudes and outcomes. Addressing these influences requires a comprehensive approach that includes culturally responsive teaching, socioeconomic support, family engagement, and promoting growth mindsets. By adopting these strategies, educators create more inclusive and effective learning environments that cater to the diverse needs of all learners.

3.1.3. Factors related to the educational environment

Addressing resistance to learning within the educational environment necessitates a multifaceted approach. Such an approach will identify the contributing factors and implement strategies to mitigate these challenges. Here, we delineate these factors before outlining ways to address them.

a. Factors in play

The lack of clarity in curriculum content and teaching methodologies creates confusion and resistance among students and educators. Perceived increases in workload due to new teaching approaches contribute to resistance from both educators and students. Additionally, difficulties inherent in the teaching environment, including those related to educational equity, exacerbate resistance to learning.

- Ambiguity in curriculum and teaching methods: the lack of clarity in curriculum content and teaching methodologies creates confusion and resistance among students and educators [55].
- Workload concerns: the perceived increase in workload due to new teaching approaches contributes to resistance from both educators and students [55].
- Challenges in the teaching environment: difficulties inherent in the teaching environment, including those related to educational equity, exacerbate resistance to learning [55].
- Resistance to new teaching approaches: implementing innovative teaching methods, such as flipped learning, may encounter resistance from educators due to unfamiliarity or perceived inefficiency [56].
- Distance learning challenges: in distance learning models, student anxiety, negative perceptions of online education, and resistance to change significantly impact learning outcomes [57].
- Digital competencies and self-organization: students' digital competencies and ability to self-organize and engage in independent learning influence their acceptance of and resistance to digital learning formats [58].
- Cultural resistance among staff: staff resistance to technology-based education impedes student engagement and the success of online learning programs [59].

b. Ways to address the barriers

Clear communication about curriculum content and teaching methodologies reduces ambiguity and resistance. Addressing concerns about workload by providing support and resources helps mitigate resistance from educators and students. Creating a supportive and equitable teaching environment alleviates challenges and fosters a positive learning experience.

- Clarity in curriculum and teaching methods: clear communication about curriculum content and teaching methodologies reduces ambiguity and resistance [55].
- Managing workload: addressing concerns about workload by providing support and resources helps mitigate resistance from educators and students [55].
- Supportive teaching environment: creating a supportive and equitable teaching environment alleviates challenges and fosters a positive learning experience [55].

- Familiarization with new approaches: offering training and resources to familiarize educators with new teaching approaches reduces resistance and improves implementation effectiveness [56].
- Support for distance learning: providing resources and support to address the challenges of distance learning, including managing student anxieties and perceptions and improving acceptance and engagement [57].
- Enhancing digital competencies: developing students' digital competencies and self-organization skills facilitates a smoother transition to digital learning formats [58].
- Addressing cultural resistance: implementing initiatives focused on staff development and engagement helps overcome cultural resistance and promote the successful integration of technology in education [59].

In conclusion, effectively addressing resistance to learning requires a comprehensive understanding of the underlying factors and implementing targeted strategies. Creating more conducive and inclusive learning environments that enhance student motivation and engagement is possible. This will be achieved by tackling issues related to curriculum clarity, workload, teaching environment challenges, resistance to new approaches, distance learning obstacles, digital competencies, and cultural resistance.

3.1.4. Personal and emotional factors

Personal and emotional factors significantly influence the learning process, impacting student engagement, motivation, and resistance to learning. These factors range from individual emotional states to broader emotional design in educational materials. Understanding these factors and their implications on learning outcomes is crucial for educators who foster supportive and effective learning environments. Below is an organized summary detailing the factors and suggesting ways to address the barriers.

a. Factors in play

How students perceive their social environment triggers academic emotions, affecting learning and achievement. The emotional design of learning resources directly influences outcomes by inducing emotions that impact the learning process. Additionally, induced negative emotions before learning trials narrow attention and affect learning, particularly in mapping word meanings.

- Student appraisals of social environment: how students perceive their social environment triggers academic emotions, affecting learning and achievement [60].
- Emotional design of learning materials: the emotional design of learning resources directly influences outcomes by inducing emotions that impact the learning process [61].
- Negative emotional states: induced negative emotions before learning trials narrow attention and affect learning, particularly in mapping word meanings [62].
- Impact on vocabulary learning and text comprehension: emotions are crucial in vocabulary acquisition and text comprehension [63].
- Inflation of judgments of learning: emotional experiences lead individuals to overestimate their learning progress [64].
- External emotion-inducing methods: reading emotional text or viewing emotional content also influences learning outcomes [65].
- Emotional presence in learning environments: learners' emotional states are essential to successful learning in traditional and online environments [66], [67].
- Induced emotions in specific contexts: emotions impact learning outcomes in particular settings, such as ESP writing classes [68].

b. Ways to address the barriers

Incorporating a positive emotional design in learning materials mitigates negative impacts and enhances engagement. Creating learning environments that support emotional well-being helps manage negative emotions and improve learning outcomes. Additionally, boosting students' self-efficacy increases participation, motivation, and resilience, enhancing online and traditional learning experiences.

- Enhancing emotional design: incorporating cheerful emotional design in learning materials mitigates negative impacts and enhances engagement [61].
- Supportive learning environments: Creating learning environments that support emotional well-being helps manage negative emotions and improve learning outcomes [60].
- Self-efficacy improvement: boosting students' self-efficacy increases participation, motivation, and resilience, enhancing online and traditional learning experiences [69], [70].
- Promoting emotional intelligence and resilience: fostering emotional intelligence and resilience among learners helps them manage stress and negative experiences more effectively, positively affecting engagement and motivation [71], [72].
- Addressing past negative experiences: understanding and addressing past negative experiences reduces resistance to learning and improves student engagement [73].

- Utilizing external emotion-inducing methods positively: external methods to induce positive emotional states enhance learning outcomes and student engagement [65].

Personal and emotional factors, especially self-efficacy, are pivotal in shaping learners' engagement and resistance to learning. Educators must understand and address these factors by creating supportive learning environments, enhancing emotional design, and fostering emotional intelligence and resilience. Through these strategies, it is possible to promote positive emotional experiences that enhance student engagement and success.

3.1.5. Cognitive and neurological factors

Resistance to learning is a multifaceted issue. It is influenced by cognitive and neurological factors. Educators must understand and address these factors to foster effective learning environments. Here, we will explore the key factors and how to address them.

a. Factors in play

Inhibition of the CREB/Nrf2 signaling pathway is associated with reduced learning and memory, increased cellular apoptosis, and cognitive dysfunction. Consumption of a Western diet high in saturated fats and simple carbohydrates impairs cognitive abilities due to neurobiological changes in the hippocampus. Additionally, hypercholesterolemia has been linked to cognitive impairment, indicating a connection between dietary factors and neurological function.

- The CREB/Nrf2 signaling pathway inhibition: this is associated with reduced learning and memory, increased cellular apoptosis, and cognitive dysfunction [8], [9].
- Dietary habits and cognitive function: consumption of a Western diet high in saturated fats and simple carbohydrates impairs cognitive abilities due to neurobiological changes in the hippocampus [74].
- Hypercholesterolemia: this condition has been linked to cognitive impairment, indicating a connection between dietary factors and neurological function [75].
- Oxidative stress: This induces treatment resistance and highlights oxidative stress's role in neurological responses [76].
- Neurogenesis in the dentate gyrus: neurogenesis is linked to learning and memory, and alterations in neurogenesis affect cognitive performance [78].
- Neurodiversity: conditions such as attention deficit hyperactivity disorder (ADHD), dyslexia, dyspraxia, and autism spectrum disorder impact learning experiences due to differences in attention, cognitive processing, and information retention [79], [80].
- TBI: TBI causes deficits in spatial learning and memory function, showcasing the neurological basis of learning difficulties [77].
- Cognitive overload: task complexity and instructional support contribute to students' perception of cognitive overload, hindering learning outcomes [81], [82].

b. Ways to address the barriers

Educators and parents emphasize the importance of balanced nutrition to support cognitive function and learning. Introducing activities and habits that reduce oxidative stress, such as regular exercise and a diet rich in antioxidants, potentially supports neurological health. Additionally, awareness and interventions for hypercholesterolemia mitigate its impact on cognitive and neurological functions.

- Diet and nutrition education: educators and parents emphasize the importance of balanced nutrition to support cognitive function and learning [74].
- Managing oxidative stress: introducing activities and habits that reduce oxidative stress, such as regular exercise and a diet of antioxidants, potentially supports neurological health [76].
- Supporting neurological health: awareness and interventions for hypercholesterolemia mitigate its impact on cognitive and neurological functions [75].
- Tailoring educational approaches: recognizing and accommodating neurodiversity in classrooms using tailored teaching strategies to support students with ADHD, dyslexia, dyspraxia, and autism spectrum disorder [83], [84].
- Reducing cognitive overload: simplifying content, providing adequate support, and employing strategies to manage information overload are essential for optimizing learning experiences [85], [86].
- Creating inclusive environments: educators should foster inclusive environments that respect neurodiversity, promote empathy, and encourage collaboration among students with varying cognitive profiles [84].

A thorough understanding of the cognitive and neurological factors contributing to resistance to learning is necessary. By implementing strategies to address these factors, educators will enhance learning outcomes and support the diverse needs of all students. This is a crucial step for equitable education.

3.1.6. Environmental and contextual factors

Understanding and addressing resistance to learning requires a comprehensive approach that considers various environmental and contextual factors. These factors significantly influence an individual's engagement and success in the learning process. Below, we detail these factors, followed by strategies to mitigate resistance, and enhance learning outcomes.

a. Factors in play

The interpretation of environmental and contextual variables significantly affects learning experiences, as individual perceptions either facilitate or inhibit the learning process. Contextual cues guide attention and memory processes, underscoring the resilience of implicit learning mechanisms to disruptions. Additionally, organizational culture and industry influences play a crucial role in workplace learning, either facilitating or inhibiting it.

- Contextual variations: the interpretation of environmental and contextual variables significantly affects learning experiences. Individual interpretations of these variables either facilitate or inhibit the learning process [12], [87].
- Implicit learning mechanisms: contextual cues guide attention and memory processes, highlighting the resilience of implicit learning mechanisms to disruptions [88].
- Organizational culture and industry influences: these factors play a crucial role in workplace learning, either facilitating or inhibiting it [89].
- Environmental stressors: radiation, extreme temperatures, and chemical agents induce stress resistance and affect learning [90], [91].
- Physical learning environment: the design and conditions of the physical learning space impact social practices, student engagement, and overall development [92], [93].
- Digital divide: access to digital learning environments and resources breaks barriers to education and enhances instructional richness [94].
- Global events: global events such as the COVID-19 pandemic necessitate the development of adaptive teaching models to maintain or improve students' enthusiasm for learning [95].
- Psychosocial learning environment: for instance, the atmosphere within science classrooms is directly linked to students' motivation and affects their attitudes toward learning [96].

b. Ways to address the barriers

Contextual variations must be embraced as opportunities for learning by adapting teaching methods to suit diverse interpretations and experiences. Contextual cues must be utilized in educational design to support attention and memory processes, facilitating implicit learning pathways. Additionally, organizational cultures and industry practices must be developed to support continuous learning and adaptability.

- Leveraging contextual variations: embracing contextual variations creates an opportunity for learning when teaching methods are adapted to suit diverse interpretations and experiences [12], [87].
- Enhancing implicit learning: utilizing contextual cues in educational design will support attention and memory processes, facilitating implicit learning pathways [88].
- Cultivating supportive organizational cultures: developing organizational cultures and industry practices will support continuous learning and adaptability [89].
- Mitigating environmental stressors: implementing strategies to reduce the impact of environmental stressors on learning will ensure a safe and conducive learning environment [90], [91].
- Optimizing the physical learning environment: designing and maintaining learning spaces conducive to cognitive, social, and physical development will promote engagement and reduce resistance [92], [93].
- Bridging the digital divide: providing equitable access to digital resources and intelligent learning environments will ensure all students engage in learning [94].
- Adapting to global events: developing flexible and responsive teaching models that adapt to global events will maintain student interest and engagement [95].
- Improving the psychosocial environment: Fostering a positive psychosocial learning environment in classrooms will enhance students' motivation and reduce resistance to learning [96].

Educators and institutions must create more engaging, inclusive, and effective learning environments. This is necessary to cater to learners' diverse needs. It can be achieved by recognizing and strategically addressing the complex web of environmental and contextual factors contributing to resistance to learning.

3.2. Discussion

3.2.1. Psychological factors

Psychological factors affecting learning delve into the complex interplay between students' mental and emotional states and educational outcomes [26]-[42]. This analysis highlights the detrimental effects of psychological barriers on learning and proposes strategies to mitigate these obstacles. The detailed exploration of factors and remedial measures underscores the necessity of a holistic approach to address learners' challenges.

Factors in play: psychological barriers such as fear, anxiety, lack of confidence, stress, technophobia, and fixed mindsets significantly affect students' learning experiences, hindering their engagement, motivation, and academic performance. Fear and anxiety lead students to avoid learning activities, which slows progress, while fixed mindsets create a fear of failure and reluctance to try new things. The COVID-19 pandemic highlighted difficulties with technophobia and online learning, emphasizing the need to address the psychological aspects of learning. These challenges increase the mental effort required to learn and introduce additional obstacles, necessitating strategies to reduce stress and enhance student comfort with technology.

Ways to address the barriers: to overcome psychological barriers, educators should employ a comprehensive strategy that encourages growth mindsets, utilizes active learning, and fosters an understanding of learning psychology to build resilience and motivation within a supportive environment. Teaching students to view failures as opportunities for growth promotes openness to challenges, while active learning engages them more deeply, enhancing focus and performance. Additionally, it is vital to boost students' self-esteem and maintain motivation in an environment where they can confidently face and learn from failures. Such a supportive setting helps students overcome obstacles and improve academically.

In summary, overcoming psychological barriers is crucial for effective learning. It requires strategies that promote growth mindsets, active participation, resilience, and a nurturing atmosphere. These approaches enable students to surpass these barriers and enhance their educational outcomes.

3.2.2. Sociocultural factors

Exploring sociocultural factors provides a nuanced understanding of how various external influences shape learners' educational experiences and outcomes [43]-[54], [97]. This analysis underscores the importance of recognizing and addressing these factors to foster more inclusive and effective learning environments. The discussion involves identifying specific sociocultural influences and proposing targeted strategies to mitigate their impacts.

Factors in play: sociocultural factors significantly influence student engagement and academic performance. Cultural and social influences can lead to resistance to specific learning tasks if they conflict with a student's values and norms. Socioeconomic status impacts access to educational resources and opportunities, affecting learning experiences. Additionally, family situations and home learning environments are critical to educational success. Peer interactions and social norms influence students' motivation and receptiveness to feedback, affecting their academic outcomes. Language barriers and cultural adjustments challenge immigrant students to integrate into new educational systems. A combination of sociocultural factors, self-confidence, and psychological needs also determines student engagement and success in learning.

Ways to address the barriers: Addressing sociocultural challenges requires inclusive and flexible approaches. Teaching methods acknowledging students' diverse backgrounds can enhance participation and academic outcomes. Involving families and communities helps bridge socioeconomic disparities and fosters a supportive learning environment program providing socioeconomic support level the playing field for students from various backgrounds. Training educators in cultural sensitivity ensures a welcoming environment for students from different cultures. Encouraging growth mindsets can mitigate the effects of socioeconomic and other barriers. Supporting language learners and valuing linguistic diversity is crucial for integrating into new educational contexts.

In summary, sociocultural factors significantly impact learning. They necessitate comprehensive strategies to make education equitable and effective. By utilizing culturally aware teaching methods, engaging families and communities, supporting socioeconomic challenges, and promoting inclusivity, educators can address these challenges and enhance student success.

3.2.3. Factors related to the educational environment

Factors related to the educational environment critically examine the obstacles hindering academic learning processes [55]-[59]. This underscores the importance of identifying these challenges and implementing effective strategies to mitigate resistance to learning. This analysis is crucial for understanding how to enhance the educational environment to better support educators and students.

Factors in play: resistance to learning in educational settings arises from unclear curricula, novel teaching methods, and challenges in digital learning. Confusion about curricular content and instructional methods creates difficulties for students and teachers, increasing workload and stress. Furthermore, perceived inequities in education intensify this resistance. Skepticism towards innovative teaching approaches like flipped classrooms often stems from uncertainty about their effectiveness. Distance learning introduces additional problems, including student anxiety and skepticism about the value of online education, which can impede success. Effective online learning requires students to have robust digital skills and effective self-management. Additionally, if faculty are reluctant to adopt technology, it can prevent students from fully engaging with and succeeding in online programs.

Ways to address the barriers: clear communication and strong support for teachers and students are crucial to overcoming educational challenges. Simplifying explanations about curricula and teaching methods reduce confusion and resistance while addressing workload issues helps alleviate stress. Creating a fair and supportive educational environment is also essential. Training teachers in new methods and supporting distance learning minimizes resistance and increases the effectiveness of these approaches. Helping students manage anxiety, see the value in online classes, and improve their digital and planning skills are critical for their success in digital learning environments. Furthermore, addressing staff reluctance to use technology through development programs and engagement initiatives can eliminate significant barriers to technology integration in education.

In summary, addressing resistance in educational settings requires understanding the root issues and implementing targeted strategies to resolve them. Educators will create motivational and engaging learning environments by clarifying communication, supporting educators, ensuring fairness, and adopting new teaching methods and technologies. This also supports the requirements of contemporary educational doctrines.

3.2.4. Personal and emotional factors

The discussion on personal and emotional factors illuminates their critical role in learning. It highlights how individual and environmental emotional elements significantly influence student engagement, motivation, and overall academic success [60]–[73]. This comprehensive overview emphasizes the need for educators to understand and address these factors to foster more supportive and effective learning environments.

Factors in play: personal and emotional factors significantly impact learning. Students' perceptions of their social environments trigger emotions that influence both learning and performance. The emotional response to learning materials is critical to educational outcomes, with negative feelings before studying particularly reducing focus and hindering learning, such as acquiring new vocabulary. Emotions are crucial for learning vocabulary and understanding texts and influencing how students gauge their progress, often leading them to overestimate their knowledge. Materials that evoke strong emotions, such as emotionally charged texts or videos, greatly enhance learning success. Additionally, the emotional climate of learning environments, whether online or in-person, is vital. In specific contexts like writing classes for English learners, emotions distinctly affect learning outcomes, demonstrating how the impact of emotions varies with the context.

Ways to address the barriers: effective strategies can mitigate the negative impacts of personal and emotional factors on learning. Creating learning materials that evoke positive emotions can enhance student interest and motivation. Supportive environments prioritizing emotional health are crucial as they help manage negative emotions and improve the learning atmosphere. Increasing students' sense of capability is essential to boost their engagement, motivation, and resilience, benefiting in-person and online learning settings. Teaching students to handle their emotions and stress effectively enhances their participation and motivation. Addressing past negative experiences can also reduce learning barriers and increase engagement. Activities that trigger positive emotions significantly improve learning success and involvement.

Personal and emotional factors strongly influence students' engagement and resistance to learning. Educators need to address these with tactics that promote a positive learning environment, improve the emotional impact of educational materials, enhance students' emotional skills, and incorporate positive emotional triggers. These measures improve student involvement and achievement.

3.2.5. Cognitive and neurological factors

Exploring cognitive and neurological factors sheds light on the complex interplay between biological processes and learning outcomes. This underscores the significance of understanding these elements for educators aiming to overcome resistance to learning [8], [9], [74]–[86]. They highlight the key factors affecting cognitive functions and offer strategic interventions to enhance educational practices.

Factors in play: cognitive and neurological factors are crucial in learning processes. Impairing the CREB/Nrf2 pathway affects memory, demonstrating the connection between brain function and learning difficulties. Diets high in saturated fats and simple sugars negatively impact brain areas like the hippocampus, while high cholesterol levels can deteriorate brain health, closely tying diet to cognitive performance. Oxidative stress damages cells and impairs brain health, complicating the creation of new brain cells essential for learning and memory. Conditions such as ADHD, dyslexia, and autism disrupt attention, information processing, and memory, posing challenges for affected learners. Brain injuries and information overload can also hinder brain function and learning capacity.

Ways to address the barriers: addressing cognitive and neurological issues requires strategies promoting healthy eating to enhance brain function and reducing oxidative stress through exercise and antioxidant-rich diets to maintain brain health. Educating about and managing high cholesterol is also crucial for protecting brain health. Adapting teaching methods to accommodate students with varying needs, such as those with ADHD or dyslexia, improves learning outcomes. Simplifying lessons, providing additional support, and providing well-organized information can help reduce student overwhelm. Creating inclusive and supportive learning environments fosters a positive educational atmosphere.

In summary, cognitive and neurological factors significantly impact learning, necessitating diverse approaches by educators to assist students in overcoming these challenges. Effective strategies include focusing on brain health, accommodating different learning needs, and fostering inclusive learning environments. These efforts collectively enhance student learning and engagement.

3.2.6. Environmental and contextual factors

Environmental and contextual factors profoundly influence learning processes and outcomes [12], [87]–[96]. This highlights the need for educators to adopt a comprehensive approach to mitigate resistance to learning. This section meticulously outlines these factors and presents strategies for enhancing learning outcomes by addressing the identified challenges.

Factors in play: environmental and contextual factors significantly impact learning by influencing engagement and success. Students' perceptions of their surroundings can either facilitate or obstruct their learning, highlighting the importance of the educational setting. Learning also occurs indirectly through environmental cues, indicating that attention and memory are maintained despite distractions. In the workplace, the culture of the organization and industry norms critically affect learning. Environmental stressors such as radiation, extreme temperatures, and pollutants complicate learning processes by inducing stress. Additionally, the design and condition of physical learning environments are crucial for maintaining student involvement and fostering development. The digital divide highlights disparities in access to learning resources, exacerbated by events like the COVID-19 pandemic, pushing educators to innovate new teaching methods. Moreover, the atmosphere of learning spaces, particularly in scientific subjects, directly influences students' motivation and attitudes toward learning.

Ways to address the barriers: to address these challenges, teachers utilize differences in learning environments as opportunities by tailoring their teaching strategies to meet everyone's needs. Leveraging environmental cues to enhance indirect learning paths and building a supportive culture in workplaces and schools are crucial for continual learning and adaptability. Mitigating the negative impacts of environmental stressors is vital to creating safer learning spaces. Well-designed physical environments promote mental, social, and physical growth, keeping students engaged. Ensuring equal access to digital tools provides all students with learning opportunities. Adapting teaching methods to current global conditions maintains student interest and participation, while a positive classroom atmosphere increases motivation and reduces learning resistance.

In short, by recognizing and addressing the various environmental and contextual factors affecting learning, educators enhance engagement, inclusivity, and effectiveness. These efforts cater to diverse learner needs, improving educational outcomes and overcoming learning barriers. They are essential for providing equitable and fair educational settings for learners.

3.3. Future research directions and recommendations

Moving forward, it is essential to continue researching and applying findings from studies like this to create fair, open, and supportive learning environments. This study lays the groundwork for future research to enhance our understanding and methods for overcoming learning resistance. Key focus areas for future studies should address this study's limitations and include:

- Longitudinal studies: essential for evaluating educational strategies' long-term effectiveness and sustainability.
- Quantitative analyses: it is necessary to broaden the scope of findings, allowing for the identification of correlations between factors and learning outcomes to enhance empirical robustness.

- Technology-enhanced learning: investigating artificial intelligence and virtual reality can help mitigate learning resistance and innovate educational practices.
- Cross-cultural studies: important for understanding how cultural and socio-economic contexts influence learning attitudes and behaviors, guiding the development of inclusive practices.
- Teacher education and professional development: examining the impact of teacher training on learning resistance is critical for developing skills and strategies that create motivating and inclusive environments.
- Neurological and psychological factors: exploring these can provide personalized strategies that address individual cognitive and emotional needs, contributing to a deeper understanding of barriers to learning engagement.
- Brain, mind, learning synergy: further research is recommended into the neuro-bio-psychological factors that affect learning processes to enhance our understanding of brain function relationships with learning.
- Implementation challenges: future research should also consider the practical challenges of applying strategies, including institutional and resource constraints.

Exploring these areas will help researchers and practitioners develop more effective, inclusive, and innovative educational strategies. The collaborative efforts of educators, policymakers, and researchers will be crucial in implementing practical interventions that promote success and engagement for all learners. All of these are essential for a holistic approach to alleviate resistance to learning, which is the very purpose of this study.

3.4. Suggestions for policy and practice

The following recommendations aim to create a more inclusive, engaging, and supportive educational landscape that addresses the root causes of resistance to learning and promotes positive educational outcomes for all students. They are two-fold: recommendations for policy and recommendations for practice. The policy recommendations include:

- Develop policies that foster a growth mindset among students and educators, emphasizing the value of effort and resilience in learning.
- Implement educational policies that promote active and experiential learning opportunities, encouraging student engagement and participation.
- Ensure policies support integrating emotional and cognitive support services, such as counseling and mentoring programs within educational institutions.
- Advocate for inclusive educational policies that recognize and address the diverse needs of learners, including those with learning disabilities and neurological differences.
- Emphasize the importance of environmental and contextual factors in learning by creating policies that ensure safe, supportive, and resource-rich learning environments.

Likewise, the practice recommendations are as follows:

- Educators should incorporate techniques that promote a growth mindset, such as providing constructive feedback and celebrating effort as much as achievement.
- To enhance student engagement, implement active learning strategies in the classroom, such as project-based learning, group discussions, and interactive simulations.
- Provide emotional and cognitive support through structured peer support systems, mentorship programs, and access to counseling services.
- Adapt teaching methods and materials to accommodate diverse learning needs and styles, ensuring all students have equal opportunities to succeed.
- Create a learning environment that is physically and psychologically safe for all students, fostering a sense of community and belonging.

3.5. Merits of the study

The paper presents a comprehensive and innovative analysis identifying a broad spectrum of factors contributing to resistance to learning across psychological, sociocultural, environmental, personal-emotional, and cognitive dimensions. It not only diagnoses these factors but also offers detailed remedies, integrating both within a single scholarly work, which enriches academic discourse significantly:

- Integrative problem-solving: the study provides a holistic view that seamlessly transitions from identifying to addressing the issues, offering a complete understanding of resistance to learning.
- Targeted remedies: the study presents specific, research-driven strategies tailored to different learning environments and student populations' unique needs.
- Empirical and practical synergy: this paper is a valuable unified resource for educators, administrators, and policymakers, bridging the gap between research and practical application and providing actionable insights for educational settings.

- Innovative educational contribution: the format and multidimensional content offer novel contributions to educational research and practice, serving as a comprehensive resource for stakeholders aiming to enhance learning outcomes.
- Enhancing academic discourse: by pairing causes with solutions, the paper fosters a solution-oriented approach in educational discussions, promoting actionable knowledge and a proactive stance toward educational improvement.

The study's integrated approach, which combines deep analysis with a broad array of solutions, expands academic and practical understanding of learning resistance. Therefore, the study also provides a crucial blueprint for educational improvement. Thus, the study fulfills its purpose of becoming a distinct and innovative contribution to the field.

3.6. Limitations of the study

This study uses qualitative research to offer insights into resistance to learning but is limited by several factors. It reviews only peer-reviewed articles from the last two decades, potentially overlooking seminal theories and insights before this period, which could inform the evolution of educational strategies and challenges. The focus on qualitative data provides deep thematic understanding. However, it lacks the breadth of quantitative analysis, which might better capture the prevalence and variability of resistance factors across populations, affecting the generalizability of the findings.

The study discusses strategies to mitigate learning resistance in detail, including potential challenges such as institutional policies, resource availability, and stakeholder acceptance that could hinder these strategies' application. Additionally, its cross-sectional nature does not consider the long-term dynamics of resistance and strategy effectiveness, potentially overlooking varying impacts over time. Lastly, the study lacks specific methodologies or tools for evaluating the effectiveness of these strategies, complicating the assessment of their impact on learning resistance.

4. CONCLUSION

In conclusion, resistance to learning is a multifaceted issue influenced by various psychological, sociocultural, educational environment, personal-emotional, cognitive, and neurological factors. Each of these dimensions presents unique barriers that can hinder student engagement and academic performance. Psychological factors such as fear, anxiety, and fixed mindsets, along with sociocultural influences like socioeconomic status and cultural norms, significantly affect learners' experiences and outcomes. Additionally, the clarity of curricula, the design of educational environments, and the emotional climate play crucial roles in either facilitating or obstructing the learning process.

To effectively address the aforementioned barriers, a comprehensive approach is essential. In terms of policy, policymakers should implement policies that promote growth mindsets, active learning, and integrate emotional and cognitive support services within educational institutions. It is essential to create inclusive educational policies that address the diverse needs of learners, including those with learning disabilities and neurological differences. Ensuring that educational environments are safe, supportive, and resource-rich will help reduce resistance to learning. In terms of practice, educators should foster growth mindsets by providing constructive feedback and celebrating effort alongside achievement. Employing active learning strategies and offering emotional and cognitive support are crucial. Adapting teaching methods to meet diverse learning needs and creating physically and psychologically safe environments will enhance student engagement and success. Recognizing the importance of emotional health, educators should work to boost students' self-esteem and motivation. Inclusive and culturally responsive teaching methods, along with family and community engagement, are vital for addressing sociocultural barriers. Additionally, improving digital competencies and adapting to global events are necessary to overcome modern educational challenges.

Future research should focus on several key areas to continue addressing resistance to learning. Longitudinal studies are necessary to evaluate the long-term effectiveness and sustainability of educational strategies. Quantitative analyses can broaden the scope of findings and enhance empirical robustness by identifying correlations between factors and learning outcomes. Investigating technology-enhanced learning, including artificial intelligence and virtual reality, can offer innovative solutions to mitigate learning resistance. Cross-cultural studies are important to understand how cultural and socio-economic contexts influence learning attitudes and behaviors, guiding the development of inclusive practices. Further exploration into neurological and psychological factors will provide personalized strategies for addressing individual cognitive and emotional needs. Finally, examining the impact of teacher training on learning resistance and the practical challenges of implementing strategies will help develop more effective, inclusive, and innovative educational approaches.

APPENDIX

Table 1. The main themes, codes, and sub-codes, together with the actual references consulted and their count

Main theme	Code	Sub-codes	Number of references	Actual references
Psychological factors	Factors in play	Fear, anxiety, and lack of confidence; stress and technophobia; fixed mindsets; online learning challenges.	9	[26]–[34]
	Ways to address the barriers	Promoting growth mindsets; active learning methods; understanding psychological aspects of learning; encouraging resilience and intrinsic motivation; supportive learning environments	8	[35]–[42]
Sociocultural factors	Factors in play	Cultural and social influences; socioeconomic status; family influence and home learning environments; social norms and peer feedback; language barriers and acculturation; self-efficacy and psychological needs	11	[42]–[52]
	Ways to address the barriers	Inclusive and adaptive teaching methods; family and community engagement; socioeconomic support programs; cultural sensitivity training for educators; promoting growth mindsets; addressing language barriers	6	[42], [46], [47], [51], [53], [54]
Factors related to the educational environment	Factors in play	Ambiguity in curriculum and teaching methods; workload concerns; challenges in the teaching environment; resistance to new teaching approaches; distance learning challenges; digital competencies and self-organization; cultural resistance among staff	5	[55]–[59]
	Ways to address the barriers	Clarity in curriculum and teaching methods; managing workload; supportive teaching environment; familiarization with new approaches; support for distance learning; enhancing digital competencies; addressing cultural resistance	5	[55]–[59]
Personal and emotional factors	Factors in play	Student appraisals of social environment; emotional design of learning materials; negative emotional states; impact on vocabulary learning and text comprehension; inflation of judgments of learning; external emotion-inducing methods; emotional presence in learning environments; induced emotions in specific contexts	9	[60]–[68]
	Ways to address the barriers	Enhancing emotional design; supportive learning environments; self-efficacy improvement; promoting emotional intelligence and resilience; addressing past negative experiences; utilizing external emotion-inducing methods positively	8	[60], [61], [65], [69]–[73]
Cognitive and neurological factors	Factors in play	Dietary habits and cognitive function; hypercholesterolemia; oxidative stress; inhibition of CREB/NRF2 signaling pathway; TBI; neurogenesis in the dentate gyrus; neurodiversity; cognitive overload	11	[8], [9], [74]–[82]
	Ways to address the barriers	Diet and nutrition education; managing oxidative stress; supporting neurological health; tailoring educational approaches; reducing cognitive overload; creating inclusive environments	6	[74]–[76], [83]–[86]
Environmental and contextual factors	Factors in play	Contextual variations; implicit learning mechanisms; organizational culture and industry influences; environmental stressors; physical learning environment; digital divide; global events; psychosocial learning environment	11	[12], [87]–[96]
	Ways to address the barriers	Leveraging contextual variations; enhancing implicit learning; cultivating supportive organizational cultures; mitigating environmental stressors; optimizing the physical learning environment; bridging the digital divide; adapting to global events; improving the psychosocial environment	11	[12], [87]–[96]

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