Research Article / Araştırma Makalesi



A Systematic Review of Research Articles on the Effects of Multiple Intelligences-Based Instruction in Türkiye

Türkiye'de Çoklu zekâ Temelli Öğretimin Etkilerine İlişkin Araştırma Makalelerinin Sistematik Analizi

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Keywords

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Abstract

Purpose: The implementation of Multiple Intelligences (MI)-based instruction holds significant promise for educational advancement, facilitating the pluralization and personalization of pedagogical methods and assessments to engage diverse learners effectively. This study aims to systematically and critically evaluate research articles published on the effects of MI-based instruction from January 2007 to March 2023 within the context of Türkiye, examining their content, objectives, participants, materials, methodologies, outcomes, and publication years.

Design/Methodology/Approach: The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) framework was employed, and 68 research articles were determined using the specified eligibility criteria. A descriptive analysis was conducted to synthesize findings from these studies.

Findings: Findings were discussed through the four predominant themes regarding the effect of MI-based instruction on (1) achievement, (2) attitudes, (3) retention, and (4) teachers' and students' views on the effectiveness of MI-based instruction. The dominance of exam-oriented understanding and the positivist research tradition was quite prominent since the effect of MI-based instruction on achievement was the most studied theme, and experimental design studies were dominant compared to qualitative ones.

Highlights: Findings explicitly revealed the increasing and decreasing attention to the subject and showed inconsistencies between the nature of the theory and methodological choices of studies on MI-based instruction.

Öz

Çalışmanın amacı: Çoklu zekâ temelli (ÇZT) öğretim, her öğrenciye ulaşmak için öğretim yöntemlerinin ve değerlendirmelerin çoğullaştırılması ve kişiselleştirilmesi gibi eğitim için hayati vaatlere sahiptir. Bu nedenle, ÇZ teorisi kısa sürede birçok ülkede, Türkiye'de ise 2000'li yılların başında eğitimde bir trend haline gelmiştir. Bu çalışmanın amacı, Ocak 2007-Mart 2023 tarihleri arasında ÇZ temelli öğretimin etkisi üzerine yazılmış araştırma makalelerini içerik, amaç, katılımcı, materyal, desen, sonuç ve yayın yılları açısından sistematik ve eleştirel bir şekilde analiz etmektir.

Materyal ve Yöntem: Bu sistematik inceleme çalışmasında PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) kullanılmış ve belirlenen uygunluk kriterleri aracılığıyla 68 araştırma makalesi analize dâhil edilmiştir. Çoklu zekâ temelli öğretimin etkileri üzerine yapılan 68 araştırmayı düzenlemek ve analiz etmek için betimsel analiz yöntemi kullanılmıştır.

Bulgular: Bulgular, analiz edilen çalışmalarda, çoklu zekâ temelli öğretimin (1) başarı, (2) tutumlar, (3) kalıcılık ve (4) öğretmen ve öğrencilerin çoklu zekâ temelli öğretimin etkililiğine ilişkin görüşleri üzerindeki etkisi olmak üzere dört ana temanın baskın olduğunu ortaya koymuştur. Çoklu zekâ temelli öğretimin başarıya etkisinin en çok çalışılan tema olması ve deneysel desenli çalışmaların nitel olanlara kıyasla baskın olması nedeniyle, analiz edilen çaışmalarda, sınav odaklı anlayışın ve pozitivist araştırma geleneğinin baskınlığı oldukça belirgindir.

Önemli Vurgular: Bulgular, konuya yönelik artan ve azalan ilgiyi açıkça ortaya koymuştur. Çoklu zekâ kuramının 2004 yılında ulusal eğitim programına dâhil edilmesinin ardından çoklu zekâ kuramına olan ilgi ve dikkat artmış, ancak 2006 yılından sonra, bu ilgi kısa sürede giderek azalmıştır. Öte yandan, gelecekteki araştırmalarda dikkate alınması gereken bazı eksiklikler de bulunmaktadır. Örneğin, bu derleme çalışması, ÇZ temelli öğretim üzerine yapılan çalışmalarda teorinin doğası ve metodolojik seçimler arasında tutarsızlıklar olduğunu ortaya koymuştur.

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INTRODUCTION

Intelligence has long been a contentious construct, yet early twentieth-century discourse adopted a scientific lens. Pioneers such as Spearman, Galton, Binet-Simon, Stern, Terman, or Weschler contributed to the establishment of the "general intelligence" framework, while some others debated its "multiplicate" nature (Şakir, 2013). In 1983, Howard Gardner's seminal work, 'Frames of Mind,' introduced the 'theory of multiple intelligences' (MI theory), positing intelligence as multidimensional and modular, thereby challenging the prevailing notion of a singular intelligence (Davis, Christodoulou, Seider & Gardner, 2012).

Gardner's inquiry into the workings of the human mind unexpectedly resonated with educators (Campbell & Campbell, 1999). By 2011, scholarship on MI theory in educational contexts coalesced in "*Multiple Intelligences Around the World*," edited by Chen, Moran, and Gardner, showcasing applications across diverse age groups and settings -including schools, museums, and after-school activities- demonstrating the theory's widespread impact (Davis, Christodoulou, Seider & Gardner, 2012). The rapid embrace of MI theory in education is attributable to its promise of recognizing the unique potential of each learner. Traditionally, educational systems prioritized linguistic and logical-mathematical intelligences, often leading to detrimental labelling. Conversely, Gardner's perspective affirms the distinct capacities inherent in all individuals (Davis, Christodoulou, Seider & Gardner, 2012; Gardner, 2013). MI theory expands the conceptualization of intelligence and asserts the developmental nature of cognitive abilities, allowing for greater personalization of educational experiences. As such, it offers more expansive avenues for student growth than general intelligence theories, emphasizing intelligence as a blend of heritable traits and skills fostered through diverse experiences (Davis, Christodoulou, Seider & Gardner, 2012).

There is another notable divergence between MI and general intelligence theories concerning their educational implications. Gardner eschewed the development of psychometric tools for assessing multiple intelligences, positing that "intelligence is too important to be left to the intelligence testers" (Gardner, 1999). He drew from research -including evolutionary biology, neuroscience, anthropology, psychometrics, and psychology- to delineate eight criteria for identifying a distinct intelligence: (1) the existence of savants, prodigies, and other exceptional individuals, (2) a distinctive neural representation, (3) a distinctive developmental history and a definable set of expert 'end-state' performances, (4) some basis in evolutionary biology, (5) support from psychometric findings, (6) support from experimental psychological tasks, (7) an identifiable core operation or set of operations, and (8) susceptibility to encoding in a symbol system (Davis, Christodoulou, Seider & Gardner, 2012; Arca, 2013). In this context, Gardner characterizes intelligence as a bio-psychological potential for problem-solving or producing culturally valued outputs. He articulates eight relatively autonomous intelligences -verbal-linguistic, mathematical-logical, visual-spatial, bodilykinaesthetic, musical, interpersonal, intrapersonal, and naturalistic (Scapens & Fraser, 2007; Davis, Christodoulou, Seider & Gardner, 2012; Arca, 2013)- which can be cultivated through enrichment and instruction, and interact in intricate ways. Despite criticisms regarding the scientific validity of MI theory (Allix, 2000; Sternberg & Grigorenko, 2004; Waterhouse, 2006) and concerns about its comprehensibility (Klein, 1997) and educational applicability (Waterhouse, 2006), it has engendered a constructive discourse on the uniqueness of intelligence and diverse student learning profiles, fostering optimism about the potential of all learners. This paradigm has positively influenced the beliefs of educators regarding student intelligence, achievement, and instructional strategies, which may explain the sustained interest in MI-based educational research (Campbell & Campbell, 1999; Chen, Moran & Gardner, 2011).

Multiple Intelligences-based Instruction

Since Gardner introduced the MI theory, it has significantly impacted educational practices. Hopper and Hurry (2000) articulate three compelling rationales for adopting MI as an instructional framework: (1) enhancing students' awareness of their learning processes, (2) individualizing learning experiences, and (3) fostering active engagement in the learning process. Armstrong (2000) further asserts that MI theory significantly enriches pedagogy by urging educators to diversify their instructional techniques, tools, and strategies beyond the traditional reliance on linguistic and logical modalities.

Moran, Kornhaber, and Gardner (2006) delineate MI-based instruction's content, purpose, and position within the classroom context. They assert that the fundamental purpose of education, according to MI theory, is to cultivate intelligences that enable students to achieve goals aligned with their distinct intelligence profiles. Thus, accommodating student diversity by integrating various intelligence types into lessons through a broad spectrum of learning experiences and delivering student-centered instruction are central for MI-based instruction.

Kaya (2009) identifies three seminal pioneers in the realm of MI-based instruction: Lazear (1992) in "Teaching for Multiple Intelligences," Armstrong (1994) in "Multiple Intelligences in the Classroom," and Campbell, Campbell, and Dickinson (1996) in "Teaching and Learning through Multiple Intelligences." These works delineate MI-based pedagogical strategies and illustrate their application within educational settings, emphasizing requisite teacher characteristics and behaviours conducive to MI classrooms. MI theory underscores the heterogeneity in student learning profiles. Through MI-based instruction methods, educators can devise multiple entry points -varied activities and modalities corresponding to distinct intelligences- enabling a wider array of students to engage with content and demonstrate comprehension through their inherent strengths (Campbell & Campbell, 1999; Scapens & Fraser, 2007). Gardner likens these entry points to doors accessing the same room (as cited in Scapens & Fraser, 2007). Nevertheless, the proliferation of MI theory since the 1990s has engendered misconceptions and detrimental practices. Gardner

(1995; 2011) critiques certain educational applications of MI, arguing against the futile endeavour of teaching all concepts through

all intelligences and cautioning against the evaluative labelling that could arise from contextually insensitive assessments. Furthermore, he posits that MI should serve as an educational tool rather than an ultimate objective.

Superficial activities, such as integrating music into mathematics instruction, are deemed by Gardner to perpetuate myths surrounding MI rather than embodying its authentic principles. Still, Gardner posits that MI theory can enhance educational practices by facilitating the pluralization of subject matter and personalizing student learning experiences. He asserts that a robust educational foundation is established if this personalization is coupled with a commitment to achieving meaningful educational understandings for all children (Gardner, 1995; 2011).

These promises provide interest in MI theory, and the existing literature supports the claim that MI theory is associated with several positive outcomes on student achievement, student participation, students' attitudes, motivation, self-confidence, metacognition, critical thinking, conceptual skills or self-efficacy in schools (Campbell & Campbell, 1999; Goodnough, 2001; Scapens & Fraser, 2007). Additionally, research demonstrates the positive influence of MI theory on teachers' perception of intelligence, instruction, and student achievement (Campbell & Campbell, 1999). Moreover, the "Schools Using Multiple Intelligences Theory" (SUMIT) project, conducted across 41 schools in the U.S. from 1997 to 2000, evidenced MI's positive impacts on school discipline, parental engagement, and learning gains among diverse student populations (Saban, 2009).

Despite the positive outcomes associated with MI-based instruction, research analysis in both global and Turkish contexts reveals four predominant themes. Türkiye The first three represent the variables that are affected by MI-based instruction: (1) student achievement, (2) student attitudes, and (3) retention; and the fourth theme, (4) teachers' or students' views, mainly analyses the effectiveness of MI-based instruction through opinions. Some studies explore multiple themes, such as the interplay between MI and achievement, retention, and attitudes. A comprehensive examination of each theme will be undertaken in the subsequent results and discussion sections.

The Significance of MI-based Instruction in Türkiye

MI theory became integral to the Turkish education system post-reform in 2004 (Dönder, Batdı & Akpınar, 2015; Yurt & Polat, 2015), aligning with the constructivist paradigm that emphasizes individual differences following curriculum reconstruction (Yurt & Polat, 2015). Consequently, research on MI theory and MI-based instruction surged, particularly from 2005 to 2009, peaking in 2006; however, it declined after 2009 (Saban, 2009; Karabay, Işık, Günay-Bilaloğlu & Kuşdemir-Kayıran, 2011; Dönder, Batdı & Akpınar, 2015). The accompanying table (Table 1) illustrates the trajectory of theses addressing MI theory within educational contexts from 1998 to 2003, highlighting a rise in academic interest commencing around 2003, reaching a zenith in 2006, followed by a gradual decline thereafter.

Year	Number of Master's theses	Number of Doctoral theses	Total
1998	1	-	1
1999	1	-	1
2000	2	-	2
2001	3	1	4
2002	5	-	5
2003	13	4	17
2004	19	-	19
2005	21	6	27
2006	40	2	42
2007	23	3	26
2008	18	3	21
2009	15	4	19
2010	15	2	17
2011	8	-	8
2012	8	2	10
2013	9	1	10
2014	2	2	4
2015	5	-	5
2016	8	-	8
2017	5	1	6
2018	5	-	5
2019	8	-	8
2020	5	1	6
2021	2	-	2
2022	7	-	7
Total	248	32	280

Table 1. The Number of Master's and Doctoral Theses on MI Theory in the Field of Education

There are two Master theses (Kural, 2020; Gürsu, 2022) that have conducted meta-analysis on the effects of MI-based instruction in science education. Kural (2020) reviewed experimental studies -including theses and peer-reviewed articles-published between 2006 and 2019, culminating in examining 69 studies to assess the impact of MI-based instruction on student achievement and attitudes. Similarly, Gürsu (2022) synthesized findings from 98 Master's and doctoral theses written between 2000 and 2020 that investigated MI's influence on academic performance and attitudinal shifts in science education.

Besides these, several meta-analysis studies have targeted the effect of MI-based instruction on academic success, attitude, and retention. Yurt and Polat (2015) reviewed 66 theses and seven peer-reviewed articles that used experimental design and were published between 2000 and 2014. Baş (2016) covered 75 experimental theses published between 1998 and 2014, while Aydın's (2019) meta-analysis study involved 66 theses and 30 peer-reviewed articles published between 2001 and 2014. These meta-analysis studies targeted to analyse the effect of MI-based instruction on academic success. Unlike these, one meta-analysis study only focused on the effect of MI-based instruction on mathematics achievement (Kaplan, Duran & Baş, 2015). Finally, Batdı (2015) included 51 studies published between 2000 and 2014 to analyse the effect of MI-based instruction on achievement, attitude, and retention.

In addition, several review studies have explored MI theory within the educational context in Türkiye. Saban (2009) evaluated 79 theses and 18 articles published in Turkish from 1999 to 2007, while Karabay et al. (2011) examined 176 theses from 1998 to 2010. Dönder, Batdı, and Akpınar (2015) critically reviewed 116 theses conducted between 2001 and 2012. These comprehensive reviews offer a broader perspective on MI theory in education, whereas the present study concentrates explicitly on the effects of MI-based instruction.

Problem of the Study

This review critically analyses research studies addressing the effects of MI-based instruction within the context of Türkiye between January 2007 and March 2023. Since Saban (2009) extensively reviewed both theses and articles from 1999 to 2007, reiterating that analysis would be redundant. Consequently, studies post-2006 are examined to synthesize an overarching perspective from the late 1990s. Additionally, prior works by Karabay et al. (2011) and Dönder, Batdı, and Akpınar (2015) overlooked published articles, underscoring the necessity of including research from the past 16 years. This review aims to systematically and critically analyse peer-reviewed articles on the effects of MI-based instruction, authored in Turkish and English, within this timeframe. Such a review study is essential because it has become vital to scrutinize the corpus of research examining the pervasive implications of MI theory, which has rapidly ascended to prominence and profoundly influenced curriculum developments since 2004. It is imperative to recognize that, despite a decline in interest, MI-based instruction still significantly impacts researchers and educators. Therefore, conducting a study on MI-based instruction is essential for uncovering the extensive outcomes associated with its application in educational practices. This analysis aims to synthesize the findings of existing studies on the subject, thereby providing a foundational framework to inform future inquiries into this topic and related domains. Ultimately, the central research question addressed is:

What trends characterize research articles on the effect of MI-based instruction regarding content, purposes, participants, materials, designs, results, and publication years conducted in Türkiye from January 2007 to March 2023?

METHOD

This section includes information about the review protocol, resources, systematic review process, and data analysis.

The Review Protocol

This systematic review study employs the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) framework. PRISMA provides a set of items and a standard methodology for the meticulous reporting of systematic reviews, thereby enhancing the rigor of the review process (prisma-statement.org). By applying the PRISMA guideline checklist (Page et al., 2021), the eligibility criteria were determined, pertinent information sources were identified, a robust search strategy was formulated, and the selection process was delineated. Subsequently, the data collection methodology was explicitly recorded, culminating in thoroughly compiling all relevant data. A detailed exposition of the data sources and the systematic review process is elucidated in the following section.

Data Sources and Systematic Review Process

The educational literature was systematically explored within the electronic databases of EBSCOhost (including Academic Search Complete, Education Research Complete, Education Source, ERIC, Teacher Reference Center, and ULAKBIM) to identify peer-reviewed journal articles addressing the effects of MI-based instruction in Türkiye. Following the PRISMA guidelines by Page et al. (2021), a tripartite methodological approach -identification, screening, and inclusion- was employed to curate the final dataset. During the identification phase, the keywords to explore the literature in the selected databases were decided as "multiple intelligences theory," "multiple intelligences + classroom," "multiple intelligences + education," "instructional applications of multiple intelligences theory" and "multiple intelligences based instruction." These keywords were also rendered into Turkish to ensure access to articles published exclusively in that language.

A total of 143 Master's theses, 19 doctoral theses, and 2878 research articles (*n*=278) were catalogued, all of which pertained to MI theory in the field of education and were published between January 2007 and March 2023. Following an exhaustive examination of the graduate theses, 76 Master's theses and eight doctoral theses were identified that specifically addressed the effects of MI-based instruction. Given the existence of prior reviews (Dönder, Batdı & Akpınar, 2015; Karabay et al., 2011) and meta-analysis (Gürsu, 2022) studies, the search was refined to include only accessible full-text scientific articles published in academic journals within the aforementioned timeframe. In the subsequent screening phase, we established comprehensive inclusion and exclusion criteria. The table below encapsulates the eligibility criteria:

Table	2. T	he Fli	gihility	Criteria
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Criterion	Inclusion Exclusion		
Specific subject	The effect of MI-based instruction on	Measuring MI types of children or students,	
(the focus of the study)	achievement, attitude, and retention; and	curriculum or textbook analysis regarding MI	
	teachers' and students' views on the effect of	theory, Scale development studies	
	MI-based instruction		
Literature type	Scientific articles (could be produced from a	Graduate theses, Systematic review studies,	
	thesis)	meta-analysis studies	
Conducted country	Türkiye	Countries except for Türkiye	
Language	Turkish, English	Non-Turkish and Non-English	
Published date	Between January 2007 and March 2023	Before 2007	
Accessibility	Full-text accessible articles	Not accessible articles, conference abstracts	

After setting the eligibility criteria, a comprehensive review of the potential scientific articles was conducted, excluding certain studies. Specifically, articles that were duplicate publications (n=22) or focused on measuring Multiple Intelligences (MI) among students, scale development, or analyses of curricula and textbooks were omitted (n=176).

Later, a secondary review process was employed for the 80 selected scientific articles, which was more detailed and consisted of a full-text reading process. As previously indicated, both international and national literature predominantly segregates into four salient themes concerning the ramifications of MI-based instruction: (1) student achievement, (2) student attitudes, (3) retention, and (4) teachers' and students' views. The primary objective of this review study was to elucidate the overarching patterns associated with MI-based instructional research within the national context. Nevertheless, 12 studies that explored the effect of MI-supported cooperative learning (Ilgar & Babacan, 2012; Işık & Tarım, 2009; Işık, Tarım & İflazoğlu, 2007; Kayıran & İflazoğlu, 2007; Yıldırım & Tarım, 2008), MI-supported lecturing model (Nacakcı, 2009), MI-supported project-based learning (Baş & Beyhan, 2010; Tabuk & Özdemir, 2010; 2011), MI-supported layered curriculum (Bilgili, Gömleksiz & Öner, 2020; Koç & Şahin, 2014), and MI-supported 5E learning cycle (Tüysüz & Geban, 2020) were excluded from the data to strengthen and support the intensiveness of discussion through four main themes.

Additionally, there were ten studies that, while capable of being classified into the four primary themes, also investigated the impact of MI-based instruction on facets such as self-efficacy (Epçaçan, 2013a), knowledge level (Baş, 2010a), conceptual learning (Baki, Gürbüz, Ünal & Atasoy, 2009; Gürbüz, Birgin & Çatlıoğlu, 2014), meta-cognition (Durmuş & Özdemir, 2013), reading comprehension skills (Epçaçan, 2013b), critical thinking (Kırıktaş & Ünal-Çoban, 2016), writing skill development (Elgün, Gündüz & Ünal, 2016), ecological awareness (Akkuzu, Güven & Uyulgan, 2021), and children's learning styles, interests and active participation (Gürkan, Dinçer & Çabuk, 2010). The pertinent segments of these studies were included in one of the four predetermined themes. Ultimately, 68 research articles were included in the present review study regarding the determined criteria. The final step (inclusion) covered all included scientific articles' reading and coding processes. A study flow diagram succinctly encapsulates the systematic review process employed:



Figure 1. The flow diagram of the review (based on the PRISMA flow diagram by Page et al., 2021)

In short, scientific articles written within the context of Türkiye between January 2007 and March 2023 that are accessible and examine the effect of MI-based instructional practices constitute the primary data sources for this study. Furthermore, the reference lists of the found studies were examined to ensure that all relevant articles were contained in the data pool. Nonetheless, despite the meticulous steps undertaken during the literature searches to assemble a representative corpus about the effects of MI-based instruction, it is conceivable that some relevant studies may have inadvertently been omitted from the current review.

Data Analysis

A descriptive analysis was employed to systematically organize and evaluate the 68 research studies examining the effects of MI-based instruction. According to Yıldırım and Şimşek (2013), descriptive analysis seeks to transform data into an interpretable format. Consequently, the data was systematically arranged and structured regarding the research purpose by using NVivo 14 to yield descriptive insights. As previously noted, the identified and selected articles were categorized into four predetermined thematic areas based on prevailing international and national literature trends. Nevertheless, it is important to acknowledge that the content of certain studies may overlap with multiple themes; thus, pertinent sections were included and discussed within both relevant themes. The analysis was structured around these areas, with points categorized as codes under each theme. This approach aimed to evaluate the articles within the data pool descriptively. Frequency tables and percentages derived from descriptive statistics were utilized to facilitate interpretation. Given that this review focused on the content and context of the studies, it was assumed that the findings presented were valid and reliable.

FINDINGS

The distribution of the reviewed studies (n=68) regarding their themes, publication years, research designs, participants, and subject fields are shared in the following sub-sections.

Distribution of the Reviewed Studies Regarding Themes

Sixty-eight research articles were reviewed through the four predetermined themes - the effects of MI-based instruction on student achievement, (2) the effects of MI-based instruction on student attitudes, (3) the effects of MI-based instruction on retention, (4) teachers' and students' views on the effectiveness of MI-based instruction- to generate an understanding of research on the effects of MI-based instruction in Türkiye. As illustrated in Table 2, the findings revealed that most studies concentrated on the effectiveness of MI-based instruction in enhancing student achievement. Conversely, research on teachers' and students' perspectives received moderate attention. At the same time, studies examining the impact of MI-based instruction on attitudes and retention were notably fewer than the most extensively researched theme.

Table	3.	Distribution	of s	Studies	Regarding	Four	Main	Themes
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Themes /	Publication	f
Sub-categories		
Student Achievement	Karakoç & Sezer (2007); Kaya et al. (2007); Köksal & Yel (2007); Temur (2007); Demirci & Yağcı (2008); Demirel et al., (2008); Öngören & Şahin (2008); Yılmaz (2008); Alaz (2009); Çırakoğlu & Saracaoğlu (2009); Sivrikaya & Kaya (2009); Baş (2010b); Çelen, Mirzeoğlu & Mirzeoğlu (2010); Oral & Doğan (2010); Can, Altun & Harmandar (2011); Kurt & Temelli (2011); Kurt, Gümüş & Ermurat (2011); Şengül & Altuntaş (2011); Uzunöz & Akbaş (2011); Erkaçan, Moğol & Ünsal (2012); Erkan & Üster (2012); Durmuş & Özdemir (2013); Güney, Aytan & Şengül (2014); Gürbüzoğlu-Yalmancı & Gözüm (2013); Kurt, Gümüş & Temelli (2013); Kaplan & Yılmaz (2015); Gülfırat Kıbrız (2016); Kılıç & Şahin (2016); Kırıktaş & Ünal-Çoban (2016); Gurcay & Ozturk-Ferah (2017); İnan & Erkuş (2017); Sağıroğlu (2017); Batdal- Karaduman & Cihan (2018); Akkuzu-Güven & Uyulgan (2021); Irmak & Çelik (2021)	35
Teachers' and Students' Views	Bozkurt & Yenilmez (2008); Demirel, Tuncel, Demirhan & Demir (2008); Gürçay & Eryılmaz (2008); Yılmaz (2008); Keser & Çakır (2009); Kutluca et al. (2009); Gürkan, Dinçer & Çabuk (2010); Özbaş (2010); Karatekin, Sönmez & Kuş (2010); Uşun (2010); Epçaçan (2013b); Gürbüz & Baki (2013); Ozan, Taşgın, Bay & Kaya (2013); Baş (2014); Elgün-Gündüz & Ünal (2016); İnan & Erkuş (2016); Çakır & Keser (2017); Çelik-Karacalı & Tezel (2017); Gökbulut & Dirik (2017); Kabapınar & Sargın (2018); Şener & Doğan (2021)	21
Student Attitudes	Kaya et al. (2007); Köksal & Yel (2007); Temiz & Kiraz, (2007); Alaz (2008); Demirel et al., (2008); Şengül & Öz (2008); Epçaçan (2013a); Sivrikaya & Kaya (2009); Baş (2010a); Baş (2010b); Çelen, Mirzeoğlu & Mirzeoğlu (2010); Şahin, Öngören & Çokadar (2010); Uzunöz (2010); Ayaydın & Özsoy (2011); Can, Altun & Harmandar (2011); Erarslan-Taşpınar & Kaya (2016); Kılıç & Şahin (2016); Gurcay & Ozturk- Ferah (2017); Irmak & Çelik (2021)	19
Retention	Köksal & Yel (2007); Temur (2007); Demirel et al., (2008); Hasenekoğlu & Gürbüzoğlu (2008); Baki, Gürbüz, Ünal & Atasoy (2009); Can, Altun & Harmandar (2011); Şengül & Altuntaş (2011); Uzunöz & Akbaş (2011); Erkaçan, Moğol & Ünsal (2012); Gürbüzoğlu-Yalmancı & Gözüm (2013); Akçin & Baktaş- Çetinkaya (2014); Gürbüz, Birgin & Çatlıoğlu (2014); Kaplan & Yılmaz (2015)	13

In Table 3, the studies that investigated more than one theme were included to show the tendency regarding four main themes. However, Table 4 displays the exact distribution of themes of the reviewed studies:

Table 4. Distribution of Studies	Regarding Theme	s in Detail
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Themes	Frequency (f)
Achievement	18
Attitude	9
Retention	4
Achievement + Attitude	7
Achievement + Retention	6
Achievement + Attitude + Retention	3
Teachers' and Students' View	8
Teachers' View	9
Students' View	3
Achievement + Students' View	1

The findings from the review -detailed in Table 3- indicate a noteworthy prevalence of research studies analysing the effect of MIbased instruction on academic achievement, outnumbering investigations focused on other themes. This trend may be attributed to Türkiye's exam-oriented educational system prioritizes national examinations and academic performance over students' interests, skills, or overall well-being (Öztekin-Bayır & Tekel, 2021). Furthermore, the perspectives of both teachers and students regarding the efficacy of MI-based instruction have been more extensively examined compared to the effects of MI on attitudes or knowledge retention. This observation aligns with previous reviews by Saban (2009) and Dönder, Batdı, and Akpınar (2015). The emphasis on teachers' perspectives is particularly pertinent in the context of the curriculum changes implemented in 2004. As numerous scholars have criticized (Bozkurt & Yenilmez, 2008; Gürçay & Eryılmaz, 2008; Kutluca et al., 2009; Özbaş, 2010; Karatekin, Sönmez & Kuş, 2010; Uşun, 2010; Gürbüz & Baki, 2013; Ozan, Taşgın, Bay & Kaya, 2013; Baş, 2014), the knowledge and experience levels of teachers concerning MI-based instruction may pose significant challenges to the effectiveness of such pedagogical approaches. Consequently, the insights of educators are critical for formulating recommendations to enhance instructional efficacy.

Distribution of the Reviewed Studies Regarding Publication Years

Regarding publication years, the distribution of studies revealed no significant increase in the last 16 years in the studies about the effect of MI-based instruction, which is parallel with the number of theses written (Table 1). Table 5 shows the number of articles written between 2007 and 2023.

Table 5. Distribution of Studies Regarding Publication Years

Year	Frequency (f)
2007	5
2008	9
2009	8
2010	10
2011	6
2012	2
2013	6
2014	4
2015	1
2016	6
2017	6
2018	2
2019	-
2020	-
2021	3
2022	-
2023	-

Conversely, there exists a notable decline commencing in 2010, with a marked reduction in empirical investigations, particularly post-2017. These findings show that after the peak in 2006, the number of studies on MI theory in education gradually decreased, and there are only a few studies since 2018. In other words, the subject started to be investigated after the sudden implementation of MI theory in the national curriculum in 2004. Especially between 2005 and 2009, many studies were conducted on the MI theory in education (Dönder, Batdı & Akpınar, 2015). However, this trend has since exhibited a downward trajectory, potentially indicative of the literature reaching a state of saturation regarding the subject (Dönder, Batdı & Akpınar, 2015).

Moreover, the findings from the reviewed studies in the present study mainly highlighted that teachers must have adequate knowledge and experience. They need in-service training to apply MI-based activities in classrooms. Consequently, a consensus is evident among researchers that MI-based instruction ought to be incorporated into the curricula of teacher education programs (Bozkurt & Yenilmez, 2008; Gürçay & Eryılmaz, 2008; Kutluca et al., 2009; Özbaş, 2010; Karatekin, Sönmez & Kuş, 2010; Uşun, 2010; Gürbüz& Baki, 2013; Baş, 2014; Şener & Doğan, 2021).

Nonetheless, these recommendations have been largely overlooked, as neither in-service training nor dedicated undergraduate courses addressing MI theory have been established since the theory was designated as a principal framework during the curriculum revision in 2004. This oversight may contribute to a gradual distancing from the discourse surrounding the subject over time.

Distribution of the Reviewed Studies Regarding Research Designs

The reviewed studies are analysed in terms of the research design they conducted. As seen in Table 6, the experimental and quasi-experimental designs have been used in most studies that analysed the effect of MI-based instruction.

Table 6. Distribution of Studies Regarding Research Design

Design	Frequency (f)	Percentage (%)
Experimental and quasi-experimental research	46	67.6
Survey design	9	13.2
Qualitative research (not specified)	5	7.4
Qualitative case study	5	7.4
Action research	2	2.9
Mixed methods research	1	1.5

The experimental studies primarily focused on comparing the effects of MI-based instruction with traditional instruction in terms of achievement, attitude, or retention. Control and experimental groups were established to conduct these studies. The MI-based methods were implemented over a limited period, typically four weeks, while traditional instructional methods were

used for the control groups. Following the instruction period, outcomes were assessed through achievement tests or attitude scales to evaluate the effectiveness of MI-based instruction compared to traditional methods. The table below (Table 6) outlines the durations of these applications:

Duration	Not	Week									
	specified	1	2	3	4	5	6	7	9	10	12
Frequency (f)											
	8	2	3	3	13	5	4	2	1	3	2

Table 7. Duration of a	pplications for e	xperimental and o	guasi-exi	perimental studies

The dominance of the positivist approach in the field of education in Türkiye may explain the preference for intensive experimental designs, tests, scales, or surveys over qualitative data collection methods (Dönder, Batdı & Akpınar, 2015). The choices made by educational researchers regarding research design or data collection may reflect their overall understanding or approach to the subject matter and the education system. For example, in the reviewed studies, multiple intelligences (MI) are considered significant in analysing their effects on achievement, retention, and attitudes toward the subject, all of which relate to educational achievement. Furthermore, the specifics of the instructional applications based on MI were not shared, and the majority of the experimental studies (n=29) did not discuss MI-based methods and techniques. As a result, the literature lacks quality information regarding the methods, techniques, or activities grounded in MI theory. A few experimental studies (n=18) contained some relevant information. However, three of these studies can be criticized for using questionable methods -such as playing music during lessons or employing practices that may lead to the labelling of students (Alaz, 2009; Erarslan, Taşpınar & Kaya, 2016; Güney, Aytan & Şengül, 2014).

Moreover, researchers predominantly opted to use tests to measure achievement or attitudes. Using tests or scales contradicts the essence of MI theory, as Kurt and Temelli (2011) have indicated. Gardner (2013) emphasized two key educational implications of MI theory: individuation (personalization) and pluralization. Pluralization refers to teaching the same subject in various ways. In many experimental and quasi-experimental studies, applications lasted from 1 to 12 weeks and involved several activities based on multiple intelligences, which aimed to ensure pluralization. However, personalization -which pertains to the individualization of teaching and assessment- was not adequately achieved, as standardized testing tools (scales, achievement tests) were primarily used. Only a few experimental studies (n=11) (Öngören & Şahin, 2008; Yılmaz, 2008; Epçaçan, 2013a, 2013b; Sivrikaya & Kaya, 2009; Çelen, Mirzeoğlu & Mirzeoğlu, 2010; Şahin, Öngören & Çokadar, 2010; Can, Altun & Harmandar, 2011; Erkaçan, Moğol & Ünsal, 2012; Elgün-Gündüz & Ünal, 2016) employed semi-structured interview forms or observation forms in addition to the scales and achievement tests. Notably, only one study lasted an entire semester (one of the most prolonged application durations), using only midterm and final scores without additional scales or tests (Erkan & Üster, 2012).

In addition to experimental and survey designs, the number of qualitative studies (n=12) was comparatively low. Action research (n=2) can potentially expand knowledge and practice in this field, as enhancing teachers' instructional and assessment repertoire is crucial for the two important concepts of MI theory in education: pluralization and individualization (Gardner, 2013).

Distribution of the Reviewed Studies Regarding Participants

The grade level of participants is a significant concern in the literature on MI-based instruction. As highlighted by Hodge (2005) and Scapens and Fraser (2007), there is a need for more research examining the impact of MI-based instruction on achievement, attitudes, retention, self-efficacy, and self-confidence among secondary school students (grades 6 to 12). It is suggested that the perception of MI-based activities being more suitable for younger children contributes to this oversight. However, as illustrated in Table 8, a substantial portion of research has focused on students in grades 6 to 8 (39.7%). In comparison, a notable number of studies investigated high school students (19.1%), and there was also attention given to undergraduate students (8.8%).

These findings align with Saban's review study (2009), which indicated that 35.1% of studies were conducted with middle school students, whereas 17.5% were focused on high school students. Consequently, there appears to be a discrepancy between national and international literature concerning the participants' grade level or age. Additionally, since MI theory was established as part of the 2004 national curriculum, understanding teachers' perspectives (f=8) is crucial for assessing the theory's effectiveness and application.

Table 8. The Distribution	of Studies Regarding	g Participants'	Class Levels
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	-
Participants	Frequency
Pre-school students	1
Primary education students (1 to 5 th grade)*	13
Middle school students (6 th to 8 th grade)	27
High school students (9 th to 11th grade)	13
Teachers	8
Undergraduate	6

*Only one study involving 5th-grade students was conducted and published before 2012 when primary education lasted five years. **Distribution of the Reviewed Studies Regarding Subject Fields**

Table 9 below shows the variety of fields studied through MI-based instruction:

Table 9. Th	e Distribution	of Studies	s Regarding	Subject Fields
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General subject field	Subject	Frequency (f)	Total Frequency (f)
	Science education (5 th to 8 th grade)	10	
Science	Biology education (9 th to 11 th grade)	5	18
	Physics education (9 th grade)	3	
Math	-	-	13
		_	
	Geography (6 th to 9 th grade)	5	
Social sciences	Life sciences (1 st to 3 rd grade)	4	11
	Social studies (4 th to 6 th grade)	3	
Language education	Turkish literature	4	8
	English as a second language	4	
Elementary education	-	-	5
Art education	-	-	3
Physical education	-	-	2
Environmental education	-	-	2
Traffic education	-	-	2
Pre-school education -		-	1
Religious culture and	-	-	1
ethics			
Architectural design	-	-	1

MI theory has been applied across various subjects, from environmental education to the arts. However, most studies have focused on math and science (f=31; 45.5%), which aligns with Saban's (2009) review findings. This emphasis on math and science may pose a problem concerning the nature of MI theory. Gardner argues that while logical-mathematical and verbal abilities are important, each individual possesses unique interests, abilities, strengths, and weaknesses. For instance, teaching math through music or physical activities supports this claim. Nevertheless, the predominance of studies aimed at enhancing student achievement or attitudes toward science and math raises questions. Why has less focus been on improving learning in music, art, or social sciences? Statistics reveal that most research on MI theory has concentrated on math and science, reflecting the curriculum's emphasis on these subjects and the standardized tests in Türkiye. However, this trend does not align with the foundational principles of MI theory.

DISCUSSION

The primary motivation behind this study was to critically analyse research on MI-based instruction in the educational context of Türkiye. This review aims to contribute to the national literature by comparing and contrasting national findings with international studies. Based on a selection of 68 research articles published between January 2007 and March 2023, the current review is based on four predetermined key themes consonant with international literature: the effect of MI-based instruction on (1) student achievement, (2) student attitudes, (3) retention of knowledge, and (4) the perspectives of teachers and students on the effectiveness of MI-based instruction. Each of these themes is discussed concerning its international context.

The Effect of MI-Based Instruction on Student Achievement

The concept of student achievement has emerged as a pivotal focus within educational research, and it is fundamentally understood as the extent of academic content mastery within a specified timeframe. Regardless of the frameworks employed - Multiple Intelligences (MI) theory, individual differences, varying interests, or distinct skill sets- the discourse invariably converges on "achievement."

A vast body of literature proved the effectiveness of MI-based instruction in enhancing student achievement (Duval & Mark, 1994; Hoerr, 1996; Campbell & Campbell, 1999; Goodnough, 2001; Kornhaber, 2004). The Schools Using Multiple Intelligence Theory (SUMIT), initiated by Project Zero investigators, provides the most compelling evidence supporting MI-based applications and their impact on student academic outcomes. Throughout three and a half years, SUMIT researchers amassed data from 41 diverse schools across 18 states that integrated MI theory into their curricula. The results were categorized into four distinct outcomes, with one specifically addressing academic achievement; remarkably, nearly 80% of participating schools reported enhancements in students' standardized test scores (as cited in Johnson, 2007).

The outcomes of the reviewed studies (n=68), which employed experimental designs to assess changes in student achievement, align consistently with findings from the broader international literature. However, the way they reached the data is quite different. For instance, Campbell and Campbell (1999) and Kornhaber, Fierros, and Veenema (2004) in the SUMIT project reached the data through observations and interviews in a natural setting of schools by observing students' improvement

throughout the project; they used the standardized test results of students which were a part of the standard teaching-learning process, as schools already applied the MI theory.

Conversely, researchers in Türkiye implemented additional experiments and activities within a constrained timeframe, predominantly spanning four weeks. This approach introduces potential limitations concerning the research design, as it diverges from the natural sequence of curricular implementation; instead, supplementary activities are utilized to evaluate the effectiveness of MI-based instruction in a restricted period. The duration of applications is a crucial factor in assessing the reliability and validity of findings, as highlighted by Saban (2009); notably, eight of the reviewed articles (17.4%) did not specify the duration of applications, and approximately 35.6% of the experimental studies were conducted over less than five weeks. Moreover, many reviewed studies prepared additional achievement tests to assess students' academic performance, which raises methodological concerns, as MI theory fundamentally challenges quantitative representations of intelligence. Kurt and Temelli (2011) acknowledged this inconsistency, advocating for using qualitative measurement techniques to derive data concerning students' academic achievement despite their research employing achievement tests.

In summary, it is evident that the conceptualization of "achievement" was problematic across the reviewed studies; framing the inquiry as "the effect of MI-based instruction on learning" may be more consistent with MI theory's theoretical foundations and assertions. Nonetheless, MI theory itself and its associated claims have the potential to yield positive outcomes, particularly for altering teacher perceptions. Echoing the Pygmalion effect, Gardner's framework suggests that every individual possesses the potential for success (Campbell & Campbell, 1999). When educators believe in each student's unique strengths, it can positively transform students' self-perceptions, consequently facilitating their cognitive, emotional, and social development (Akey, 2006). Gardner's work equips educators with a multifaceted model of intelligence, empowering them to nurture students' growth across diverse dimensions by fostering belief in their intrinsic potential (Campbell & Campbell, 1999).

The Effect of MI-Based Instruction on Student Attitudes

In psychological constructs, attitude is defined as an individual's evaluative response -encompassing behaviour, emotion, or cognition- toward an object, situation, or event (Atik, 2010). Within the framework of this review, the term "attitude" pertains explicitly to students' dispositions toward various academic subjects, including Mathematics, Biology, Music, and Art. The reviewed literature demonstrates a consistent methodology wherein researchers employed attitude scales to assess students' perceptions of these subjects. A positive attitude has been shown to correlate significantly with enhanced learning outcomes and academic achievement. Multiple Intelligences (MI) theory posits that recognizing individual differences in abilities, intelligences, interests, strengths, and weaknesses can lead to more effective educational practices. Instructional approaches encompassing all types of intelligences are likely to engender favourable attitudes towards the relevant subjects.

Empirical evidence indicates that MI-based instruction promotes a positive disposition among students toward the subject matter and cultivates essential skills such as motivation, participation, and engagement. The SUMIT project notably illustrated that integrating MI principles resulted in increased student motivation and participation and improved engagement levels. Furthermore, research conducted by Kornhaber, Fierros, and Veenema (2004) found a noteworthy reduction in disciplinary issues, positing that "student discipline is directly linked to student engagement." When students are actively engaged in their academic and social learning experiences, they are less likely to encounter disciplinary challenges (Johnson, 2007).

The findings from the reviewed studies reflect a consistent trend: nearly all studies utilized attitude scales to evaluate students' attitudes toward their subjects and collectively highlighted the positive impact of MI on motivation, interest, and participation. However, these additional insights were not solely derived from attitudes scales in experimental designs; several studies also incorporated qualitative methods such as interviews and observations (Temur, 2007; Öngören & Şahin, 2008; Şengül & Öz, 2008; Yılmaz, 2008; Sivrikaya & Kaya, 2009; Çelen, Mirzeoğlu & Mirzeoğlu, 2010; Epçaçan, 2013b; Elgün, Gündüz & Ünal, 2016; İnan & Erkuş, 2017). In these qualitative studies utilizing various data collection tools (Temiz & Kiraz, 2007; Demirel et al., 2008; Gürçay & Eryılmaz, 2008; Kutluca et al., 2009; Gürkan et al., 2010; Kılıç & Şahin, 2016; Kabapınar & Sargın, 2018; Şener & Doğan, 2021), similar conclusions were drawn. However, quantitative results from three distinct studies did not indicate a significant shift in students' attitudes toward the subjects (Köksal & Yel, 2007; Ayaydın & Özsoy, 2011; Kurt & Temelli, 2011). This suggests that a four-week timeframe may not effectuate meaningful changes in emotions, thoughts, behaviours, or attitudes. While the majority of studies indicate a positive transformation in students' attitudes toward their academic subjects, there remains a pressing need for qualitative research designs to thoroughly examine the application of MI theory and its resultant impacts within educational settings. The findings underscore that interviews and observations can yield a more nuanced understanding than traditional scales alone. Consequently, it may be prudent to shift the focus from a narrow examination of "attitude towards subject matter" to a broader investigation of "attitude towards school or the learning process." This shift could elucidate the intricate relationships among motivation, participation, positive attitudes, and engagement in educational contexts.

The Effect of MI-Based Instruction on Retention

Retaining learned material has long been a significant concern in education, commonly referred to as "retention" in academic studies. Recently, with the growing emphasis on brain research and cognitive psychology in the educational field, teachers are increasingly questioning how learning and memory function. MI theory offers a non-traditional perspective on this issue. MI theory claims that memory can be approached in various ways. Consequently, it allows teachers to become more actively involved in

making their lessons cater to the myriad paths of student learning and remembering (Anderson, 1998). The central question for research exploring the impact of MI-based instruction is whether it leads to lasting learning outcomes.

It can be asserted that the "retention" studies within the context of MI theory are linked to the potential connection between active learning and long-term knowledge retention. Research indicates that students' active engagement in learning enhances their ability to learn and remember (Chi, 2009). Given that MI-based instructional methods necessitate active participation and that MI-based classrooms prioritize student engagement, applying MI theory may enhance the likelihood of long-term knowledge retention.

The studies reviewed assessed retention through tests administered two weeks to a month after the intervention. Researchers predominantly employed achievement tests as retention measures to evaluate the durability of the knowledge imparted. Results of reviewed studies confirmed that MI-based instruction increases the permanence of knowledge (Köksal & Yel, 2007; Temur, 2007; Hasenekoğlu & Gürbüzoğlu, 2008; Can, Altun & Harmandar, 2011; Şengül & Altuntaş, 2011; Uzunöz & Akbaş, 2011; Erkaçan, Moğol & Ünsal, 2012; Gürbüzoğlu-Yalmancı & Gözüm, 2013; Akçin & Çetinkaya, 2014). However, it can be claimed that regarding the scope of the reviewed studies, retention as a construct in the instructional context or its relationship with MI theory was not discussed in detail or associated together.

Teachers' and Students' Views on the Effectiveness of MI-Based Instruction

The findings of this theme are crucial for analysing the potential of MI-based instruction within the context of education in Türkiye. The findings reveal that both teachers and students hold positive views on instruction based on MI theory. They agree that MI-based instructional methods enhance participation, motivation, self-confidence, and achievement. However, teachers interviewed in the reviewed studies predominantly emphasized the need for more knowledge, experience, and practice to implement MI-based instructional methods and create appropriate learning environments effectively. Additionally, the adequacy of classroom conditions -such as available materials and opportunities- emerges as another critical factor for successful practice. For instance, teachers frequently highlighted challenges such as large class sizes, a heavy curriculum load, and insufficient learning environment conditions, which are significant barriers to integrating additional MI-based activities. Consequently, the findings indicate that while MI theory is present in the national curriculum and teachers and students have a favorable view of MI-based instruction, achieving its practical application necessitates appropriate teacher training and classroom conditions.

Discussing ways to enhance these conditions is crucial, especially given that students generally express positive views about MI-based applications. Thus, the data from studies prioritizing teachers' opinions can serve as a valuable starting point for a more practical discussion.

In this context, seeking teachers' insights and consulting them about their experiences can establish a foundation for understanding the obstacles and conditions necessary for the effectiveness of MI-based instruction. Conducting experiments demonstrating the efficacy of MI-based instruction is only meaningful and efficient if teachers are knowledgeable and well-informed.

Furthermore, the qualitative studies reviewed provided more valuable insights than the experimental studies. The quantitative studies tended to employ similar designs and procedures across various subject areas, failing to elaborate on the techniques or methods used, and they inadequately defined MI-based instruction. Although nearly all of them recommended in-service training for teachers, the studies encompassed in the previous three themes primarily concentrated on the impact of MI-based instruction on student achievement, attitudes, and retention. In contrast, incorporating teachers' perspectives shifts the focus from these outcomes to the essential requirements for creating a learning environment conducive to improving those variables.

Discussing ways to enhance these conditions is crucial, especially given that students generally express positive views about MI-based applications. Thus, the data from studies prioritizing teachers' and/or students' opinions can be a valuable starting point for a more practical discussion.

In Table 10, teachers' and students' general views about the effectiveness of MI-based instruction are gathered to see all results clearly:

Table 10. Summary of Teachers' and Students' Views about the Effectiveness of MI-based Instruction

Teachers' views		Students' views	
Positive	Negative	Positive	Negative
-Prevents learning environments from being monotonous -Students experiencing success thanks to activities addressing different intelligence domains -Increased student self-efficacy, motivation, participation, and engagement -Provide meaningful learning	-No adequate knowledge about the theory and its application -Need in-service training -Inadequate conditions (materials, class size, classroom opportunities, time, and others) to apply such practices -Noisy environment, as students all together participate in the process, and this sometimes bothers -Course hours are not enough -Curriculum is quite intense and hinders the implementation of MI- based activities	-Enjoy learning through MI- based activities -Become motivated to learn -Communication skills improved -Started to believe in themselves -Increased participation -Could understand better through MI-based activities -More eager to study -Could explore and investigate individually -Feel more responsible for learning	-Noisy environment, as they all together participate in the process, and this bothers

CONCLUSION AND RECOMMENDATIONS

This review aims to analyse studies conducted in Türkiye from January 2007 to March 2023 regarding the effectiveness of instruction based on Multiple Intelligences (MI). The findings indicate a notable fluctuation in attention towards MI theory since its integration into the national curriculum in 2004. Initially, there was an increase in interest and engagement with MI theory; however, this interest began to decline significantly after 2006, suggesting that the theory had become a fleeting "trend." Numerous studies were conducted during this period, predominantly featuring similar research designs, but the overall interest in the topic has waned over time.

Moreover, several deficiencies must be addressed to enhance future research on MI-based instruction. To begin with, the content and structure of MI-based instruction processes should be more thoroughly elucidated and debated in future studies, as this may impede a clear understanding of the subject. Additionally, many studies lack a critical perspective on the inadequacies present in curricula or textbooks. It is also worth noting Gardner's (2013) critique that standardized assessment tools and quantitative evaluation methods do not align well with the essence of MI theory. Consequently, the design of experimental studies and the duration allocated for implementation and evaluation should be more congruent with the nature of the theory. There is a pressing need for more detailed, structured, and long-term studies to yield valid quantitative data. Ultimately, findings manifested that qualitative studies have produced more insightful interpretive data; thus, this perspective should gain greater prominence in future research.

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Statements of Publication Ethics

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Ethics Committee Approval Information

This is a systematic review study; the data was from articles on MI-based instruction. Therefore, no application was made to any Ethics Committee.

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