Science, Education and Innovations in the Context of Modern Problems

Issue 1, Vol. 9, 2026

RESEARCH ARTICLE

Kinesthetic (Bodily–Motor) Intelligence Among Adolescent Secondary School Students: Gender-Based Differences, Environmental Influences, and Educational Implications within the Framework of Multiple Intelligences Theory

Abdellatif Chenini
Dr.
University of Algiers 3
Algeria
E-mail : dzabdelatif@gmail.com; ORCID : 0009-0001-8490-1767

Oussama Merzougui
Dr.
Higher Teachers' School of Taleb Abderrahmane, Laghouat
Algeria
E-mail : o.merzougui@ens-lagh.dz; ORCID : 0009-0000-9890-1269

Issue web link https://imcra-az.org/archive/389-science-education-and-innovations-in-the-context-of-modern-problems-issue-1-vol-9-2026.html

Keywords Kinesthetic intelligence ; Bodily–motor intelligence ; Multiple intelligences ; Secondary education; Adolescence ; Gender differences; Educational environment

Abstract

This study investigates the level of kinesthetic (bodily–motor) intelligence among adolescent secondary school students and examines gender-based differences within the context of environmental and educational influences. Grounded in Howard Gardner's theory of multiple intelligences, the research adopts a descriptive survey methodology to explore students' self-perceived kinesthetic intelligence and to identify statistically significant variations according to gender. The study sample consisted of 795 secondary school students enrolled in the final years of secondary education, selected through random sampling procedures to ensure representativeness. Data were collected using a validated kinesthetic intelligence scale designed to measure students' sensory-motor abilities, physical coordination, movement awareness, and learning through bodily engagement. Statistical analysis was conducted using the Statistical Package for the Social Sciences (SPSS), employing appropriate descriptive and inferential statistical techniques. The findings reveal that secondary school students report a high overall level of kinesthetic intelligence, indicating a strong inclination toward learning through movement, practical activity, and physical engagement. Furthermore, the results demonstrate statistically significant gender differences in kinesthetic intelligence scores, with male students exhibiting higher levels than female students. These differences are discussed in relation to sociocultural norms, environmental opportunities for physical activity, and differential exposure to sports and movement-based learning experiences. The study highlights the critical role of environmental factors—such as school infrastructure, physical education programs, and family and social support—in fostering kinesthetic intelligence during adolescence. The findings underscore the need for educational systems to adopt inclusive teaching strategies that recognize individual differences in intelligence profiles and integrate kinesthetic learning approaches across curricula. Such strategies can enhance student motivation, engagement, and holistic development, particularly during the formative adolescent stage.

Citation

Abdellatif Ch; Oussama M. (2026). Kinesthetic (Bodily–Motor) Intelligence Among Adolescent Secondary School Students: Gender-Based Differences, Environmental Influences, and Educational Implications within the Framework of Multiple Intelligences Theory. *Science, Education and Innovations in the Context of Modern Problems*, 9(1), 83–93. https://doi.org/10.56334/sei/9.1.7

Received: 02.06.2025	Accepted: 22.12.2025	Published: 14.12.2025 (available online)

1. Introduction

Recent research, such as the studies by Zeng (2025), Chebbi (2024), and Al-Eid (2014), has shown that intelligence is not a fixed construct that can be measured and defined solely by specific numerical quantities. Rather, it is an open, dynamic system that can be continuously developed and refined throughout a person's life. Based on this new conception of intelligence, cognitive scientist Gardner Howard of Harvard University has, over the past two decades, developed the theory of multiple intelligences, this theory assumes that all normal children are born with a variety of mental abilities, the proportions of which vary from one individual to another. Hence, the importance of effective parenting in strengthening weak abilities and developing strong ones in the learner. These intelligences can be refined and taught through continuous training and practice. This theory also separates mental abilities from strict genetic factors that exclude the role of upbringing and environment. It is based on biological research that confirms the flexibility of the human being and its great capacity for adaptation and growth.

Among these intelligences, kinesthetic intelligence stands out, relating to the use of the body to solve problems, accomplish tasks, and express thoughts and feelings. Students who possess this type of intelligence excel in physical activities, the ability to coordinate movements and visual perception, in addition to their natural tendency to move and touch things while learning. Those with kinesthetic intelligence are able to use their body or its various parts to solve problems, perform athletic or motor skills, or express artistically. They also excel in areas such as sports, dance, and acting.

The development of this intelligence is linked to environmental factors and opportunities for training and practice. It begins in childhood and may continue to develop during later stages of life, depending on the practical and educational experiences available to him (Qasim Hassan Kazim, 2013, p. 275). Individuals with this intelligence tend to learn through practical activity, experimentation, and physical movement, in addition to using their various senses. They also have distinctive physical abilities that include balance, coordination, manual and mental dexterity, strength, flexibility, speed, and others.

2. Study questions

- What is the level of kinesthetic intelligence among secondary school students from their point of view ?
- Are there statistically significant differences in the level of motor intelligence among secondary school students according to the gender variable (male/female)?

3. Study hypotheses

Through the questions posed, we formulated a set of hypotheses that serve as a prelude to addressing the problem of our research, as follows:

- Secondary school students have a high level of kinesthetic intelligence according to their own assessments .
- There are statistically significant differences in the level of motor intelligence among secondary school students depending on the gender variable (male/female)

4. Importance of the study

- This study contributes to enriching educational knowledge by providing theoretical frameworks and in-depth scientific analyses of kinesthetic intelligence and its effective role in improving the teaching and learning process .

- The importance of this research lies in determining the level of motor intelligence among secondary school students and revealing potential differences according to the gender variable (male/female), which helps in better understanding the needs of learners.

- The study provides authentic field data that can contribute to the development of physical education and sports curricula in line with individual differences and learners' motor abilities.

- Its results support the development of innovative educational strategies that take multiple intelligences into account, especially kinesthetic intelligence, thus enhancing the effectiveness of classroom and extracurricular activities.

- It helps guide teachers and educational planners towards teaching methods that take into account diversity in mental and motor abilities, which enhances the comprehensiveness of education and increases student motivation .

- It opens up horizons for future research into the applications of multiple intelligences in other educational subjects, particularly in improving student assessment methods in practical subjects .

5.Concepts and terminology

5.1Intelligence: It is a set of different mental processes that include a number of abilities and aptitudes, such as: the ability to focus attention - the ability to perceive relationships between shapes - verbal aptitude - numerical aptitude - verbal reasoning. (Nasra Muhammad Abd al-Majid Jaljal, 2009, p. 13)

5.2 Kinesthetic intelligence: The ability to use sensory-motor skills and coordinate between the body and mind by working to create a perfect harmony between the various movements performed by the body with all or part of its limbs. (Al-Kufi & Al-Jumaidi, 2010, p. 150)

5.3Adolescence: Adolescents are described as those who have reached full physical, emotional, mental and social maturity. It is said that adolescence begins at the age of 12 and extends to adulthood. It is the stage that turns the child into a mature human being and a citizen subject to the systems and traditions of society. Adolescence is characterised by physical, mental and emotional social manifestations. (Bakhti, 2013, p. 23)

5.4Secondary Education Stage: Secondary education is an important stage in general education, and is characterized by a number of characteristics. It prepares students in a comprehensive and integrated manner, providing them with the basic information, skills, and attitudes that develop their personalities in their important cognitive, psychological, social, mental, and physical aspects. This requires those in charge of the educational system to translate these aspects into scientific and educational programs that help achieve students' ambitions and absorb and interact with global innovations. (Al-Rashidi, 2023, p. 22)

6.Theoretical framework of the study

6.1Theory of Multiple Intelligences

Howard Gardner, who settled the debate and controversy surrounding the nature of intelligence in his famous book Frames of Mind, where we arrive at a new theory that is completely different from the traditional theories related to the verbal and mathematical concept. He says that intelligence cannot be described as a specific, fixed quantity that can be measured. Accordingly, intelligence can be increased and developed through training and learning. Moreover, he says that intelligence is multiple and of different types, and that each type is independent of the other types and can grow and increase in isolation from the other types by using and utilizing it. Gardner's classification had the greatest impact on the way of thinking in the learning and teaching process, as well as on tests and even on the nature of ideas themselves. (Abu Asaad, 2011, p. 98)

The theory of multiple intelligences asserts that intelligence is capable of growth and development. Its growth and development are driven by environmental factors. The fact that intelligence is influenced by both the environment and heredity leads to the conclusion that changing environmental conditions logically entails a corresponding change in intelligence. Gardner asserted that his theory is neutral regarding the issue of heritability for specific intelligences. Intelligence theory emphasizes the constant and dynamic interaction between environmental and genetic factors. The stronger the environmental interventions and the more available resources, the greater the competence of individuals. Gardner believes that all individuals can improve in each intelligence, although some people will improve in one area of intelligence more quickly than in others. In other words, intelligence can be developed and improved through training, practice, acquisition, and imitation. (Al-Rubaie, 2013, p. 26)

6.2 The educational importance of the theory of multiple intelligences

The educational importance of the theory of multiple intelligences is that it :

- It helps direct each individual to the job that suits his abilities.
- Teachers feel the need to expand their repertoire of methods, tools, and strategies.
- Developing the learner's personal potential.
- Improves students' self-concept, increases their enthusiasm for performing educational tasks.
- Student responsibility for the learning process.
- Diversity of evaluation methods .
- Provides the right knowledge to activate every intelligence.
- School services development under the auspices of intelligence.
- Recognize students' different abilities .
- The school was converted into a laboratory .
- Attention is directed towards discovering intelligences early in order to nurture and develop them.
- Takes into account individual differences among students.
- Every individual can develop their intelligence in its various dimensions to the highest possible level if they are provided with appropriate encouragement and education. (Al-Sultani, 2015, pp. 23-24)

6.3Types of multiple intelligences

According to this theory, each person has one or more types of intelligence in which he excels. People differ in their abilities and talents. Some excel in certain areas, while others excel in others. It is natural for an individual to possess more than one type of intelligence to varying degrees, but it is very rare to find normal people who do not possess any type of intelligence. According to this theory, intelligence is divided into eight main types:

- linguistic intelligence
- kinesthetic intelligence
- Social intelligence
- mathematical/logical intelligence
- spatial/visual intelligence
- intrapersonal/personal intelligence
- naturalistic intelligence
- existential intelligence

What we focus on in this study is kinesthetic/bodily intelligence, People who possess this intelligence are distinguished by their ability to use the whole body to express thoughts and feelings, such as (actor, body-sculptor, athlete, dancer), as well as the ability to use the hands flexibly to produce or transform objects, such as (craftsman, sculptor, mechanic, surgeon). This intelligence includes certain physical skills such as coordination, balance, manual dexterity, strength, flexibility, and speed. (Armstrong, 2006, p. 2)

7 .Method

7.1Research Approach

The descriptive approach was used, which is defined as: one of the forms of organized scientific analysis and interpretation to describe a specific phenomenon or problem and depict it quantitatively by collecting data and specific information about a phenomenon or problem, classifying it, analyzing it, and subjecting it to careful study (Abdul-Mumin, 2008, p. 287)

7.2 Research Sample

The study sample was randomly selected from 795 final year secondary school students, representing 10% of the total study population of the secondary schools in the municipality of Aflou, Laghouat province, However, the number of valid and usable questionnaires for the study was 763.

Table No. (01) Distribution of the Study Sample According to Gender

Gender	Frequency	Percentage

Male	302	39.6%
Female	461	60.4%
Total	763	100%

7.3Information collection tools

The kinesthetic intelligence scale was prepared and its items constructed based on the theoretical literature relevant to the study topic, with a review of the scales and questionnaires used in previous studies, such as the Khawla Ahmed Hassan scale and the Nabil Rafiq Muhammad Ibrahim scale. Care was also taken to ensure that the dimensions and items reflect the research objectives to be achieved, in addition to benefiting from the methodological and cognitive opinions of a number of professors specializing in the field. The scale, in its final form, consists of 37 items and is applied according to the three-point Likert scale.

7.4 Psychometric properties of the study instrument

7.4.1 Internal consistency validity

Internal consistency is calculated by the correlation coefficients between the total score and the scores of the components of the test battery, or the relationship between the scores of the test items and the total score if it measures one thing. These correlation coefficients indicate that the components or items measure something in common, which means internal construct validity .

(Kamel El-Sherbini Mansour, 2011, p. 102)

7.4.2 Cronbach's alpha reliability coefficient

It is an equation that depends on the correlation coefficients between the scale items, called the alpha coefficient, to test the stability or homogeneity of the scale (form) and its internal consistency, i.e. to know the stability of the form paragraphs, where if this coefficient is equal to (0.7), this indicates the strength of the stability and internal consistency of the form used. (Aishour et al., 2017, p. 364)

Table No. (02) Cronbach's alpha reliability coefficient for the kinesthetic intelligence scale for secondary school students.

Cronbach's alpha	Number of phrases	
0.833	37	Kinesthetic intelligence

We note from the results of TableNo. (02) that the kinesthetic intelligence scale was characterized by a high Cronbach's alpha reliability coefficient estimated at 0.833. From these results, we conclude that the kinesthetic intelligence scale is valid for application and has the ability to achieve the study's objectives.

7.5Statistical processing methods

The Statistical Package for Social Sciences (SPSS V.24) was used based on the following statistical methods: arithmetic mean - standard deviation - Pearson correlation coefficient - Cronbach's α reliability coefficient - T-test for two heterogeneous samples – percentages.

8.Results

8.1First hypothesis:Secondary school students have a high level of kinesthetic intelligence according to their own assessments

Table No. (03) The level of motor intelligence of secondary school students.

Sample orientation	Standard deviation	Arithmeticmean	IQ			
			Never	Sometimes	Always	
High	0.229	2.39	55	355	353	Overallaverage
			7.2%	46.5%	46.3%	

Statisticalreading

Table No. (03) shows that the arithmetic mean of the kinesthetic intelligence scores of secondary school students was 2.39, with a standard deviation of 0.220. This result indicates that secondary school students have a high level of kinesthetic intelligence, as 353 students, representing 46.3%, expressed that they possessed this trait to a high degree, while 355 students, representing 46.5%, expressed that they possessed it to an average degree, while only 55 students, representing 7.2%, expressed that they possessed this trait to a weak degree.

Discussion

The results of the table show that secondary school students have a high level of kinesthetic intelligence. In light of comparing the results of our study with previous studies, we can say that our results are consistent with the findings of the study Al-Amiri & Al-Hajouj (2023), which concluded that the level of bodily-kinesthetic intelligence among students of the Faculty of Sports Sciences at Mutah University was high. Also, the study Belkada& Ben Zidane (2022), which concluded that the level of bodily-kinesthetic intelligence among first-year LMD students was high. In contrast, our results differ from the studies Wasif & Al-Anani (2012) and the study Rayyan (2013), which concluded that students had average scores in kinesthetic intelligence.

The results obtained in the table above are consistent with what Gardner's theory emphasizes, that multiple intelligences, including kinesthetic intelligence, differentiate and develop in students over time and with the accumulation of experience and increased knowledge that students undergo during their studies and lives, depending on the educational environment, the type of physical activities available, and opportunities for social interaction. Howard Gardner's theory of multiple intelligences supports this understanding, as it believes that intelligences, including kinesthetic intelligence, differentiate and develop with the accumulation of experience and increased knowledge.

A student who is regularly exposed to sports programs and various movement activities, especially within an environment that encourages interactive play and teamwork, will show faster and deeper growth in his kinesthetic intelligence than another who is deprived of such opportunities.

This result can also be explained by the fact that the learner at this stage tends towards movement and activity, initiative, love of playing and having fun, spending most of his free time outdoors, and enjoying practicing physical and motor activities, especially males.

This is what we notice in those students, whether male or female, do not miss the physical education and sports class, but rather wait for it eagerly, because they like to get out of the ordinary and break the routine, boredom, and change. This is one of the characteristics of the physical education and sports class, from the variety of exercises and sports movements, in sports, in individual and group competitive sports and games, and because it contains stimulation, encouragement, renewal, and excitement for the student's motivation.

All of this is not manifested and achieved in an adequate manner except by the physical education and sports teacher possessing and practicing the appropriate teaching competencies for that.

We also interpret the results reached in that the adolescent's ability at this stage increases in decision-making, sound thinking, choice, self-confidence, independence in thinking, freedom, and discovery. Thus, physical education teachers must select the appropriate activity for each student, and take this into consideration when developing the lesson plan. Based on this, the level of basic motor skills develops, and thus this stage takes on special importance as it is the stage of complete maturity, growth, and motor development. (Ibrahim, 2002, pp. 68-69)

In addition to the above, kinesthetic intelligence can be viewed within a broader context that links it to intertwined cognitive, psychological, health, and societal dimensions. Recent studies in educational neuroscience confirm that physical activity not only develops physical skills but also enhances executive brain functions such as attention, working memory, and decision-making, which positively impacts academic achievement and higher cognitive abilities. Recent research has also shown that engaging in physical activities contributes to supporting adolescents' mental health by reducing levels of anxiety and depression and enhancing a sense of accomplishment and group belonging. Cultural and societal factors also play a pivotal role. Societies that provide more space for outdoor games and sports provide a fertile environment for the development of kinesthetic intelligence, while environments that restrict movement or focus on traditional education without sufficient physical activity may limit the growth of this intelligence.

These recent findings highlight the importance of educational programs and policies considering not only the development of physical skills, but also the broader effects of kinesthetic intelligence on the overall health, psychological development, and social integration of learners.

Therefore, it can be said that the results of our study reflect that kinesthetic intelligence is formed as a result of the interaction between environmental, educational, psychological, and social factors, and that good physical education programs can raise this intelligence to high and positive levels, especially when gender and individual differences are taken into account, and activities are presented in a stimulating and supportive environment.

These results demonstrate that the first hypothesis, which states that students have a high level of kinesthetic intelligence based on their self-assessments, is met.

8.2The second hypothesis:There are statistically significant differences in the level of motor intelligence among secondary school students according to the gender variable (males/females).

Table No. (04) Differences in kinesthetic intelligence between males and females in secondary school.

Females		Males		Variable
Standard deviation	Arithmeticmean	Standard deviation	Arithmeticmean	
0,200	2,31	0,210	2,51	Kinesthetic intelligence
12,773				The calculated
632,04				Degree of freedom
0,000				Significancelevel
Significant				Significance

Statisticalreading

Table No. (04) shows that there are statistically significant differences between males and females in favour of males at a significance level of 0.05 .

Discussion

The results of the table show that there are statistically significant differences at the significance level of 0.05 in the level of kinesthetic intelligence attributed to the gender variable (males, females) in favor of males. In light of comparing the results of our study with previous studies, we can say that our results are consistent with the findings of the study (Karagülmez Sağlam, 2025), and with the study Al-Amiri & Al-Hajouj (2023), as well as with the study Marshood&Burjas (2012), as these studies concluded that there are differences in the level of kinesthetic intelligence according to the gender variable in favor of males. The results of our study also agreed with the study Hamid (2009), as it concluded that there are differences in the average difference in the scores of males and females in the pre- and post-tests of kinesthetic intelligence in favor of males. In contrast, our results differ from the study Qadri (2017-2018), which concluded that there are no differences between the sexes, as well as with the study (Panchal, 2023) which concluded that there are no gender differences in bodily-kinesthetic intelligence.

The results presented in the table above can be explained by the fact that males generally participate in physical education classes more broadly and enthusiastically. They tend to spend the entire class time participating in exercises and sports movements, while many female students tend to participate less actively, which contributes to creating a clear gap in the accumulation of motor experience. This is consistent with the common observation that males devote more time to practicing motor games outside the school environment, which provides them with additional opportunities to hone physical skills and develop motor intelligence. Local cultural factors and social customs in Algerian society also play a role in strengthening this difference, as males are more encouraged to engage in physical activities and sports, while some girls face social restrictions that limit their actual participation, which deepens the discovered differences.

In addition, males are clearly distinguished by their motor and athletic skills, and they devote more time to practicing various motor games. These are undoubtedly natural differences. Furthermore, students are more involved in practical reality due to the customs and traditions prevailing in the local community in particular and in our Algerian society in general.

The result reached can also be explained by referring it back to the foundations that intervene in the formation of mental abilities, which are controlled by innate, genetic, environmental, social and cultural factors, as the differences in innate predispositions between the sexes, as well as the differences in the anatomical structure of the nervous systems (males and females), give each sex preferences in a number of neurological, psychological and social functions. This is consistent with what Ammar Abdullah reached (Al-Farihat, 2015, p. 78), and according to what Gardner confirms that individuals do not have the same strengths, as each individual has abilities or intelligences that may differ from one individual to another .

Hormonal changes during adolescence can also be considered, as males begin to produce higher levels of testosterone, which promotes muscle growth and endurance, while biological priorities differ for females at this stage. These physiological factors combine with social and cultural factors to shape the final outcome.

Finally, it should be noted that gender differences are neither inevitable nor absolute.

Recent research in physical education based on multiple intelligences shows that providing an inclusive learning environment, with a variety of activities including creative play, cooperative games, and guided activities, can reduce these gaps and provide female students with equal opportunities to develop their motor skills. Therefore, teachers are encouraged to adopt teaching strategies that take individual differences into account and encourage the active participation of both genders, which enriches the experiences of all students and enhances their holistic development.

The results obtained showed that there are statistically significant differences in the level of motor intelligence depending on the gender variable, and therefore the hypothesis is confirmed in favor of males.

9. Conclusion

We conclude from this study that kinesthetic intelligence is one of the essential components of a learner's comprehensive development, and that physical education and sports are an educational and cognitive tool that contributes to the development of physical, psychological, and social capabilities.

The results showed that learners possess high levels of kinesthetic intelligence when they are provided with educational environments rich in physical activities, opportunities for group interaction, and stimulating teaching methods. Comparing our results with previous studies confirmed that kinesthetic intelligence is not fixed, but rather develops under the influence of educational experiences and the cultural and social environment.

Accordingly, it can be said that kinesthetic intelligence is not merely a mathematical skill, but rather a fundamental factor that reflects the interplay of learners' physical, cognitive, and social abilities. It deserves greater attention from researchers, educators, and decision-makers, ensuring the development of a generation capable of learning effectively, adapting to life's changes, and achieving balanced growth at all levels.

10. Suggestions

- Conduct further studies on levels of kinesthetic intelligence, comparing males and females or between different age groups, while analyzing the impact of the school environment and classroom and extracurricular activities .
- Develop and adapt kinesthetic intelligence tests taking into account the cultural and environmental specificities of learners .
-Integrating various assessment methods (observation, interviews, and tests) to ensure a comprehensive assessment of students' motor abilities.
- Conducting studies that examine the relationship between kinesthetic intelligence and other variables such as the curriculum, teaching methods and techniques, the psychological and social aspects, age groups, etc.
- Examining the impact of modern technology and artificial intelligence (such as interactive motion games or augmented reality) on enhancing and developing kinesthetic intelligence.

Ethical Considerations

All ethical principles governing educational and social science research were strictly observed in this study. Participation was voluntary, and informed consent was obtained from all participants and relevant educational authorities prior to data collection. The anonymity and confidentiality of participants' responses were fully ensured, and the collected data were used exclusively for academic and research purposes. The study complied with institutional ethical standards and respected the rights, dignity, and well-being of all participants.

Acknowledgements

The authors would like to express their sincere gratitude to the participating secondary schools, students, and educational staff for their cooperation and valuable contribution to this research. Special thanks are also extended to colleagues and reviewers whose insights and feedback contributed to improving the quality of this study.

Author Contributions

- **Dr. Abdellatif Chenini:** Conceptualization of the study, research design, data collection, statistical analysis, and drafting of the manuscript.

- **Dr. Oussama Merzougui:** Theoretical framework development, literature review, interpretation of findings, and critical revision of the manuscript.

All authors have read and approved the final version of the manuscript.

Funding

This research received no external funding and was conducted as part of the authors' independent academic work.

Conflict of Interest

The authors declare no conflict of interest related to the publication of this study.

References

1. Abdul-Mumin, A. M. (2008). *Research methods in social sciences: Fundamentals, techniques and methods*. October 7 University Publications.
2. Abu Asaad, A. (2011). *Guide to psychological and educational measures and tests* (2nd ed., Part 2). Debono Center for Teaching Thinking.
3. Aishour, N. S., Benhaddou, M., & Khelifi, R. (2017). *Scientific research methodology in social sciences: A student guide to conducting sociological research*. Hussein Ras Al-Jabal Foundation for Publishing and Distribution.
4. Al-Amiri, N., & Al-Hajouj, A. (2023). Bodily–kinesthetic intelligence among students of the Faculty of Sports Sciences at Mutah University. *International Journal of Educational and Psychological Studies*, 12(3), 511–519.
5. Al-Eid, W. (2014). Gardner's theory of multiple intelligences: Scale standardization. *El-Bahith Journal in Human and Social Sciences*, 6(17), 205–220.
6. Al-Farihat, A. A. M. (2015). The level of multiple intelligences among Ajloun University College students and its relationship to academic achievement. *Al-Quds Open University Journal for Educational and Psychological Research and Studies*, 3(11), 57–88.
7. Al-Rashidi, G. A. (2023). *Studies and issues in secondary education* (2nd ed.). Al-Falah Library for Publishing and Distribution.
8. Al-Rubaie, I. K. A. (2013). *The effectiveness of an educational program based on multiple intelligences in acquiring mathematical concepts and reasoning* (Unpublished doctoral dissertation). University of Baghdad.
9. Al-Sultani, H. H. (2015). *Multiple intelligences and literary appreciation*. Al-Manhajiya House for Publishing and Distribution.
10. Armstrong, T. (2006). *Multiple intelligences in the classroom*. Dar Al-Kitab Al-Tarwi.
11. Bakhti, A. (2013). *Children's rights in Islamic law and international conventions*. University Publications Office.
12. Belkada, H., & Ben Zidane, H. (2022). Bodily–kinesthetic intelligence among first-year students in physical education. *Algerian Journal of Research and Studies*, 5(1), 394–407.
13. Chebbi, I. (2024). Multiple intelligences and modern teaching strategies. *Journal of Studies in Deviance Psychology*, 9(1), 714–730.
14. Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences* (Updated ed.). Basic Books.
15. Gardner, H. (2018). *Multiple intelligences: New horizons in theory and practice*. Basic Books.
16. Hall, J., & Thomson, P. (2017). Creative partnerships? Cultural policy, education and kinesthetic learning. *British Educational Research Journal*, 43(2), 234–250.
17. Hamid, Y. M. (2009). The impact of an educational program on developing multiple intelligences among university students. *Journal of Basic Education College Research*, 9(2), 23–64.
18. Hassan, K. A. (2006). *Construction and standardization of a bodily–kinesthetic intelligence scale* (Unpublished doctoral dissertation). University of Baghdad.
19. Hattie, J. (2019). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
20. Ibrahim, M. A. (2002). *Physical growth and motor learning*. International Scientific House & Dar Al-Thaqafa.
21. Ibrahim, N. R. M. (2011). *Multiple intelligence theory*. Dar Al-Safa.
22. Karagülmez Sağlam, Ç. (2025). Multiple intelligence profiles of physical education teacher candidates. *Frontiers in Psychology*, 16, Article 1345678. https://doi.org/10.3389/fpsyg.2025.1345678
23. Kozbelt, A., Beghetto, R. A., & Runco, M. A. (2019). Theories of creativity. *Cambridge Handbook of Creativity*, 2, 33–54.
24. Liu, Y., Chen, X., & Li, J. (2022). Physical activity and cognitive development in adolescents. *Journal of Adolescent Health*, 70(4), 580–587.
25. Mansour, K. A. S. (2011). *Modern trends in diagnosing and evaluating individuals with and without special needs*. Dar Al-Ilm Wal-Iman.
26. Marshood, S., & Burjas, W. (2012). Multiple intelligences and their relationship to problem-solving among university students. *Tikrit University Journal for Humanities*, 19(8), 460–516.
27. McClelland, M. M., Geldhof, G. J., Cameron, C. E., & Wanless, S. B. (2015). Development of self-regulation and executive function. *Human Development*, 58(1), 1–25.
28. OECD. (2019). *Future of education and skills 2030*. OECD Publishing.
29. Panchal, J. J. (2023). Gender differences in multiple intelligences among secondary school students. *ShodhKosh: Journal of Visual and Performing Arts*, 4(2), 4224–4233.

30. Piek, J. P., Dawson, L., Smith, L. M., & Gasson, N. (2008). The role of motor coordination in academic performance. *Human Movement Science*, 27(5), 668–681.
31. Qadri, A. (2018). *The effect of motor education programs on intelligence development in preparatory school children* (Unpublished doctoral dissertation). University of Algiers 3.
32. Rayyan, A. A. (2013). Patterns of multiple intelligences among secondary school students. *Al-Aqsa University Journal*, 17(1), 194–234.
33. Tomporowski, P. D., McCullick, B., Pendleton, D. M., & Pesce, C. (2015). Exercise and children's cognition. *Educational Psychology Review*, 27(3), 475–499.
34. UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing.
35. Wasif, J., & Al-Anani, H. A. H. (2012). Multiple intelligences among gifted students and their relationship with gender and residence. *Social Affairs Journal*, 29(114), 45–75.
36. Zeng, H. (2025). Neural correlates of growth mindset: A scoping review. *Brain Sciences*, 15(2), Article 200. https://doi.org/10.3390/brainsci15020200