



## Multiple Intelligences in Physical Education: A Systematic Review of Evidence and Measurement Issues

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### Abstract

The aim of this study was to systematically review the existing research on the application of the Multiple Intelligences theory in Physical Education. The research focused on the relationship between the theory and learning outcomes, student characteristics, and teaching practices. The results from the majority of studies indicate the beneficial impact of the theory on the learning process. However, the validity of these findings continues to be questioned due to the use of self-report questionnaires and the methodology of cross-sectional studies. Improvements in students' motor and social skills, as well as increased motivation for active participation in the learning process, were among the most significant findings, especially in studies that implemented intervention programs. The lack of reliable and valid tools for measuring the types of intelligence, as well as the need for longitudinal studies incorporating intervention programs, should be the main focus of future research.

### I. Introduction

The theory of Multiple Intelligences (MI), proposed by Gardner (1983), is a concept that has generated ongoing debate in the fields of educational psychology and pedagogical practice regarding its potential use as a teaching approach. Gardner himself clarified that his theory does not constitute a pedagogical proposal, as it clearly distinguishes multiple intelligences from learning styles and from broader social domains of activity. The theory conceptualizes intelligence as a set of distinct and relatively independent capacities, rather than a single general cognitive ability traditionally measured through standardized tests (Sternberg, 2018).

According to Gardner (2010), the development of the theory was grounded in anthropological, psychological, and biological research. Gardner (1983; 1999; 2011) identified the following intelligences: linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, intrapersonal, interpersonal, and naturalistic (Armstrong, 2018). Additional forms, such as

spiritual intelligence, have also been proposed by later researchers (King, 2008; King & DeCicco, 2009; Shearer, 2018).

The theory has gained considerable popularity in educational settings, as it allows educators to better understand differences in students' cognitive profiles and learning preferences (Armstrong, 2018). It has also been associated with student-centered teaching approaches, supporting the development of differentiated instruction and promoting active participation and inclusive classroom environments (Sherman, Cameron, & Nichols, 2023). Similarly, Kornhaber (2019) suggests that approaches aligned with MI theory, which allow students to process information in diverse ways, can enhance learning effectiveness.

Physical Education is considered a field where Multiple Intelligences (MI) theory can be particularly useful, as it allows teachers to engage different types of intelligence and support kinesthetic learning, collaboration, and active participation (Sağlam&Doğan, 2025; Sherman, Cameron, & Nichols, 2023). Among these, bodily-kinesthetic intelligence plays a central role, since it is directly related to movement control, the development of motor skills, and the ability to handle objects effectively through both gross and fine motor coordination (Schmidt & Lee, 2019; Magill & Anderson, 2017). In addition, intrapersonal and interpersonal intelligences are also important, as Physical Education often involves cooperation, interaction, and students' ability to regulate their behavior, particularly in team activities (Kitsantas et al., 2025; Weinberg & Gould, 2019).

Despite its widespread use in educational contexts, MI theory has received considerable criticism. Researchers such as Gottfredson (2004) and Willingham (2004) have questioned both its theoretical basis and its empirical support. These researchers argue that Gardner's theory is not innovative in the study of intelligence, since many of the "intelligences" he proposed already existed in cognitive psychology as cognitive abilities or skills (Waterhouse, 2006; Willingham, 2004). Schneider and McGrew (2018) as well as Willingham



(2004), further argue that the description of intelligence as a single general cognitive ability provides a more comprehensive framework, as reflected in the concept of the general intelligence factor (g). In agreement with this view, Lilienfeld et al. (2010) and Waterhouse (2006) suggest that intelligences such as bodily-kinesthetic or musical are more likely to be skills or talents rather than distinct intelligences. Another issue concerns the lack of a clearly defined structure, as the final number of intelligences has not been definitively established and new ones continue to be proposed (Waterhouse, 2006).

Finally, regarding MI theory as a pedagogical approach, Willingham (2004) expresses reservations, noting that educators face several practical difficulties in its implementation. Large class sizes, extensive curricula, and limited resources constitute significant barriers to the effective application of MI-based teaching practices.

In the field of Physical Education, although a sufficient number of studies have been produced in recent years exploring the relationship between Multiple Intelligences and kinesthetic learning and teaching approaches, the literature remains relatively limited compared to other subjects in the school curriculum (Bayram&Keskin, 2020; Gani, Tomoliyus, &Hariono, 2023; KaragülmezSağlam&Doğan, 2023). The studies by Kemec (2016), Elizabeth et al. (2019), and Shukry, B.J., & Qasim, Y.Z. (2025) are among these. Specifically, Kemec (2016) investigated the effect of gender on the intelligence levels of prospective physical education teachers. Data analysis revealed that women exhibited higher levels of linguistic, spatial, and musical intelligence. In contrast, men excelled in Logical-Mathematical intelligence. The findings of the study by Elizabeth et al. (2019) indicate that the Physical Education environment is not merely a setting for students to run or jump, but can contribute to the development of various types of intelligence, such as communication, expression, and motor skills, provided that the Physical Education teacher has the knowledge to design programs aimed at developing all forms of intelligence. Finally, Shukry and Qasim (2025) investigated the relationship between Multiple Intelligences and the development of physical fitness and skills.

The purpose of this study was to review and synthesize the existing scientific literature related to Multiple Intelligences in Physical Education. Emphasis was placed on their relationship with learning outcomes, student characteristics, and teaching practices.

## II. METHODOLOGY

The guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were followed in the search and selection of the studies included in this research.

The study selection process consisted of four stages. In the first stage, studies were identified, while in the second stage, a check was conducted to identify potential duplicates. In the third stage, both the titles and abstracts were evaluated, and finally, in the fourth stage, a final evaluation of the full text was conducted of the studies that met the established inclusion criteria.

The search for studies to be included in the review was conducted in reputable databases such as Scopus, ERIC, PubMed, SportDiscus, Google Scholar, and the National Documentation Centre. The search for studies was conducted using keywords such as: “multiple intelligences,” “physical education,” “motor learning,” “bodily-kinesthetic intelligence,” “sport pedagogy,” “physical activity,” “cognitive development,” and combinations of these terms. The search was conducted in English, Greek, and French and included studies conducted between 2010 and 2026.

Studies were included if they met the following criteria:

- a) They examine the Multiple Intelligence theory within the context of physical education, motor learning, and sports pedagogy,
- b) They include empirical data, quantitative, qualitative or both, that explored the use and/or measurement of Multiple Intelligences,
- c) The empirical data must refer to students participating in physical education classes and to physical education teachers,
- d) The studies must be in Greek, English, or French,
- e) They must have been published between 2010 and 2026,
- f) They must have been published in peer-reviewed scientific journals or presented at international conferences, or be at the level of a doctoral dissertation.

The study did not include research referring to subjects other than Physical Education, lacking empirical data, not constituting academic publications, written in a language other than Greek, English, or French, or published before 2010.

The narrative synthesis method, as proposed by Popay et al. (2006), was used to analyze the studies included in the study. This method allows the researcher, when the empirical data are not identical and therefore do not permit meta-analysis, to proceed with a descriptive and comparative synthesis of the results. Specifically,



for each study included in the analysis, the researchers recorded the sample (numbers, composition by gender and age), the methodology used, the type(s) examined, and the main results. The next step involved comparing the results and linking them to identify trends and differences, with the ultimate goal of drawing conclusions regarding the application of Multiple Intelligences theory in the field of Physical Education.

A basic methodological appraisal was conducted focusing on study design, sample description, and data collection procedures. Emphasis was placed on the clarity of the research design, the adequacy of the sample description, and the appropriateness of the data collection methods. Although no standardized quality assessment tool was applied, all studies met basic academic and methodological criteria.

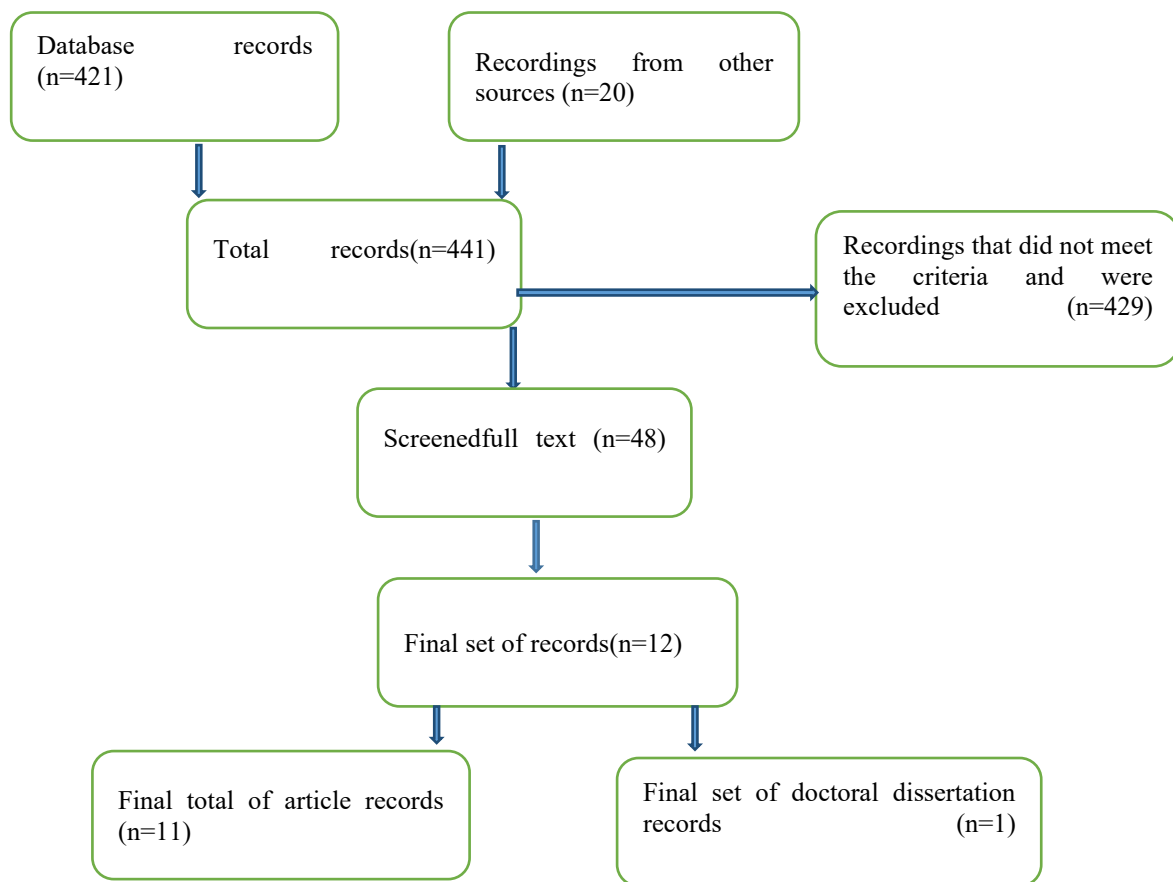


Figure 1. Survey search flow chart

As shown in Figure 1, from the literature review, taking into account the title and keywords, 441 studies related to the topic under investigation were identified. Of these, 429 were excluded since 336 were not related to Physical Education, 52 were published before 2010, 25 were already review studies, and 16 were theoretical studies.

### III. Results

This review included a total of 12 studies that examined the application of Multiple Intelligences theory in the context of Physical Education, both in primary and secondary education as well as in university departments training future

physical education teachers. These studies were selected based on specific criteria from an initial pool of 48 studies.

Of the 12 studies, 8 followed a cross-sectional design using self-report questionnaires for data collection, 2 were experimental studies implementing intervention programs to develop types of intelligence, 1 was a case/experimental design study, and 1 was a correlation study. A total of 2,996 individuals participated in 11 of the studies, while one study, Elizabeth et al. (2017), did not report the sample size. The sample size ranged from 58 (Gani et al., 2023) to 1,199 (Ekici, 2011) participants, covering a wide range of age groups.



Finally, the number of countries in which the studies were conducted is limited, with Turkey having the most (4), while China, Cuba, Greece, Indonesia, Iraq, Peru, the Philippines, and the Republic of Northern Cyprus each had one study.

The findings of the studies indicate that there are no significant differences in the profiles of intelligence types exhibited by the participants. Gender and age are factors that influence intelligence types; however, general conclusions

cannot be drawn. Furthermore, the findings indicate that Bodily-Kinesthetic, Intrapersonal, and Interpersonal Intelligences are the types of intelligence most strongly associated with the Physical Education curriculum.

Finally, the three studies that implemented intervention programs found improvements in both the participants' motor and social skills and in their motivation to participate in the class (Table 1).

**Table 1.** Summary of empirical studies on the Multiple Intelligences theory in Physical Education

Authors	Title	Aim	Participants	Method	Study Design	Key findings
Bayram&Keskin (2020) Turkey	Examining the multiple intelligence types based on academic success, age, gender and job experience of physical education teachers in state schools in Turkey	To examine PE teachers' multiple intelligences and their variation across demographic characteristics	110 PE teachers (46 women, 64 men)	Quantitative (questionnaire)	Cross-sectional	No significant differences for most demographic variables; age significantly affected interpersonal intelligence
Ekici, S. (2011) Turkey	Multiple intelligence levels of physical education and sports school students	To investigate MI levels and their variation based on demographic characteristics	1.199 students (541 women, 658 men)	Quantitative (questionnaire)	Cross-sectional	Relatively balanced MI profiles; some gender-based differences in specific intelligences
Elizabeth et al. (2017) Cuba	Influence of multiple intelligences theory in physical education: Cases study	To examine the impact of MI theory on teaching PE skills	School students (case study; sample size not reported)	Case study (observation and questionnaire)	Case study/experimental	An 8-week intervention improved motor, social, and communication skills
Estrella, E. (2020) Philippines	Multiple intelligences among physical education students	To examine MI levels among PE students	303 PE students	Quantitative (questionnaire)	Cross-sectional	Moderate to high MI levels; no significant demographic differences
Galarza-Porras,	Multiple	To	272	Quantitative	Cross-	Weak or



E.Y. & Torres-Acuña, W. (2018) Peru	Intelligences & Academic Performance	investigate the relationship between MI and academic performance	secondary schools students	ve	sectional	non-significant correlations; no relationship between bodily-kinesthetic intelligence and PE performance
Gani, Tomoliyus & Hariono (2023) Indonesia	Integration of multiple intelligence in the learning process of physical education in elementary school based on teacher gender	To examine MI integration in PE and gender differences among teachers	58 PE teachers (36 men, 22 women)	Quantitative (questionnaire)	Cross-sectional	Gender differences observed; MI integration associated with improved learning processes
Karagülmez Sağlam & Doğan (2023) Turkish Republic of Northern Cyprus	Examination of Physical Education and Sports teachers' Intelligence Areas Based on the Theory of Multiple Intelligence	To investigate the relationship between MI and demographic characteristics	168 PE teachers	Quantitative (questionnaire)	Cross-sectional	School type and demographics influence specific intelligences differently
Kemec D.G. (2016) Turkey	Comparison of multiple intelligence fields of physical education and sports college students	To compare MI types among PE students based on demographics	185 PE students	Quantitative (questionnaire)	Cross-sectional	Gender differences observed; men scored higher in logical-mathematical, women in other domains
Masadis Gr. (2020) Greece	The impact of different teaching approaches on multiple intelligence and the achievement of the subject of Physical	To examine the effect of teaching models on MI and achievement,	387 primary school students (Grades 5-6)	Quantitative (questionnaire) with intervention	Experimental	Cooperative and mixed teaching approaches significantly improved MI levels



	Education in elementary education	considering gender				
Sağlam&Doğan (2025) Turkey	Multiple intelligence profiles of physical education teacher candidates.	To examine MI profiles of prospective PE teachers	102 PE students	Quantitative (questionnaire)	Cross-sectional	Higher linguistic scores; bodily-kinesthetic had the lowest mean
Shukry, B.J. & Qasim, Y. Z. (2025) Iraq	Multiple Intelligences and Their Relationship to Physical and Skill Achievement among middle School Students	To examine the relationship between MI and physical/skill performance	92 students	Quantitative (fitness tests and questionnaire)	Correlational study	Positive and significant correlations between MI, fitness, and motor skills
Wang, C., Zou, Y. (2023) China	Curriculum Design of Physical Education Based on Multiple Intelligences Theory	To apply MI theory in PE curriculum design	120 secondary school students (experimental and control groups)	Experimental intervention	Experimental	Significant improvements in participation, motor skills, confidence, and cooperation

#### IV. Discussion

The aim of this systematic review was to investigate whether and how the Theory of Multiple Intelligences is applied in physical education. More specifically, the study focused on the relationship between the theory and learning outcomes, student characteristics, and teaching practices. The research findings indicate that participants exhibit a profile of multiple intelligences without significant deviations in many cases (Ekici, 2011; Estrella, 2020). Overall, a relatively balanced profile of multiple intelligences is observed (Ekici, 2011). Nevertheless, in some studies, certain variations were observed that were attributed to gender (Ekici, 2011; Kemec, 2016), the age of the participants (Bayram&Keskin, 2020), and the educational environment (KaragülmezSağlam&Doğan, 2023).

One point that requires particular attention is that Bodily-Kinesthetic, Intrapersonal Intelligence, and Interpersonal Intelligence appear to be related to the basic requirements of the Physical Education

course, a fact that highlights their relevance to the subject. This result is likely due to the very nature of the subject, since its proper implementation requires students to engage in movement, interaction, and collaboration with one another. Intervention studies suggest that the Physical Education course not only provides the opportunity but also fosters the development of skills related to both motor control and students' social and emotional development (Elizabeth et al., 2017; Masadis, 2020; Wang & Zou, 2023).

Another finding that warrants special attention is that some of the studies reviewed indicate that when elements of Multiple Intelligences theory are incorporated into the teaching method used by the educator, the learning process becomes more interactive (Gani, Tomoliyus&Hariono, 2023; Wang & Zou, 2023). Specifically, research findings indicate that motivation to participate increased significantly (Masadis, 2020), while experimental studies observed improvements in students' motor skills



(Elizabeth et al., 2017; Masadis, 2020; Wang & Zou, 2023) and an increase in self-confidence and cooperation (Elizabeth et al., 2019; Wang & Zou, 2023), as well as in students' autonomy (Masadis, 2020). These findings suggest that when teaching approaches are diversified by incorporating new practices and become more student-centered by taking into account each student's learning characteristics, such as their intelligence profile, then the learning process becomes more effective (Masadis, 2020; Wang & Zou, 2023).

From what has been mentioned above, it is evident that the application of Multiple Intelligences theory in the field of Physical Education yields positive results. However, both these results themselves and their interpretation should be approached with skepticism and great caution, particularly regarding the methodology followed by most studies. A critical stance toward the reliability of the results and conclusions is imperative, since self-report questionnaires were used to collect data regarding the classification of participants into a specific type of intelligence (Bayram&Keskin, 2020; Ekici, 2011; Estrella, 2020; KaragülmezSağlam&Doğan, 2023; Kemec, 2016; Sağlam&Doğan, 2025). According to Temiz and Kiraz (2016), although self-report questionnaires offer many advantages to researchers, there is a clear risk that participants will respond not according to their own beliefs but according to the views and desires of their social environment.

Another "problematic" aspect that should be seriously considered is the cross-sectional design of the majority of studies, a design that largely prevents the drawing of causal conclusions, as well as the limited ability to determine the temporal sequence of events (Lack of Temporal Order) (Wang & Cheng, 2020).

The heterogeneous educational contexts and samples—since the studies come from different countries and educational systems such as China, Cuba, Greece, Iraq, Peru, the Philippines, and Turkey—constitute another limitation of the research, as they make it difficult to generalize the findings. One might argue that the diversity of the studies provides a broader perspective on the application of Multiple Intelligences theory in Physical Education worldwide. And while there appears to be diversity in the research, the fact that only a small number of studies met the inclusion criteria should not go unnoticed. This small number indicates that the relevant literature in the field of Physical Education is still in its developmental stage.

The lack of empirical evidence for the types of intelligence, as well as the inability to distinguish between them, are also points of contention and disagreement between researchers who support the theory of Multiple Intelligences and those who oppose it. This fact compels proponents of the theory to take it seriously into account by re-examining the findings of their research. However, what proponents of the theory must seriously consider—and what requires a swift solution—is the lack of measurement tools for the types of intelligence that are accepted by the majority of the research community.

Nevertheless, studies by Masadis (2020) and Wang and Zou (2023) it is found that their contribution to the diversification of teaching as well as to students' active participation in the learning process is consistent with contemporary pedagogical approaches and enables the teacher to create a more engaging and effective learning environment. A concern raised by critics of the theory - namely, that the implementation of such approaches is very difficult or even impossible due to large class sizes, time constraints, and a lack of sufficient resources- has been refuted by Masadis (2020), who argues that the application of the theory is necessary and provides solutions to the above cases.

Taking into account both the negative critiques that have been expressed and the positive views, particularly from researchers who have implemented intervention programs, the researchers consider it appropriate for future research to focus on conducting longitudinal studies that include intervention programs, given the dominance of cross-sectional studies in the literature to date (Elizabeth et al., 2017; Masadis, 2020; Wang & Zou, 2023), a fact that will allow for a more systematic investigation of the impact of Multiple Intelligences theory on learning outcomes in Physical Education. Finally, one point that proponents of applying the theory in the Physical Education context should pay particular attention to is the development and use of reliable tools for measuring types of intelligence, which will enhance the quality and reliability of research data.

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