SCIENTIFIC CULTURE

www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 2.1, (2026), pp. 1460-1469
Open Access. Online & Print

DOI: 10.5281/zenodo.122.226119

THE EFFECTIVENESS OF PRACTICAL COURSES ON BODILY-KINESTHETIC INTELLIGENCE AMONG PHYSICAL EDUCATION STUDENTS IN THE ARAB UNIVERSITIES

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Received: 07/11/2025
Accepted: 22/11/2025

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ABSTRACT

Bodily-Kinesthetic Intelligence (BKI) refers to the ability to use the body skilfully and precisely in activities requiring high motor coordination. BKI contributes to improving motor performance, neuromuscular coordination, and body awareness, making it a key component in physical education (PE), especially for training pre-service teachers. This Arab cross-cultural descriptive study was conducted to identify the effectiveness of practical courses on BKI among PE students at Jordanian, Omani, and Iraqi universities. A convenience sample of 663 students from PE faculties and departments in universities across Oman, Jordan, and Iraq completed the e-BKI scale. This scale consisted of 30 items, divided into four domains: motor learning, motor control, motor adaptation, and motor expression. The results showed that practical courses effectively enhanced BKI in all three countries, with students from Jordan achieving higher improvements in motor learning and motor control. Specifically, Jordanian students displayed superior abilities in motor control tasks, such as maintaining balance, coordinating complex movements, and adapting to new physical challenges, compared to their peers from Oman and Iraq. Based on these findings, the study recommends expanding practical course offerings in Iraqi and Omani universities and implementing programs to identify students with exceptional physical abilities.

KEYWORDS: Bodily-Kinesthetic Intelligence, Cross-Cultural Studies, Physical Education, Practical Courses, Universities in Arab Countries, University Students.

1. INTRODUCTION

Physical activity plays a fundamental role in maintaining overall health and well-being. Regular engagement in physical activity improves physical capacities such as muscle strength, flexibility, and cardiorespiratory endurance, thereby enhancing overall physical performance (Al-Hadabi et al., 2025).

There is a reciprocal link between physical activity and the development of physical skills: individuals who consistently participate in physical activity tend to show better basic motor skills, which in turn improve their overall physical abilities (Chen et al., 2023). Conversely, people with higher physical abilities can perform physical tasks more efficiently, which also strengthens their motor skills (Cadenas-Sanchez et al., 2021).

In this context, physical activity contributes to enhancing college students' Bodily-Kinesthetic Intelligence (BKI), which involves the capacity to use the body to carry out tasks, solve problems, and express ideas, relying on effective coordination between the nervous and muscular systems (Gardner, 2011).

Activities such as regular exercise, group sports, and precision-based training help develop fundamental physical abilities—including strength, flexibility, balance, and speed—that are essential components of BKI (Foster & Armstrong, 2018). Students who participate consistently in these activities show marked improvements in motor control and coordination of complex movements, enhancing both physical performance and expressive motor abilities (Gao et al., 2021).

Engaging in physical activity also promotes body awareness, life quality, and confidence in one's physical capacities (Lalović et al., 2025), supporting the development of BKI across educational and social settings (Michelaki & Bournelli, 2016). Generally, regular participation in motor activities not only strengthens physical abilities but also directly contributes to the growth of BKI, enabling university students to learn actively and perform effectively in both academic and practical tasks.

BKI is one of Howard Gardner's multiple intelligences, referring to an individual's capacity to use the body effectively for problem - solving, idea expression, and performing tasks that require both fine and gross motor skills (Gardner, 2011). This intelligence has been applied in physical education and practical teaching settings, where its integration helps enhance students' motor abilities and educational competencies (Campbell, 1992).

In these environments, BKI contributes significantly to motor learning, neuromuscular coordination, and physical expression, thereby improving overall performance in sports and movement-related activities (Armstrong, 2009). Recent research highlights the impact of structured and practical learning experiences on developing multiple intelligences, particularly BKI (Ekici, 2011).

For example, Şuruba-Rusen and Vasiliu (2025) found that specifically designed educational programs can substantially strengthen BKI among physical education students, demonstrating the value of experiential learning in motor skill acquisition.

As a result, learners with well-developed BKI tend to perform better and adapt more effectively in sports, games, and various motor tasks, making it essential for preparing future physical education teachers (Shearer, 2018).

Furthermore, cultivating positive attitudes toward sports is linked to greater BKI development, emphasizing the role of practical courses in promoting both motivation and skill enhancement (Koçak, 2019).

Practical courses are an essential part of physical education programs, playing a major role in developing BKI through direct activities, continuous practice, and motor learning exercises (Baena-Morales et al., 2021; MacPhail & Halbert, 2010). These courses help improve motor abilities while building the cognitive and professional skills required for future teaching careers (Lander et al., 2017). Although these courses are important, there is still little research that examines their impact in Arab universities, and cross-cultural comparisons are also limited.

Differences in course structure, teaching style, available facilities, and academic focus may all influence how BKI is developed (Bailey & Morley, 2006). Studies in physical education, such as those by Chen et al. (2016), emphasize the need to understand how various educational environments support physical and motor growth.

Accordingly, this study seeks to fill these gaps by examining how practical courses influence BKI among university students in Oman, Jordan, and Iraq. It investigates the overall growth of BKI and explores possible variations related to gender, academic achievement, and country.

Through this, the study provides a broad perspective on the elements that shape bodily-kinesthetic development within Arab higher education. The main purpose is to assess how effective practical courses are in improving BKI and to identify any gender-based differences in its development, as well as the relationship between

students' academic performance (GPA) and their BKI levels.

Furthermore, it compares how practical courses function across the three countries. Based on this, the study assumes that practical courses have a significant positive effect on BKI, with measurable variations depending on gender, academic performance, and country.

2. METHOD

2.1. Study Design

A cross-cultural quantitative descriptive study was conducted to examine the effectiveness of practical courses on BKI among PE students at Jordanian, Omani, and Iraqi universities.

2.2. Participants

A convenience sample consisted of 663 students from the faculties and departments of PE at the universities of Oman, Jordan, and Iraq. Participants were distributed as follows: Iraq 169, Jordan 267, and Oman 227.

According to gender, the number of participants was 271 males and 391 females. These participants responded to the e-BKI scale during the second semester of the 2024-2025 academic year. Participants were selected using convenience sampling, which is a type of non-probability sampling (Stratton, 2023). On the other hand, the selection of participants was not random, as lists of the number of students in the departments and faculties of PE at the universities of the targeted countries were not available. Furthermore, the methodology of cross-cultural studies (three Arab countries) may make it difficult to calculate the sample size.

Therefore, a convenience sample was used, as students responded to e-BKI scale voluntarily.

2.3. Data Collection

The Bodily-Kinesthetic Intelligence (BKI) scale was designed following Gardner's multiple intelligences theory (Gardner, 1999) and through an examination of related literature (Blumenfeld-Jones, 2009; Suhadi et al., 2020; Michelaki & Bournelli, 2022; González-Treviño et al., 2020).

The initial version of the BKI scale consisted of 36 statements grouped into four main areas: motor learning, motor control, motor adaptation, and motor expression.

To confirm the face validity of the initial version of the BKI scale, it was evaluated by seven specialists in PE and educational measurement from universities in Oman, Jordan, and Iraq. Based on their feedback, several adjustments were applied to improve clarity, relevance, and alignment with the study objectives.

The finalized version of the BKI scale included 30 items categorized into four dimensions: motor learning (1–8), motor control (9–15), motor adaptation (16–23), and motor expression (24–30). Participants rated each statement using a three-point Likert scale: Agree (3), Neutral (2), and Disagree (1). To measure the effectiveness of the practical courses, the average scores for the BKI items were interpreted using the following scale: low (1.00–1.67), average (1.68–2.34), and high (2.35–3.00) (Ling & Yamat, 2020; Al-Shibli et al., 2023; Al-Hadabi et al., 2024; Almughairi et al., 2025).

For reliability verification, a pilot test was administered to 42 PE students representing the three countries. The results showed satisfactory internal consistency. Cronbach's alpha coefficients for the four domains were as follows: motor learning (0.77), motor control (0.82), motor adaptation (0.74), and motor expression (0.73).

2.4. Study Procedures

The final version of BKI scale was administered electronically via Google Forms during the second semester of the 2024–2025 academic year.

The scale link was shared with students through official university emails and WhatsApp groups, in coordination with deans and department heads from PE departments in Jordan, Oman, and Iraq. Instructions emphasized the study's purpose, confidentiality, and proper completion of the scale. Data collection was closely monitored to ensure completeness and accuracy.

2.5. Data Analysis

The collected data were analyzed using SPSS software. Descriptive statistics, including means and standard deviations, were calculated, while inferential tests such as t-tests, one-way ANOVA, and LSD post hoc comparisons were performed to identify differences in BKI scores according to gender, GPA, and country.

2.6. Ethical considerations

Ethical approval was obtained from the Research Ethics Committee at the College of Education in SQU, Oman.

3. RESULTS

Results of the first question: What is the effectiveness of practical courses on BKI among PE students in the Arab universities?

To answer this question, the means (M) and

standard deviations (S.D) were calculated. Table (1) shows these results.

Table 1: Means and Standard Deviations of the Effectiveness of Practical Courses on BK.

Domains	N	M	S.D	Level
Motor Learning	663	2.80	.298	High
Motor Control	663	2.73	.376	High
Motor Adaptation	663	2.70	.378	High
Motor Expression	663	2.72	.394	High

Table (1) indicates a high level of practical courses on BKI across all domains, according to participants' assessments. In other words, the practical courses were a highly effective in enhancing all aspects of BKI. Among the four domains, motor learning demonstrated the greatest level of effectiveness, whereas motor adaptation showed slightly lower yet still high results. Overall, the findings suggest that practical courses play a crucial role in enhancing students' motor skills, control, adaptability, and physical expression, thereby promoting their growth in both academic and professional settings. Figure (1) provides a visual representation of the domains of the BKI scale.

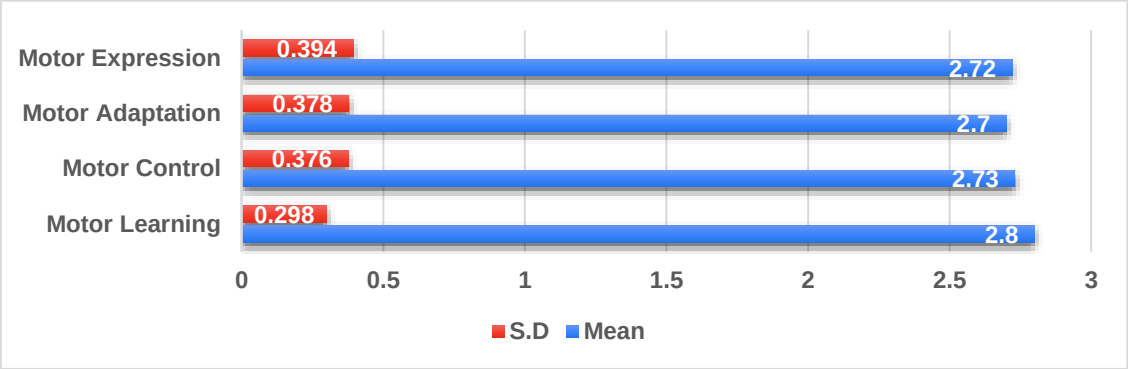

Figure 1: Domains of BKI Scale.

Results of the second question: Does the effectiveness of practical courses on BKI differ according to the gender of PE students?

To answer the question, Figure (2) shows the means and standard deviations of the domains of the BKI scale according to the respondent's gender.

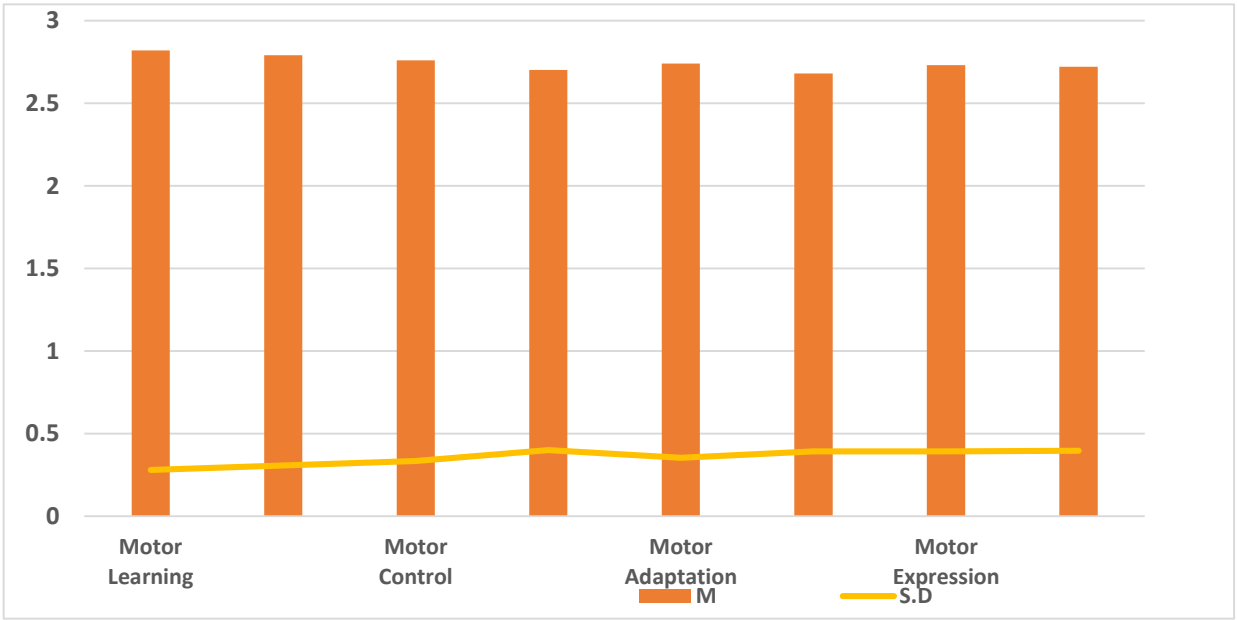

Figure 2: BKI According To Gender

Figure (2) shows that there are statistical differences on domains of BKI scale according to the respondent's gender. To determine whether these differences were statistically significant, a t-test was

used. Table (2) demonstrations the results of the t-test according to the respondent's gender.

Table 2: Results of T-Test According to Gender.

Domains	Gender	N	M	S.D	df	t	Sig.
Motor Learning	Male	271	2.82	.281	661	1.49	.137
	Female	392	2.79	.308			
Motor Control	Male	271	2.76	.335	661	1.96	.050
	Female	392	2.70	.401			
Motor Adaptation	Male	271	2.74	.354	661	1.73	.083
	Female	392	2.68	.392			
Motor Expression	Male	271	2.73	.393	661	.336	.737
	Female	392	2.72	.396			

The findings in the Table (2) reveals no significant gender-based differences across any of the BKI domains. This suggests that practical courses contribute equally to the development of motor learning, motor control, motor adaptation, and motor expression among both male and female students. These outcomes emphasize that engagement in physical activities—rather than gender—plays the primary role in fostering BKI (Koçak, 2019), thereby supporting the implementation of gender-neutral instructional approaches in PE (Table 2).

Results of the third question: Does the effectiveness of practical courses on BKI differ according to the Grade Point Average (GPA) of PE students? To answer the question, Figure (3) shows the means and standard deviations of the domains of BKI scale according to the respondent's GPA.

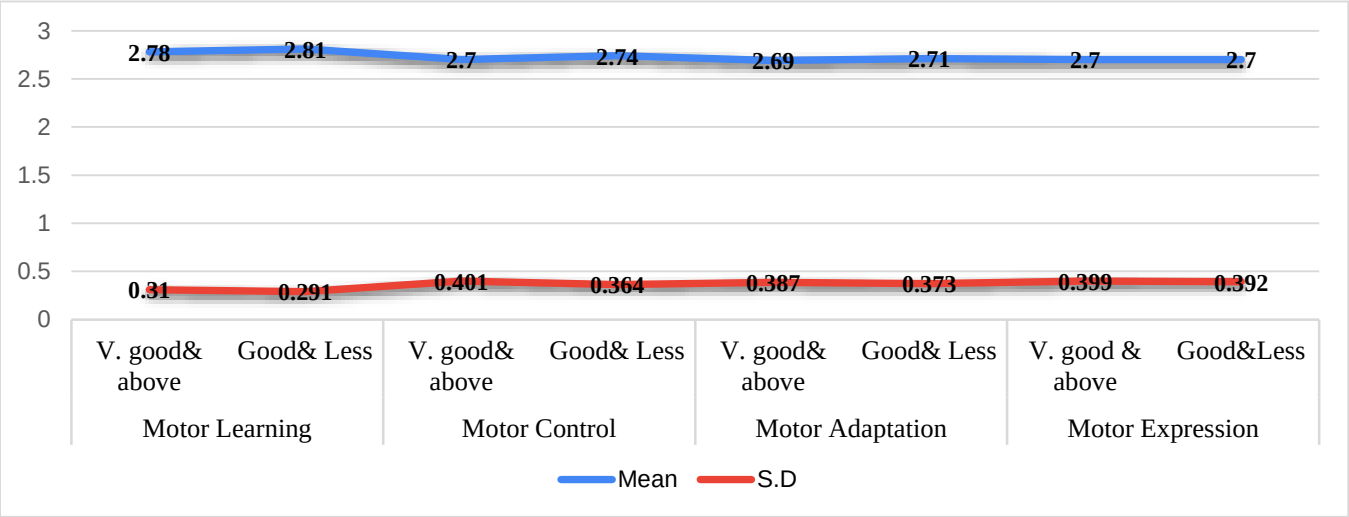

Figure 3. BKI according to GPA.

Figure (3) shows that there are statistical differences in the domains of the BKI scale according to GPA of respondent. To determine whether these differences were statistically significant, a t-test was used. Table (3) demonstrates the results of the t-test.

Table 3: Results of t-test according to GPA.

Domains	GPA	N	M	S.D	df	t	Sig.
Motor Learning	V. good & above	210	2.78	.310	661	1.554	.121
	Good & Less	453	2.81	.291			
Motor Control	V. good & above	210	2.70	.401	661	1.226	.206
	Good & Less	453	2.74	.364			
Motor Adaptation	V. good & above	210	2.69	.387	661	.530	.596
	Good & Less	453	2.71	.373			
Motor Expression	V. good & above	210	2.70	.399	661	1.102	.271
	Good &Less	453	2.73	.392			

The results in Table (3) show no statistically significant differences in BKI domains according to students' GPA. This indicates that practical courses are equally effective in enhancing motor learning, motor control, motor adaptation, and motor expression for students regardless of their academic performance. These findings suggest that the development of BKI relies more on active participation and physical experience than on cognitive achievement, underscoring the importance of experiential learning in PE programs (Gardner, 1983; Armstrong, 2009).

Results of the fourth question: Does the effectiveness of practical courses on BKI differ according to the respondent's country?

To answer the question, Figure (4) shows the means of the domains of the BKI scale according to the respondent's country (Oman, Jordan, and Iraq).

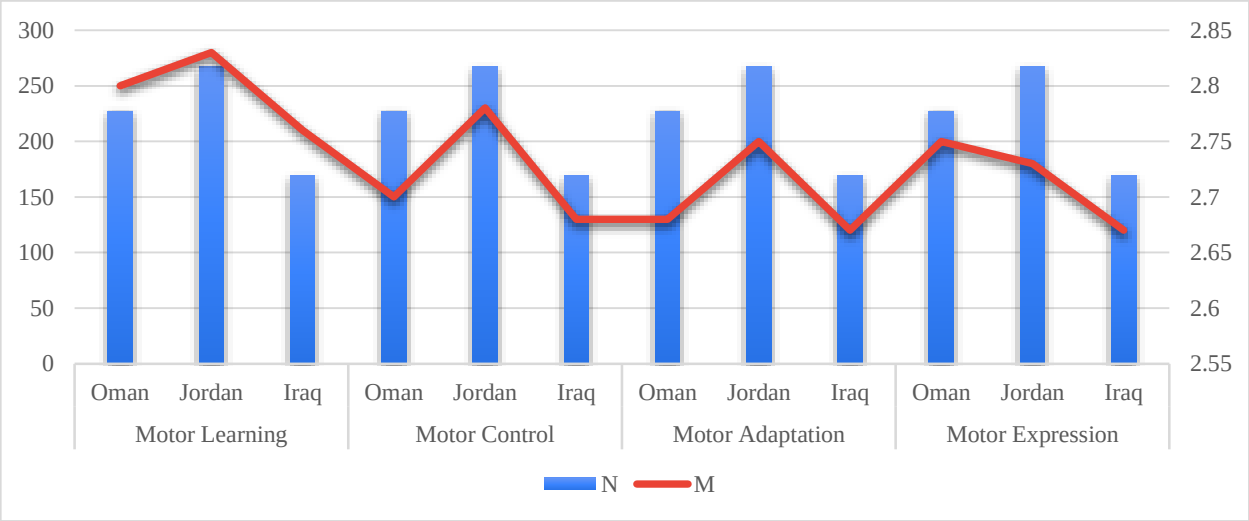

Figure 4: BKI According to Country.

Figure (4) displays that there are statistical differences on domains of the BKI scale according to country of respondent. To determine these differences are statistically significant, a one-way analysis of variance (ANOVA) used. Table (4) demonstrations the results of ANOVA.

Table 4: Results ANOVA According to Respondent's Country.

Domains	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Motor Learning	Between Groups	.537	2	.268	3.039	.049*
	Within Groups	58.312	660	.088		
	Total	58.849	662			
Motor Control	Between Groups	1.150	2	.575	4.089	.017*
	Within Groups	92.847	660	.141		
	Total	93.997	662			
Motor Adaptation	Between Groups	.828	2	.414	2.914	.055
	Within Groups	93.811	660	.142		
	Total	94.639	662			
Motor Expression	Between Groups	.563	2	.281	1.810	.164
	Within Groups	102.619	660	.155		
	Total	103.182	662			

**** p < 0.05***

Statistical analysis in Table (4) indicates significant differences in BKI domains across students from different countries. In particular, motor learning and motor control exhibited notable variation, with students from Jordan achieving higher scores compared to those from Oman and Iraq. These results suggest that variations in the design, frequency, and quality of practical courses, as well as differences in institutional resources and teaching methods, may affect BKI development. Increasing hands-on training opportunities and updating physical education curricula in Oman and Iraq could help address these disparities. To determine the significance of these differences, the Least Significant Difference (LSD) test is used. Table (5) indicates the results.

Table 5: LSD Test Results By Country.

Domains	Country	Mean	Oman	Jordan	Iraq
Motor Learning	Oman	2.81			
	Jordan	2.83		-	.014*
	Iraq	2.76			-
Motor Control	Oman	2.70	-		
	Jordan	2.78	.022*		.012*
	Iraq	2.69			-

**** p < 0.05.***

Table (5) shows statistically significant differences in motor learning and motor control based on students' countries. Students from Jordan achieved higher scores in these domains compared to their

counterparts in Oman and Iraq, indicating more effective practical courses and well-structured PE programs. These differences may result from variations in curriculum design, availability of modern resources, instructor qualifications, and the focus on hands-on experiential learning. Improving these aspects in Oman and Iraq could help reduce the disparities in BKI development among university students (Al-Maharmeh et al., 2022).

4. DISCUSSION

This study involved physical education students from universities in Jordan, Oman, and Iraq. The sample included students with varying academic achievements and both genders, providing a comprehensive view of how practical courses influence BKI development. The results showed that practical courses have a strong positive impact on all BKI domains, with the highest scores observed in motor learning (M = 2.80), followed by motor control (M = 2.73), motor expression (M = 2.72), and motor adaptation (M = 2.70). These findings indicate that practical courses are essential for developing students' motor skills, coordination, adaptability, and ability to express movements effectively (De Meester et al., 2016).

Recent research highlights the strong connection between BKI and basic movement skills, showing that well-structured practical courses can enhance students' motor coordination and physical adaptability (Lazar & Ramakrishnan, 2025). In addition, studies by Ruiz, Ortega, Castillo, and Sjöström (2010) demonstrate that higher physical activity levels and fitness are linked to improved performance in tasks requiring motor coordination, skill execution, and adaptability. Similarly, Stodden et al. (2008) stress that developing motor skills is crucial for promoting participation in physical activities, reinforcing the importance of practical training in BKI development.

These findings underscore the value of incorporating structured practical sessions into physical education programs, encouraging students to participate in a variety of activities that challenge and refine their motor abilities, ultimately enhancing overall BKI. Regular physical activity has also been associated with better cognitive functioning, suggesting that hands-on exercises support both motor and cognitive development (Gomez-Pinilla & Hillman, 2013). The results align with Gardner's (1983) theory of multiple intelligences, which identifies BKI as the capacity to use one's body skilfully and manipulate objects effectively. They also support the work of Al-Daraji et al. (2021), which highlights the role of practical education in improving psychomotor skills and bodily awareness. Notably, the importance of motor learning and control indicates that repeated practice and structured physical activities are key to acquiring skills accurately and performing effectively.

The study found no significant differences between male and female students in any of the BKI domains, indicating that when provided with similar learning opportunities, both genders gain equally from practical courses. This finding challenges traditional beliefs regarding male superiority in physical skill development and highlights the importance of fair and inclusive teaching practices (Guerrero & Puerta, 2023). Likewise, no notable differences were found based on students' GPA, suggesting that BKI development depends more on hands-on engagement than on academic performance, supporting the perspective that psychomotor learning is most effectively achieved through direct experience rather than theoretical instruction (Lacey et al., 2021).

In contrast, significant differences emerged between countries in motor learning and motor control, with students from Jordan scoring higher than those from Oman and Iraq. These variations may reflect differences in curriculum structure, teaching methods, availability of resources, and instructor training quality. As highlighted by Al-Maharmeh et al. (2022), well-designed programs with adequate facilities tend to produce stronger outcomes in psychomotor skills, whereas limited resources and less emphasis on practical teaching may hinder student development, as may be seen in the Omani and Iraqi contexts.

Although motor expression and motor adaptation had slightly lower mean scores, these domains remain essential for fostering creativity, expressive abilities, and adaptability when encountering new physical challenges. The results demonstrate that practical courses contribute not only to technical skill acquisition but also to broader development in adaptability and expressive movement (Tocci et al., 2022; Vidaci et al., 2021).

Overall, these findings underline the critical role of practical courses in enhancing BKI among PE students. They also emphasize the importance for curriculum developers and educational policymakers to strengthen practical training, provide sufficient facilities, and support continuous professional development for instructors, thereby creating an enriched environment that promotes students' psychomotor growth across different educational settings (Marron et al., 2025).

5. CONCLUSION

This study revealed that practical courses have a substantial impact on enhancing BKI in all domains, motor learning, motor control, motor adaptation, and motor expression, among physical education students in Jordan, Oman, and Iraq. The findings indicated no significant differences based on gender or GPA, suggesting that the development of BKI relies mainly on hands-on, experiential learning. Nevertheless, variations between countries were observed, with Jordanian students achieving higher scores in certain domains, highlighting the role of curriculum quality and the availability of institutional resources in shaping BKI outcomes. Overall, the findings emphasize the crucial role of well-structured and adequately supported practical courses in strengthening students' physical and expressive abilities, preparing them for professional paths that demand advanced kinaesthetic skills. These insights can guide curriculum developers and policymakers to enhance PE programs and optimize students' kinaesthetic potential across Arab universities. This study has several limitations that should be acknowledged. First, the use of convenience sampling may limit the generalizability of the findings beyond the participating universities in Jordan, Oman, and Iraq. Second, reliance on self-reported data could introduce bias, as students' responses may be influenced by personal perceptions rather than objective assessments. Third, the study focused only on three Arab countries; thus, the results may not reflect the broader context of other cultural or educational settings. Finally, the cross-sectional design does not allow for measuring the long-term effects of practical courses on BKI. Future research should employ longitudinal approaches, including a wider range of institutions, and integrate objective performance-based measures.

This study has several limitations that should be acknowledged. First, the use of convenience sampling may limit the representativeness of the sample, as participation was based on voluntary response rather than random selection. Consequently, the results may not be fully generalizable to all physical education students across Arab universities. Second, the study relied on self-reported data collected through the BKI scale, which may be subject to response bias. Students' evaluations of their BKI could have been influenced by personal perceptions, social desirability, or differing interpretations of the scale items rather than objective performance levels. Third, the study included participants from only three Arab countries, which may restrict the broader cultural applicability of the findings. Finally, the cross-sectional design does not allow for measuring the long-term effects of practical courses on BKI. Future research should employ longitudinal approaches, including a wider range of institutions, and integrate objective performance-based measures.

Funding Statement: This study was funded by the Deanship of Research at SQU (RF/EDU/PE/25/01).
Acknowledgments: Many thanks to the Deanship of Research at SQU for funding this study, and to PE students and faculty in the departments and colleges of Arab universities for their participation in the study. Special thanks to the "Talent and Giftedness research group" at SQU for choosing the idea of this study.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization, S.A. and B.A.; methodology, H.E.; software, S.AM.; validation, S.M., formal analysis, S.M.; investigation, B.A.; resources, H.E.; data curation, S.AM.; writing—original draft preparation, S.M.; writing—review and editing, S.AM.; visualization, B.A.; supervision, H.E.; project administration, B.A.; funding acquisition, B.A. All authors have read and agreed to the published version of the manuscript.

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