



## Competency-based approach in Moroccan lower-secondary Physical Education: pedagogical relevance and structural constraints

*Enfoque basado en competencias en la Educación Física del primer ciclo de secundaria en Marruecos: relevancia pedagógica y condicionantes estructurales*

### Authors

Khalid Zaouch<sup>1</sup>  
Soulaiman Harfouf<sup>1</sup>  
Nabil Mohammed Sahraoui<sup>1</sup>

<sup>1</sup> Abdelmalek Essaadi University,  
Morocco

Corresponding author:  
Khalid Zaouch  
khalid.zaouch@etu.uae.ac.ma

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### Abstract

**Introduction:** this cross-sectional study examines the implementation of the competency-based approach (CBA) in lower-secondary physical education (PE) in Morocco and identifies the structural factors that limit its effectiveness in everyday teaching conditions.

**Objective:** two hypotheses were tested: the association between training indicators and perceived relevance, and the association between students' initial motor level and reported difficulties.

**Methodology:** a questionnaire administered to 131 PE teachers from six regional academies assessed perceived relevance of the CBA, training received, students' initial motor skills, and reported teaching difficulties, complemented by two open-ended questions.

**Results:** both hypotheses were supported. Teachers who reported sufficient training were more likely to judge the CBA as relevant ( $\rho \approx .36, p < .001$ ), while higher perceived initial motor skills were associated with fewer difficulties ( $\rho = -.41, p < .001$ ). Open-ended responses highlight three recurring issues: insufficient motor foundations at entry into lower secondary school, a mismatch between curricular prescriptions and actual teaching conditions, and the need to adapt targeted competencies to heterogeneous student profiles.

**Discussion:** the patterns observed confirmed the central role of motor foundations, showed convergence between questionnaire and open responses, and highlighted that contextualised training and differentiated progression were key levers for implementing the competency-based approach under real classroom constraints.

**Conclusions:** there is a gap between ambitious curricula and weak motor foundations; rebuilding these foundations and supporting teachers through contextualised training is crucial for equitable implementation.

### Keywords

Physical Education; competency-based approach; fundamental motor skills; primary pe; teacher training.

### Resumen

**Introducción.** Este estudio transversal examina la implementación del enfoque basado en competencias (EBC) en la educación física del primer ciclo de secundaria en Marruecos e identifica los factores estructurales que limitan su eficacia en las condiciones habituales de enseñanza.

**Objetivo:** Se pusieron a prueba dos hipótesis: la asociación entre los indicadores de formación y la relevancia percibida, y la asociación entre el nivel motor inicial del alumnado y las dificultades declaradas.

**Metodología:** se administró un cuestionario a 131 docentes de educación física de seis academias regionales que evaluó la relevancia percibida del EBC, la formación recibida, las destrezas motoras iniciales del alumnado y las dificultades de enseñanza declaradas, complementado con dos preguntas abiertas.

**Resultados:** ambas hipótesis fueron respaldadas. el profesorado que declaró haber recibido una formación suficiente tendía en mayor medida a considerar pertinente el EBC ( $\rho \approx .36, p < .001$ ), mientras que unas destrezas motoras iniciales más altas se asociaron con menos dificultades ( $\rho = -.41, p < .001$ ). las respuestas a las preguntas abiertas pusieron de relieve tres problemas recurrentes: la insuficiencia de las bases motoras al ingresar en el primer ciclo de secundaria, la desalineación entre las prescripciones curriculares y las condiciones reales de enseñanza, y la necesidad de adaptar las competencias objetivo a perfiles estudiantiles heterogéneos.

**Discusión:** los patrones observados confirmaron el papel central de las bases motoras, mostraron convergencia entre las respuestas al cuestionario y las preguntas abiertas, y destacaron que la formación contextualizada y la progresión diferenciada constituyen palancas clave para implementar el enfoque basado en competencias bajo las restricciones reales del aula.

**Conclusiones:** existe una brecha entre unos currículos ambiciosos y unas bases motoras débiles; reconstruir dichas bases y apoyar al profesorado mediante formación contextualizada resulta crucial para una implementación equitativa.

### Palabras clave

Educación Física; enfoque basado en competencias; habilidades motoras fundamentales; educación física en primaria; formación del profesorado.

## Introduction

Upon entry into lower secondary school, physical education (PE) plays a central educational role. Beyond its motor dimension, it promotes cooperation, initiative-taking, emotional regulation, and students' ability to reflect on their actions. Overall, these contributions support students' holistic development (Bailey, 2006). PE therefore operates at the intersection of motor, cognitive, social and affective dimensions that shape the learning experience.

In Morocco, this mission is embedded within the competency-based approach (CBA), introduced progressively from the late 2000s. Drawing on the work of Perrenoud (2011), the reform seeks to promote durable, contextualized and transferable learning. Its implementation, however, is constrained by several structural factors. Although PE is officially planned from the primary level, actual provision remains irregular due to insufficient facilities, timetable pressure and limited specialized training. As a result, students often enter lower secondary school with highly heterogeneous motor skill levels, making it difficult for teachers to construct coherent learning progressions.

Recent studies shed light on these challenges. Ramos et al. (2024) show that teachers' conceptions strongly influence how they interpret the curriculum. Montoya (2023) highlights the importance of Pedagogical Content Knowledge (PCK) as a key determinant of instructional effectiveness. On the motor side, Mujica-Bermúdez et al. (2025) demonstrate that structured multilateral programs improve coordination, balance and fundamental motor skills, underscoring the need for a solid motor foundation at the beginning of secondary schooling.

These findings align with other recent contributions. Marín et al. (2024) argue that teacher professionalization depends on initial and in-service training systems capable of strengthening lesson planning and mastery of PCK. Maquera-Maquera et al. (2025) further emphasizes that teachers' professional competencies directly shape the implementation of competency-based curricula. In parallel, Guerra et al. (2025) highlights the effectiveness of structured motor interventions in reducing physical competence gaps at key stages of schooling.

These results extend earlier work, notably Amade-Escot (2003), who stressed the need to adjust PE instruction to students' actual characteristics. Internationally, Hardman and Green (2011) reported that many education systems face shortages of resources, large class sizes and insufficient continuing training. In Morocco, Arbia et al. (2018) identified constraints related to working conditions, teacher preparation and heterogeneous student profiles, confirming the persistent gap between curricular ambitions and school realities.

The present study is situated within this context. Focusing on PE teachers in Moroccan public lower-secondary schools ( $n = 131$ ), it examines the key factors of CBA implementation in a setting marked by structural constraints. Three dimensions commonly identified in the literature inform the analysis: students' initial motor level, teachers' didactic training linked to PCK, and the material and organizational conditions of PE instruction.

The theoretical framework draws on curricular models developed by Tyler (2022) and Taba (1962), which emphasize the analysis of learners' needs to ensure coherence between objectives, content and assessment. Within this framework, PCK is a central component, linking disciplinary knowledge with the ability to transform it into teachable content. Montoya (2023) underlines its importance, while Latino et al. (2024) show that targeted professional development can enhance both teachers' self-efficacy and students' motor and cognitive progress.

Two research questions guide the study:

Q1. To what extent are training in CBA and PCK associated with PE teachers' perceived relevance of the approach?

Q2. To what extent is students' perceived initial motor level associated with reported difficulties in implementing the CBA in lower-secondary PE?

Two hypotheses follow:

H1. Perceived relevance of the CBA is positively associated with teachers' training indicators.



H2. Students' perceived initial motor level is negatively associated with implementation difficulties.

This framework helps examine jointly the didactic and organizational factors that condition the implementation of the competency-based approach in Moroccan lower-secondary PE.

## Method

### *Study design and data collection period*

This study employed a descriptive–analytical quantitative design based on a self-administered online questionnaire. Data were collected between 10 February and 5 March 2025. The cross-sectional design allowed for the description of teachers' perceptions, and estimated associations between variables without inferring causality. Such a design is appropriate for examining relationships, such as those between training and perceived relevance, or between initial motor level and teaching difficulties, within a large sample measured at a single point in time. The ordinal structure of the five-point Likert items and the expected heterogeneity of responses also justified the use of non-parametric tests when normality assumptions were not met.

### *Population, setting and sampling*

An a priori power analysis (G\*Power 3.1) indicated that a minimum of 123 participants was required to achieve a power level of .80 for detecting a medium correlation ( $\rho = .25$ ) with  $\alpha = .05$  (Faul et al., 2009). The 131 valid responses collected exceed this threshold and also meet the empirical "10 × k" rule proposed by Wilson Van Voorhis and Morgan (2007), which recommends at least 120 observations for a model including  $k = 12$  explanatory variables.

Sampling was conducted in two stages. The first involved proportional geographic stratification across six regional academies (Rabat–Salé–Kénitra, Casablanca–Settat, Tanger–Tétouan–Al Hoceïma, Fès–Meknès, Marrakech–Safi, and Souss–Massa), thereby ensuring a diversity of urban and rural contexts within an educational system that comprises twelve regions in total. The second stage relied on purposive recruitment of volunteers with at least two years of experience in public lower-secondary schools, contacted through PE inspectors.

The target population corresponds to PE teachers working in Moroccan public lower-secondary schools. The final sample includes 131 teachers who met the inclusion criteria (public school,  $\geq 2$  years of experience) and the exclusion criteria (no administrative positions or involvement in sports sections). Sociodemographic characteristics show that 80.9% of participants are male, a proportion consistent with the typical composition of the PE teaching workforce. Work experience is generally high, with 55.7% of teachers reporting more than twenty years of service.

Regarding geographic distribution, the Tanger–Tétouan–Al Hoceïma academy is the most represented among respondents (55.7%), while the remaining teachers are distributed across the other five academies. This overrepresentation does not reflect the national distribution of teachers but is attributable to the modalities of questionnaire dissemination and to varying levels of engagement of regional professional networks in the study.

### *Instrument and data collection procedure*

The questionnaire, developed in French and Arabic, included three sociodemographic items (gender, province, experience), twenty Likert items with five response options ranging from 1 (strongly disagree) to 5 (strongly agree) organized into four dimensions (perceived relevance, training, initial motor level, and difficulties/obstacles), and two open-ended questions. It was self-administered online in a single session, anonymously, with explicit informed consent.

To ensure consistent interpretation of directionality within each dimension, items 2, 7 and 12 were reverse-coded using the formula  $x' = 6 - x$ . Item 12, which addressed perceived lack of resources or training, was reversed to align its orientation with item 18. Based on respondents' answers, three composite scores were created as means on a 1–5 scale.



The first composite, perceived relevance of the CBA, included items 1, 3, 4, 5, 14, 17 and 19 and demonstrated satisfactory reliability ( $\alpha = .83$ ). The second composite, initial motor level, was derived from reverse-coded items 2 and 7, with reliability assessed through inter-item correlation and the Spearman-Brown estimate. The third composite, difficulties/obstacles, combined items 6, 9, 15, 16 and 20 ( $\alpha = .78$ ). The “Training” dimension was not aggregated; its indicators were analyzed separately, distinguishing item 18 (perceived sufficiency of training) and the reverse-coded item 12 (perceived sufficiency of resources/training).

A composite score was calculated when at least half of the corresponding items were completed; for dimensions with two items, both responses were required. Higher scores indicate stronger perceived relevance, higher perceived motor level, and greater perceived difficulties/obstacles. For training indicators, higher values correspond to sufficient training (item 18) or sufficient resources/training after recoding (item 12). Interpretation of the Likert means followed the reference scale proposed by Pimentel (2010).

The two open-ended questions complemented the quantitative data. The first asked teachers to describe a major difficulty encountered in implementing the CBA in PE at the lower-secondary level. The second invited them to identify a priority that could facilitate this implementation.

Table 1. Interpretation of Likert means according to Pimentel (2010)

Interval	Interpretation
1.00–1.80	Strong disagreement
1.81–2.60	Disagreement
2.61–3.40	Neither agree nor disagree
3.41–4.20	Agreement
4.21–5.00	Strong agreement

Note. Voluntary and anonymous participation; Google Forms link shared via institutional email and a professional WhatsApp group.

Table 2. Organisation of variables and scoring rules

Conceptual block	Likert items	Recoding	Score construction	Reliability
Perceived relevance of the CBA	1, 3, 4, 5, 14, 17, 19	—	Mean (1–5)	$\alpha = .83$
Initial motor level	2*, 7*	Items 2 and 7 reversed	Mean (1–5)	Inter-item correlation; Spearman-Brown
Difficulties and obstacles	6, 9, 15, 16, 20	—	Mean (1–5)	$\alpha = .78$
Training indicators	18; 12*	Item 12 reversed	Item-level analysis	—

Note. Items marked with an asterisk were reverse-coded using  $x' = 6 - x$ . Composite scores were calculated when at least half of the items in a given dimension were completed; for two-item scales, both responses were required. Higher scores indicate stronger perceived relevance, a higher perceived initial motor level, and a greater perception of difficulties or obstacles. For the training indicators, higher values correspond to training considered sufficient (item 18) and to resources or training perceived as sufficient after reverse-coding (item 12).

### Content validity and reliability

Three specialists in PE didactics reviewed the questionnaire during two consecutive lecture sessions. The Content Validity Index (CVI) was calculated by determining the proportion of items judged relevant, meaning that they were rated 3 or 4 out of 4 by at least two experts, and then aggregating the results at the scale level. Discrepancies were discussed and resolved during a third review session. The overall CVI of 0.88 reflects a high level of content validity.

A pilot test with fifteen teachers confirmed the clarity of the items, with an average completion time of approximately twelve minutes, and led to minor lexical adjustments. The bilingual French–Arabic format and the online self-administered mode were retained.

As indicated in Table 2, reliability was estimated separately for each composite because the instrument is multidimensional and cannot be represented by a single coefficient for all twenty items. For dimensions that include at least three items, reliability was assessed using Cronbach’s alpha based on complete cases. This applies to perceived relevance of the CBA and to difficulties or obstacles. For the dimension composed of two items, reliability was evaluated using the inter-item correlation and the Spearman-Brown estimate, calculated using the formula  $SB = 2r / (1 + r)$ . This concerns the initial motor level. The training indicators were examined individually and were not subject to internal reliability analysis. For reference, the overall alpha of the questionnaire was .79, which is above the conventional threshold of

70. However, this value was not used for interpretation because of the multidimensional structure of the instrument

### **Statistical analyses**

Statistical analyses were performed with IBM SPSS version 26. Descriptive statistics include means, standard deviations and 95 percent confidence intervals. In line with the measurement plan in Table 2, composite scores were computed as means on a 1 to 5 scale after recoding items 2, 7 and 12 using the formula  $x' = 6 - x$ . Aggregation rules required at least half of the items to be completed within each dimension, and both responses for two-item scales.

Three composites were used in the analyses. Perceived relevance of the CBA was calculated from items 1, 3, 4, 5, 14, 17 and 19. The initial motor level was based on the recoded items 2 and 7. Difficulties or obstacles were calculated from items 6, 9, 15, 16 and 20. The indicators related to training were examined individually. Item 18 reflects training judged sufficient, while the recoded item 12 reflects the perception of adequate resources or training.

Normality of each composite was tested with the Shapiro–Wilk test. Given the ordinal nature of the items and the deviations from normality, Spearman correlations were used, with a two-tailed significance threshold set at  $p < .05$ . The first hypothesis examined the association between perceived relevance and, separately, item 18 and the recoded item 12. The second examined the association between initial motor level and the difficulties or obstacles reported.

Confidence intervals for the correlations were computed using Fisher's z transformation. Effect sizes followed Cohen's benchmarks, where values around .10 indicate a small effect, values around .30 indicate a medium effect and values of .50 or higher indicate a large effect. Correlations were calculated using complete pairs. Interpretation of Likert means followed Table 1 to ensure consistent reading of response levels. This analytical strategy makes it possible to examine robust associations between composites derived from ordered items while accounting for deviations from normality and ensuring consistency with the methodological protocol.

### **Ethical approval**

A three-member committee from the Department of Educational Sciences approved the research protocol on 15 January 2024. An information page preceded the questionnaire and informed participants about the purpose of the study, the approximate completion time, the voluntary nature of participation, the right to withdraw at any time and the procedures used to ensure confidentiality. Informed consent was considered given when participants clicked on "Start the questionnaire."

No identifying information was collected. Names, personal email addresses, phone numbers and school affiliations were not requested, and IP addresses were not retained. A de-identification procedure was applied at the source. Each response was automatically assigned a unique numerical code from R1 to R131, which served as the sole identifier in the quantitative and qualitative analyses. The dataset exported to SPSS contained only these codes and the variables described in the Methods section.

All data were stored in a secure institutional space protected by a strong password and AES 256 encryption. Access was restricted to the three members of the research team. The encryption key and the original Google Forms questionnaire were stored in separate directories to minimize re-identification risks. Data were retained for twenty-four months after the end of data collection. After that period, the Google Forms survey and all local files, including SPSS and Excel documents, will be permanently deleted. All results are presented in aggregated form, including means, standard deviations, correlations and anonymized excerpts from open responses, which eliminates any possibility of direct or indirect identification of participants.

## **Results**

### **Perceived relevance of the competency-based approach**

Across the 131 valid responses, the composite score for perceived relevance—based on items 1, 3, 4, 5, 14, 17 and 19—reached a mean of 3.90 (SD = 0.44). According to the thresholds presented in Table 1,



this value falls within the “agreement” range, indicating that teachers generally hold favorable views regarding the relevance of the competency-based approach in lower-secondary PE. Internal reliability for this dimension was satisfactory ( $\alpha = .83$ ), consistent with the methodological standards applied, and indicative of stable estimates.

At the item level, the statement “the competencies targeted must be adapted to students’ actual level” showed the highest mean score ( $M = 4.28$ ,  $SD = 0.88$ ), reflecting the strong importance teachers place on pedagogical differentiation. Detailed descriptive statistics for each item appear in Table 3, and summary indicators are presented in Table 5.

### ***Perceived obstacles and the role of motor foundations***

The composite score for difficulties or obstacles, computed from items 6, 9, 15, 16, and 20, reached a mean of 4.01 ( $SD = 0.49$ ), indicating clear agreement on the existence of barriers to implementing the competency-based approach. Internal reliability for this dimension was satisfactory ( $\alpha = .78$ ), supporting the robustness of the findings. Item 6, which concerns the lack of regular PE at the primary level, exceeded the “strong agreement” range with a mean of 4.21 ( $SD = 0.94$ ) and 87% cumulative agreement. This highlights insufficient motor foundations as a major structural constraint on students’ entry into lower-secondary school.

Open-ended responses showed strong consistency with these quantitative trends, frequently mentioning the lack of fundamental motor skills, substantial disparities between students, and insufficient work habits. These observations highlight the need for early remediation before students engage with more complex tasks. Item-level details appear in Table 3 and the qualitative synthesis is provided in Table 4.

### ***Internal consistency across dimensions***

Internal consistency was assessed according to the measurement plan described in the Methods section. Multi-item scales exhibited satisfactory reliability, with Cronbach’s alphas of .83 for perceived relevance and .78 for difficulties or obstacles, calculated on complete cases. The Initial Motor Level dimension, composed of two reverse-coded items, showed a high inter-item correlation ( $r \approx .72$ ) and a Spearman-Brown coefficient of .84, indicating good construct coherence. Since training indicators were analyzed at the item level, internal reliability does not apply to these variables.

No significant correlation was found between years of teaching experience and the composite scores ( $|\rho| < .10$ ,  $p > .25$ ), suggesting that teachers’ perceptions were relatively homogeneous regardless of seniority.

### ***Identified compensatory strategies***

Responses to items 9, 15, 16, and 20, supported by comments from the open-ended questions, highlighted several mechanisms that could mitigate weaknesses in motor foundations and facilitate access to complex tasks. Play-based and progressive learning situations, designed to rebuild fundamental motor skills, received the highest average score, with item 9 achieving a score of 4.31 ( $SD = 0.64$ ). The integration of CBA objectives into guided and structured activities produced scores ranging from 3.65 to 3.77 for items 15 and 16. An evaluation emphasizing progress rather than solely outcomes yielded a mean score of 4.12 ( $SD = 0.75$ ) for item 20, indicating its perceived value in sustaining student engagement.

In general, these results outline a pedagogical engineering approach that combines motor remediation, progressive scaffolding, and formative assessment. These findings align with the constraints identified earlier and point to practical steps for strengthening CBA implementation in Moroccan lower-secondary PE.

Table 3. Descriptive statistics by item ( $n = 131$ )

Item	Short label	M	SD	Interpretation
1	The CBA is relevant in lower-secondary PE	3.34	1.19	Neither agree nor disagree
2*	Current motor level limits CBA implementation	4.28	0.62	Strong agreement
3	CBA contributes to overall development	3.81	0.93	Agreement
4	CBA enhances motivation and understanding	3.98	0.94	Agreement
5	Competencies must match students’ actual level	4.28	0.88	Strong agreement
6	Lack of PE in primary school hinders CBA	4.21	0.94	Strong agreement



7*	CBA is less effective with no prior motor experience	4.20	1.01	Agreement
9	Play-based activities compensate initial gaps	4.31	0.64	Strong agreement
12*	Lack of resources and training	4.02	0.94	Agreement
14	CBA makes learning more meaningful	4.08	0.88	Agreement
15	Need for continuous training	3.65	0.82	Agreement
16	Institutional support is essential	3.77	0.90	Agreement
17	CBA better prepares students for life situations	3.99	0.78	Agreement
18	I received sufficient training on CBA	4.28	0.74	Strong agreement
19	Programs must account for heterogeneity	3.83	0.84	Agreement
20	Assessment should focus on progress rather than outcomes	4.12	0.75	Agreement

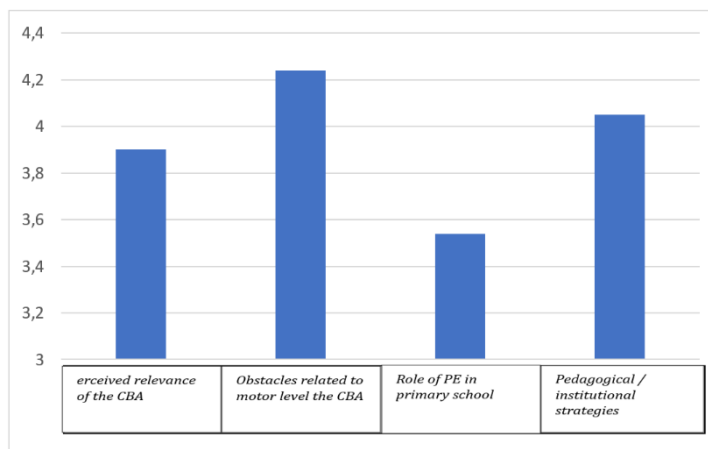
Note. Items marked with an asterisk were reverse-coded using  $x' = 6 - x$  to ensure a consistent score orientation across dimensions. The means reported here are raw item-level values. Composite scores and reliability indices are presented in Table 5.

### Graphical summary of the dimensions

The associated figure illustrates the mean values of the three composite scores, computed on a 1–5 scale after recoding items 2 and 7 using the transformation  $x' = 6 - x$ , following the procedure described in the Methods section. High mean scores for perceived relevance and for difficulties or obstacles reflect both strong endorsement of the relevance of the competency-based approach (CBA) and a clear recognition of the constraints affecting its implementation. By contrast, the composite score for initial motor level shows lower and more dispersed values, reflecting heterogeneous student profiles upon entry to lower secondary school. Because training indicators were analysed at the item level, they are not included in this graphical summary.

Figure 1 complements the descriptive statistics by showing strong agreement regarding the relevance of the CBA and clear acknowledgement of obstacles to its implementation, while the initial motor level appears lower and more heterogeneous ( $M = 2.04$  ).

Figure 1. Mean Scores of the Three Composite Variables (1–5 scale; n = 131)



### Qualitative analysis of open-ended responses

Table 4 summarises the thematic coding of the two open-ended questions. The analysis followed an inductive approach, based on two independent readings and a subsequent reconciliation process. Inter-rater agreement reached  $\kappa = .79$ , indicating substantial concordance. Each theme is operationally defined and accompanied by the number and percentage of respondents who mentioned it. Verbatim excerpts, anonymised using codes R1 to R131, were drawn directly from the raw data export. As respondents could mention multiple themes, the total number of occurrences exceeds 131. References to play or game-based activities were infrequent and were therefore incorporated into Theme T4 to ensure parsimony and clarity in the thematic structure.

Table 4. Qualitative analysis of open-ended responses (two questions, n = 131)

Theme	Operational definition	n	%	Authentic verbatim (R#)
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T1 — Deficit in fundamental motor skills / motor level	Insufficient motor foundations prior to engaging in complex tasks	126	96.2	“Integrate fundamental motor skills before addressing competencies.” (R1)
T1b — Lack of PE in primary school	Absence of continuity in primary PE; missing prerequisites upon entry to lower secondary school	86	65.6	“There is no continuity with PE in primary school.” (R8)
T3 — Need for contextualised training (CBA / PCK)	Training applied to the classroom, competency-based assessment, didactic tools	95	72.5	“Strengthen teacher training on how to apply this approach.” (R6)
T4 — Differentiation and progression (including ‘play/game’)	Adjustment to actual student levels, graded learning sequences, remediation; play mentioned as a differentiation tool	86	65.6	“Adapt the targeted competencies to the real level of lower-secondary students.” (R2)
T5 — Resources, time and institutional conditions	Timetabling, class size, equipment, facilities, institutional support	71	54.2	“Material and organisational conditions in schools.” (R13)

Note. Verbatim excerpts are raw, anonymised and unedited.

Method: Inductive thematic coding (double independent reading, reconciliation),  $\kappa = .79$ .

Table 5 reports means, standard deviations and 95% confidence intervals for the three composite scores (1–5 scale), after reverse-coding items 2 and 7 using  $x' = 6 - x$ . Reliability indices are provided for each composite score: Cronbach’s alpha for scales with three or more items, and inter-item correlation with the Spearman–Brown coefficient for the two-item scale.

Table 5. Descriptive statistics for composite scores (n = 131)

Composite score	Constituent items	Mean	SD	95% CI	Reliability
Perceived relevance of CBA	1, 3, 4, 5, 14, 17, 19	3.90	0.44	[3.83, 3.98]	$\alpha = .83$
Difficulties / obstacles	6, 9, 15, 16, 20	4.01	0.49	[3.93, 4.09]	$\alpha = .78$
Initial motor level	2 (rev.), 7 (rev.)	2.04	0.92	[1.88, 2.20]	$r = .72$ ; SB = .84

Notes. Reverse-coding of items 2 and 7 followed the rule  $x' = 6 - x$ . Reliability for two-item scales is reported using inter-item correlation and the Spearman–Brown estimate, as Cronbach’s alpha is not appropriate in this case. Training indicators (items 18 and 12, reverse-coded) were analyzed independently and do not form a composite score.

### Integrated synthesis of quantitative and qualitative analyses

Quantitative analyses indicate strong agreement regarding the relevance of the CBA, alongside a clear recognition of the obstacles hindering its implementation. In contrast, the initial motor level appears lower and more dispersed, reflecting substantial heterogeneity in students’ motor profiles at entry into lower secondary school. Training indicators, examined at the item level, reveal more nuanced perceptions: while adequate training emerges as a helpful potential lever, the availability of resources and institutional support appears more variable. These findings call for cautious interpretation, as they capture distinct dimensions of professional development.

The qualitative analysis provides a detailed account of the underlying mechanisms informing the implementation of the competency-based approach. The lack of fundamental motor skills (T1) and the absence of structured physical education provision in primary school (T1b) emerge as major impediments. Teachers also emphasise the need for contextualised training focused on pedagogical content knowledge (PCK) and competency-based assessment (T3). Differentiation and progression are described as essential for supporting students’ engagement with complex tasks (T4), while resource-related and organisational constraints recur consistently (T5).

The convergence between the composite scores in Table 5 and the themes identified in Table 4 points to a clear operational direction. Three priorities emerge: strengthening motor foundations at the start of lower secondary school, expanding contextualised professional development centred on PCK, and improving implementation conditions to address the obstacles most frequently cited. Together, these elements form a coherent strategy for promoting a more robust and equitable deployment of the CBA in Moroccan lower-secondary PE.

## Discussion

The findings show strong support among teachers for the competency-based approach (CBA), while also highlighting major structural barriers, particularly those related to students’ motor foundations and, to



a lesser degree, pedagogical and institutional constraints. Spearman correlations support both hypotheses. Training indicators are positively associated with perceived relevance, which aligns with H1, although interpretation must remain cautious since the indicators reflect different dimensions of training. Higher perceived initial motor skills are associated with fewer difficulties, supporting H2. The explicit description of recoding rules and composite construction ensures coherence across the Methods, Results and Discussion sections.

The CBA relies on the integrated mobilisation of motor, cognitive, and social skills, which presupposes diverse motor experiences during early childhood. Quantitative and qualitative results converge clearly. The Difficulties/Obstacles composite yields high scores, and theme T1 (lack of fundamental motor skills) is the most frequently cited. This convergence is consistent with models of motor learning, which emphasise progression built on the acquisition of basic motor competencies. The results confirm the importance of strengthening these foundations as soon as students enter lower secondary school. The central role of motor foundations, therefore, appears as a structural feature of teaching work, beyond individual perceptions.

From this perspective, and in line with a compensatory rather than normative reading of curriculum implementation, the difficulties reported by teachers should not be interpreted as a rejection of the competency-based approach itself, but rather as the consequence of a mismatch between uniform curricular expectations and students' heterogeneous motor capital upon entry into lower secondary school. In this context, models derived from non-linear pedagogy emphasize the value of open and progressive learning situations that allow students to construct motor competencies adapted to their individual constraints, rather than responding to standardized curricular demands. Such approaches appear particularly relevant for students with limited motor experience, as they prioritize adaptive processes, exploration and gradual stabilization of motor solutions over immediate performance outcomes (Kaloka et al., 2025).

Research on motor development further supports this interpretation by highlighting the central role of foundational movement skills in shaping students' engagement with learning tasks in physical education. According to the developmental model proposed by Hulsteen et al. (2018), insufficient motor foundations at early stages can limit later learning opportunities and increase difficulties when students are exposed to uniform curricular expectations. These findings reinforce the need for progressive and adaptive pedagogical approaches that allow students with low motor capital to construct competencies gradually, rather than being evaluated against standardized performance norms.

Although teachers agree on the existence of structural barriers, they describe a variety of adjustment strategies. Items 9, 15, 16 and 20 reflect the use of graded learning sequences, stronger didactic scaffolding and progress-based assessment. Themes T3 and T4 from the open-ended responses emphasise the need for contextualised training and the importance of gradual differentiation. The synthesis figure confirms this hierarchy. Within this framework, a progressive introduction of complex tasks, combined with initial motor remediation and an assessment system that values progress, emerges as a coherent response to the evidence collected.

The patterns observed in the open-ended responses confirm the statistical trends. Lack of fundamental motor skills is associated with higher levels of perceived obstacles, while requests for the adaptation of targeted competencies tend to come from teachers who view the CBA positively. This convergence is supported by the composite scores, item means highlighting adaptation to actual student profiles, and the strong presence of themes T1, T3 and T4. Teachers' comments highlight the gap between curricular prescriptions and classroom realities, without questioning the relevance of the approach itself.

The analysis reveals a leverage effect of training on perceived relevance, confirming H1 at the item level and aligning with theme T3. However, the available indicators reflect different aspects of training, perceived sufficiency and resource availability, calling for a nuanced reading. The findings are consistent with those of Marín et al. (2024), who argue that the effectiveness of training systems depends on their ability to strengthen specific didactic skills, particularly planning and PCK mastery. They also align with Maquera-Maquera et al. (2025), who underscores the determining role of teachers' professional competence and actual practices in implementing competency-based curricula. Practically, two directions emerge: developing contextualized training modules focused on CBA, PCK, differentiation and motor

remediation; and improving working conditions, including resources, monitoring tools and pedagogical support, rather than relying on a single training indicator.

The recommendations aim for transferability while remaining strictly grounded in the data. Making the first year of lower secondary school a targeted consolidation phase appears particularly relevant. Over a limited period, progressive activities involving running, jumping, throwing and catching can be integrated into warm-ups, followed by gradually more complex tasks. This proposal formalises the content implied by items 9, 15, 16 and 20 and aligns with theme T4. Implementing a progress tracking booklet and simplified initial and final assessments would help objectify learning trajectories. References to play, which were infrequent in responses, were integrated into T4 as a possible differentiation tool rather than a systematic prescription.

Two main limitations should be noted. The first concerns potential self-report bias, mitigated through several control measures: prior information, anonymity, absence of identifying data and explicit methodological procedures for recoding and aggregation. The second relates to the cross-sectional design, which prevents causal inference. A further limitation concerns the measurement of training, analysed at the item level rather than through a scale, which reduces reliability and calls for cautious interpretation. Several avenues emerge; combining questionnaires with standardized motor assessments and classroom observations, including additional educational stakeholders, and conducting longitudinal studies or training intervention trials to examine the effects of contextualized professional development on differentiation and student progression.

Many education systems report similar challenges when motor exposure in primary school is insufficient, reducing the prerequisites needed for engaging in complex tasks. These findings align with Guerra's and al conclusions (Guerra et al., 2025), which highlight the value of structured motor programs in reducing initial disparities. They also converge with Maquera-Maquera's analyses, which emphasise that effective implementation of competency-based curricula depends largely on teacher professionalism and actual classroom practices. While not allowing for direct comparison, the nature of the obstacles identified, from motor deficits to the need for contextualised training—appears transferable to other educational contexts facing similar challenges. The results support several generalizable levers: increasing motor exposure in primary school, anchoring professional development in real classroom contexts and strengthening progress-monitoring tools. The combination of foundational motor consolidation and gradual introduction of complex tasks emerges as a realistic strategy beyond the present study's context.

## Conclusions

This study highlights a central paradox in Moroccan physical education. The 2009 curriculum, grounded in the competency-based approach, is modern and ambitious. Yet, in practice, many students enter lower secondary school with insufficient motor foundations. The analyses confirm both hypotheses: training indicators are positively associated with the perceived relevance of the approach, and higher initial motor skills are linked to fewer difficulties, with a substantial negative association between motor level and obstacles ( $\rho = -.41, p < .001$ ).

These results align with motor learning models that emphasise gradual acquisition. Competencies develop in stages, based on a stabilised repertoire of fundamental motor skills. Without varied motor experiences in childhood, students lack the motor patterns needed to engage effectively in complex tasks, as indicated by foundational work from Schmidt (1975) and recent contributions from Stodden et al. (2008). This perspective is also consistent with international institutional frameworks, which stress that the development of fundamental motor competencies constitutes a prerequisite for equitable and effective participation in physical education across schooling levels (UNESCO, 2015). Teachers, therefore, advocate rebuilding motor foundations from the first year of lower secondary school, not to move away from the CBA, but to adapt it to classroom realities and enhance its feasibility.

Three main directions emerge, strengthening primary-school PE to ensure educational continuity, establishing dedicated motor remediation periods in lower secondary school, and developing targeted, contextualised professional development. Pedagogically, these recommendations call for a spiral pro-

gression, graded learning situations and a renewed emphasis on fundamentals. Physical literacy, understood as the combination of competence, confidence and motivation to act, offers a relevant framework for aligning curricular expectations with students' lived experiences.

Overall, successful implementation of the CBA requires explicit compensatory mechanisms aimed at rebuilding motor foundations, adjusting tasks to entry-level profiles and supporting teachers through contextualised training. It is through this alignment between curricular ambitions and classroom realities that meaningful learning and sustainable progress trajectories can emerge in Moroccan lower-secondary PE.

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### Authors and translators' details:

Khalid Zaouch	khalid.zaouch@etu.uae.ac.ma	Author
Soulaiman Harfouf	s.harfouf@uae.ac.ma	Author
Nabil Mohammed Sahraoui	Mohammed.sahraouinabil@etu.uae.ac.ma	Author
Amghar Khalid	Amgharkhalid88@gmail.com	Translator

## Appendix

### Appendix A. Full wording of the 20 Likert items and allocation to analytical blocks:

#### Appendix A

No.	Full item wording	Analytical block
1	The CBA is relevant for teaching PE at lower secondary school.	Perceived relevance
2*	Students' current motor level limits the effectiveness of the CBA.	Initial motor level (reverse-coded)
3	The CBA contributes to students' global development (motor, cognitive, social).	Perceived relevance
4	The CBA enhances motivation and understanding of learning goals.	Perceived relevance
5	Targeted competencies must correspond to students' actual levels.	Perceived relevance
6	The absence of regular PE in primary school hinders CBA implementation in lower secondary.	Difficulties/obstacles
7*	The CBA is less effective for students without prior motor experience.	Initial motor level (reverse-coded)
8	A lack of fundamental motor skills slows learning in PE.	Non-composite (descriptive)
9	Playful and adaptive strategies can compensate for initial gaps between students.	Difficulties/obstacles
10	Structured and progressive teaching fosters PE learning.	Non-composite (descriptive)
11	Assessment should focus on progress rather than immediate performance.	Non-composite (descriptive)
12*	Teachers lack resources and training to implement the CBA.	Training indicator (reverse-coded)
13	Combining the CBA with traditional methods is relevant.	Non-composite (descriptive)
14	The CBA makes PE learning more meaningful.	Perceived relevance
15	Teachers need ongoing professional development to succeed with the CBA.	Difficulties/obstacles
16	Institutional support is essential for implementing the CBA.	Difficulties/obstacles
17	The CBA better prepares students for real-life situations.	Perceived relevance
18	I have received sufficient training to implement the CBA in PE.	Training indicator
19	Programmes must account for the heterogeneity of student levels.	Perceived relevance
20	PE assessment should focus on progress rather than final outcomes.	Difficulties/obstacles

Note. Reverse-coded items: 2, 7, 12 following  $x' = 6 - x$ . Items 18 and 12 (reverse-coded) are analysed individually as training indicators and are not aggregated into a composite score. Items classified as *non-composite (descriptive)* document contextual aspects but are not included in composite calculations.

### Appendix B. Descriptive table for items 1 to 20 (n = 131):

#### Appendix B

Item	Mean	SD	Min-Max
1	3.34	1.19	1-5
2*	4.28	0.62	2-5
3	3.81	0.93	1-5
4	3.98	0.94	1-5
5	4.28	0.88	1-5
6	4.21	0.94	1-5
7*	4.20	1.01	1-5
8	4.23	0.89	1-5
9	4.31	0.64	1-5
10	4.26	0.69	1-5
11	3.83	0.84	2-5
12*	4.02	0.94	1-5
13	3.65	0.82	2-5
14	4.08	0.88	1-5
15	3.65	0.82	1-5
16	3.77	0.90	1-5
17	3.99	0.78	1-5
18	4.28	0.74	1-5
19	3.83	0.84	1-5
20	4.12	0.75	1-5

Notes.

Five-point Likert scale: 1 = "Strongly disagree" ... 5 = "Strongly agree".

Reverse-coded items for analysis: 2, 7, 12 (recoding rule  $x' = 6 - x$  on a 1-5 scale).