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Curriculum Implementation and Policy-Practice Alignment in Physical Education: Teachers' Perceptions in North Macedonia

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ABSTRACT

Physical education (PE) policy often translates inconsistently into classroom practice. This study examined PE teachers' perceptions of curriculum implementation in North Macedonia using the newly developed Physical Education Teachers' Perceptions of Motor Development and Curriculum Implementation (PET-MDCI) questionnaire.

A cross-sectional survey was conducted with 232 primary school PE teachers from urban (n= 130) and rural (n= 102) schools. The PET-MDCI assessed five domains: Curriculum Implementation, Barriers, Enablers/Support, Teacher Self-Efficacy, and Policy-Practice Alignment. Descriptive statistics, group comparisons, and correlation analyses were conducted.

Teachers reported moderately high curriculum implementation ($M = 3.57 \pm 0.66$) and self-efficacy ($M = 3.84 \pm 0.70$), while policy-practice alignment was the lowest-rated domain ($M = 2.92 \pm 0.84$). Rural teachers reported higher barriers ($M = 3.26$ vs. 3.09; $p = .014$, $r = .16$), whereas urban teachers reported higher support ($M = 3.82$ vs. 3.36; $p < .001$, $d = 0.76$), self-efficacy ($M = 4.06$ vs. 3.55; $p < .001$, $r = .37$), and policy-practice-alignment ($M = 3.25$ vs. 2.50; $p < .001$, $d = 0.98$). Curriculum implementation did not differ between groups ($p = .175$). Younger teachers reported higher implementation than the oldest group (ANOVA $p = .018$, $\eta^2 = .035$). Support, self-efficacy, and policy alignment were strongly intercorrelated ($r = .62$ to $.77$); barriers correlated negatively with all positive domains ($r = –.26$ to $–.45$).

Teachers perceive themselves as capable but face contextual constraints, particularly in rural schools. The newly developed PET-MDCI provides a useful framework for monitoring PE curriculum implementation.

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Introduction

Physical education (PE) shapes children's motor skills, physical literacy, physical activity and lifelong engagement in movement (Whitehead, 2010; Robinson et al., 2015). In schools and physical education classes, it supports physical, emotional, and cognitive growth (Bailey et al., 2009; Cairney et al., 2019). Students with quality physical education and physical activity backgrounds tend to move better and stay healthier (Barnett et al., 2016; Stodden et al., 2008). Yet, written policy often differs from classroom practice (Kirk, 2009). Global studies show that PE remains undervalued, despite being recognized as essential. Hardman and Marshall's (2000) worldwide survey and Hardman's (2011) follow-up European studies revealed limited class time and low institutional priority across all continental regions. Initiatives like UNESCO's QPE, the 1999 World Summit, and the EU Work Plan for Sport

(2014-2017) highlight the need for inclusive, high-quality PE with trained teachers and fair resources (UNESCO, 2014; European Commission, 2015). Still, success depends on curriculum design, teacher motivation, infrastructure and national investment (Lund & Tannehill, 2014).

Recent work emphasizes physical literacy. Studies by Durden-Myers and Evans (2025) and Essiet et al. (2024) found that teachers support physical literacy but struggle to apply it in structured lessons. Across Europe, reforms meet similar problems such as training gaps, unclear roles, and heavy workloads (Ennis, 2011; Dyson, 2014). In Central and Eastern Europe, these issues remain widespread. Mileva et al. (2017) found uneven PE quality in North Macedonia, Bulgaria and Slovenia. Many generalist teachers (elementary school) lack training in motor development and physical education generally, while PE specialists rarely access further education (Popeska et al., 2017b), highlighting limited opportunities for continuous professional development. As Tinning (2009) noted, theory and classroom conditions must align for effective PE.

In North Macedonia, the Physical and Health Education curriculum (Физичко и здравствено образование; FZO) encourages balanced development across sports, gymnastics, rhythm, and health domains. However, studies show uneven coverage. Sport games dominate, while rhythmic and health areas lag behind (Gontarev & Ruzdija, 2014; Gontarev et al., 2018). Schools face old facilities, crowded classes, and limited training opportunities (Popeska et al., 2017b; Lomsdal et al., 2022). Teachers also struggle with little time for planning and limited recognition (Wee et al., 2021).

Beyond curricular and structural conditions, monitoring systems also shape implementation. National evidence from the MakFit study (Gontarev et al., 2018) revealed concerning trends in aerobic and muscular fitness among Macedonian youth and highlighted the value of systematic monitoring for informing curriculum adjustments. Comparable European frameworks, such as Slovenia's SloFit and the FitBack Europe platform (Jurak et al., 2022; Ortega et al., 2023), connect teachers, students, and policymakers through shared monitoring data. The absence of an integrated monitoring system in North Macedonia underlines the importance of understanding how teachers themselves perceive and implement the motor development components of the curriculum.

Macedonia's situation reflects a broader European pattern of ambitious policy goals but limited implementation capacity. Structural barriers, training gaps, and lack of evaluation slow progress (Hardman, 2011). Understanding teacher perspectives is essential, as self-efficacy and environment drive curriculum success (Ennis, 2011; Kirk, 2009).

Despite this body of evidence, several gaps remain. No study has systematically examined how Macedonian PE teachers perceive the implementation of motor development goals across multiple domains simultaneously. Prior regional research has relied on descriptive or qualitative approaches and has not quantified how implementation conditions differ by school location or teacher career stage. Moreover, no validated instrument has been developed or applied in this context to assess the interplay between curriculum implementation, barriers, institutional support, self-efficacy, and policy–practice alignment as an integrated set of constructs. This study addresses these gaps directly. It presents the development and validation of the PET-MDCI instrument and uses it to provide the first quantitative, multidimensional account of PE teachers' perceptions in North Macedonia, with particular attention to urban–rural disparities and age-related differences. In doing so, it connects national evidence to broader European frameworks (UNESCO, 2014; Popeska et al., 2017a, 2017b) and offers a replicable model for monitoring PE curriculum implementation in comparable educational contexts.

Methods

Study Design

This study used a quantitative, descriptive, cross-sectional survey design to examine physical education (PE) teachers' perceptions of motor development–related curriculum implementation in North Macedonia. The design enabled systematic analysis of teachers' reported practices, perceived barriers, institutional support, self-efficacy, and the extent to which national curricular expectations align with school-level realities. The approach aligns with international recommendations for evaluating Quality Physical Education (UNESCO, 2014).

Participants

A geographically broad sample of 232 primary school PE teachers participated in the study. Teachers represented both urban and rural regions from all major geographic areas of North Macedonia. Recruitment was conducted through multiple channels, including official school email lists, professional PE teacher associations, Facebook and Viber groups commonly used by the teaching community, and personal networks. Based on these channels, approximately 250-300 teachers received the invitation. Participation was entirely voluntary and anonymous; no incentives were provided. Inclusion criteria were: (a) currently employed as a physical education teacher in North Macedonia, and (b) able to complete the online questionnaire independently. There were no exclusion criteria beyond non-completion of the survey. All responses were complete, as the online system (Google Forms) required answers to all items.

For the analysis of age differences, teachers were grouped into three categories (24-40 years, 41-55 years, and 56+ years). These categories reflect commonly used career-stage groupings in teacher development research, distinguishing early-career, mid-career, and late-career teachers. The grouping also corresponds to meaningful generational differences in teacher preparation, as younger teachers in North Macedonia have typically been trained under more recent competence-based curricula. Additionally, using three broader categories ensured sufficient sample sizes within each group for reliable statistical comparison.

Instrumentation

A new instrument, the Physical Education Teachers' Perceptions of Motor Development and Curriculum Implementation (PET-MDCI), was developed for this study to assess teachers' perceptions across five domains: Curriculum Implementation, Barriers, Enablers and Support, Teacher Self-Efficacy, and Policy-Practice Alignment. All items were developed from: Macedonian Physical and Health Education (FZO) curriculum documents; UNESCO (2014) Quality Physical Education guidelines; validated instruments assessing PE teaching practices and barriers (e.g., Kulinna & Cothran, 2003; Morgan & Hansen, 2008); and theoretical frameworks on motor competence and teacher motivation (Stodden et al., 2008; Ennis, 2011).

An expert panel of three university academics (specialists in physical education pedagogy, motor development, and teacher education) evaluated all items for content validity, clarity, and contextual relevance. Minor linguistic adjustments were made based on their feedback. A total of 37 items were drafted, piloted, and retained after expert review and preliminary analysis. All items used a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). Higher scores indicate more favorable perceptions, except for the Barriers subscale, where higher scores reflect greater perceived challenges.

Test-Retest Reliability and Structural Validity

Before collecting data from the full sample, a test–retest reliability check was carried out with 32 PE teachers, who completed the questionnaire twice over a two-week period. The results showed excellent stability over time, with ICC values ranging from .92 to .97 and Pearson correlations from .93 to .98 across all subscales. The Standard Error of Measurement (SEM = 0.09-0.14) and Minimal Detectable Change (MDC_{95} = 0.26-0.39) also indicated high measurement precision. To assess the structural validity of the PET-MDCI in the full sample (N = 232), an exploratory factor analysis (EFA) was conducted. Sampling adequacy was strong (KMO = .89) and Bartlett's Test of Sphericity was significant ($p < .001$), confirming that the data were suitable for factor analysis. Principal axis factoring with an oblique rotation was used, which allows factors to correlate, appropriate given the conceptual links between the subscales. The EFA produced a five-factor solution that aligned with the theoretically expected domains. All items loaded above .41 on their intended factors, with very few cross-loadings, demonstrating a clear and coherent structure. These factors corresponded to Curriculum Implementation, Barriers, Enablers and Support, Teacher Self-Efficacy, and Policy-Practice Alignment. Internal consistency reliability (Cronbach's α) ranged from .55 to .88. The lower α for the Barriers subscale reflects the multi-dimensional nature of that construct and remains acceptable for a newly developed broad-scale measure.

Data Collection

Data were collected online using Google Forms. Teachers accessed the questionnaire via a secure link and completed it individually in approximately 7-10 minutes. No personal identifiers (names, schools, IP addresses) were collected. All respondents provided informed consent electronically before participation.

Ethical Considerations

The study was conducted as part of an approved doctoral research project (No. 0201-748/5, approved on 28 May 2024). Participation was voluntary and anonymous, and informed consent was obtained from all participants prior to data collection. The study adhered to the ethical principles of the Declaration of Helsinki.

Data Analysis

Analyses were conducted in IBM SPSS v.25. Descriptive statistics (means, standard deviations, ranges) summarize demographic characteristics and subscale scores. Group comparisons between urban and rural teachers used independent samples t-tests or Welch's t-tests when variances were unequal. Non-parametric analyses (Mann-Whitney U, Kruskal-Wallis) were used when assumptions of normality were not fully met. Effect sizes were interpreted using Cohen's d, Pearson's r, η^2 or ε^2 where appropriate. Pearson correlations examined relationships among subscales. Statistical significance was set at $p < .05$.

Results

The final sample included 232 primary school PE teachers from North Macedonia, of whom 130 worked in urban schools and 102 in rural schools.

Table 1. Descriptive statistics for demographic variables by school type

Variable	Group	M	SD	Min	Max
Age (years)	Urban	41.04	10.64	24	61
	Rural	39.42	10.00	25	61
Years of teaching experience	Urban	12.91	9.97	1	34
	Rural	11.93	9.65	1	35
Average number of students per class	Urban	22.68	5.37	5	33
	Rural	20.27	5.13	7	28
Average number of classes per generation	Urban	3.98	1.40	1	8
	Rural	2.81	1.04	1	7

Teachers' mean age was 40.33 ± 10.37 years (range 24–61), with an average of 12.48 ± 9.83 years of teaching experience (range 1–35). Teachers reported an average of 21.63 ± 5.39 students per class (range 5–33) and 3.47 ± 1.38 classes per generation (range 1–8).

Table 2. Descriptive statistics and reliability of PET-MDCI subscales (N = 232)

Subscale	M	SD	α (Cronbach)
CI	3.57	0.66	0.77
BAR	3.16	0.52	0.55
EN	3.62	0.63	0.78
SE	3.84	0.70	0.86
PP	2.92	0.84	0.88

As shown in Table 2, teachers reported moderately high curriculum implementation, relatively high self-efficacy and perceived support, and moderate levels of barriers. Policy-practice alignment was the lowest-rated domain.

Table 3. Descriptive statistics for PET-MDCI subscales by age group

Subscale	Age group	M	SD
Curriculum Implementation	24-40	3.64	0.60
	41-55	3.58	0.64
	56+	3.23	0.89
Barriers	24-40	3.13	0.50
	41-55	3.23	0.52
	56+	3.10	0.60
Enablers	24-40	3.68	0.65
	41-55	3.58	0.57
	56+	3.43	0.73
Self-Efficacy	24-40	3.86	0.70
	41-55	3.82	0.72
	56+	3.78	0.70
Policy-Practice	24-40	3.00	0.87
	41-55	2.76	0.78
	56+	3.07	0.87

Teachers were grouped into three age categories: 24–40 years (n = 119); 41–55 years (n = 88); 56+ years (n = 25). Descriptive statistics by age group are shown in Table 3. Inferential tests are presented in Table 4.

Table 4. Age-group differences in PET-MDCI subscales

Subscale	Test	p	Effect size
CI	ANOVA	.018	$\eta^2 = .035$
BAR	Kruskal-Wallis	.240	$\varepsilon^2 = .004$
EN	ANOVA	.169	$\eta^2 = .015$
SE	ANOVA	.831	$\eta^2 = .002$
PP	Kruskal-Wallis	.065	$\varepsilon^2 = .015$

A statistically significant but small age-group difference was observed for Curriculum Implementation (ANOVA, $p = .018$, $\eta^2 = .035$). No statistically significant age differences were found for Barriers, Enablers and Support, or Self-Efficacy. For Policy-Practice Alignment, a trend-level effect emerged (Kruskal-Wallis, $p = .065$, $\varepsilon^2 = .015$), which did not reach statistical significance.

Table 5. Descriptive statistics for PET-MDCI subscales by school type

Subscale	Group	M	SD
CI	Urban	3.63	0.72
	Rural	3.51	0.57
BAR	Urban	3.09	0.55
	Rural	3.26	0.45
EN	Urban	3.82	0.61
	Rural	3.36	0.57
SE	Urban	4.06	0.66
	Rural	3.55	0.65
PP	Urban	3.25	0.77
	Rural	2.50	0.75

Differences between urban (n = 130) and rural (n = 102) schools were examined for all subscales (Table 5). Inferential tests are reported in Table 6.

Table 6. Differences between urban and rural schools across PET-MDCI subscales

Subscale	Urban M	Rural M	Test	p	Effect size
CI	3.63	3.51	t-test	.175	d = 0.18
BAR	3.09	3.26	Mann-Whitney	.014	r = .16
EN	3.82	3.36	t-test	<.001	d = 0.76
SE	4.06	3.55	Mann-Whitney	<.001	r = .37
PP	3.25	2.50	t-test	<.001	d = 0.98

Urban teachers scored significantly higher on Enablers ($p < .001$, $d = 0.76$) and Self-Efficacy ($p < .001$, $r = .37$), and substantially higher on Policy–Practice Alignment ($p < .001$, $d = 0.98$). Rural teachers reported significantly higher Barriers ($p = .014$, $r = .16$). Curriculum Implementation did not differ significantly between groups ($p = .175$, $d = 0.18$).

Table 7. Correlations between PET-MDCI subscales (N = 232)

	CI	BAR	EN	SE	PP
CI	-	-.26	.37	.43	.35
BAR	-.26	-	-.42	-.43	-.45
EN	.37	-.42	-	.62	.77
SE	.43	-.43	.62	-	.69
PP	.35	-.45	.77	.69	-

The strongest correlations appeared among Enablers and Support, Self-Efficacy, and Policy–Practice Alignment ($r = .62$ to $.77$). Barriers showed negative correlations with all other domains ($r = -.26$ to $-.45$).

Discussion

The most striking findings of this study are the substantial urban–rural disparities in teachers' perceptions, the consistently low rating of policy–practice alignment relative to other domains, and the strong intercorrelations among institutional support, teacher self-efficacy, and perceived policy alignment. Rural teachers reported greater barriers and lower support, self-efficacy, and policy alignment than their urban counterparts, with moderate to large effect sizes on three of the five domains. At the same time, teachers overall reported moderately high curriculum implementation and high self-efficacy, suggesting a workforce that perceives itself as professionally prepared while operating within constrained institutional conditions. These results echo and extend long-standing international observations that, although PE is widely valued in policy documents, its delivery is frequently challenged by insufficient resources, fragmented support systems, and inconsistent organizational conditions (Hardman & Marshall, 2000; Hardman, 2011; UNESCO, 2014). The coexistence of strong teacher self-efficacy and notable perceived barriers in the present study reflects these global patterns. The findings also correspond with contemporary literature on physical literacy and motor development. Studies by Durden-Myers and Evans (2025) and Essiet et al. (2024) highlight that while teachers recognize the importance of motor competence and holistic physical development, pressures related to limited facilities, heavy workloads, unclear curricular guidance, and restricted time can make implementation more difficult. The moderate levels of perceived barriers and the comparatively low scores for Policy-Practice Alignment in the present study are consistent with these international

findings, indicating that many teachers perceive a gap between policy expectations and the realities of school practice.

The current results extend earlier regional research. Previous work in Macedonia, Bulgaria, and Slovenia (Popeska et al., 2017a, 2017b) documented general obstacles in PE such as inadequate equipment, outdated facilities, and limited opportunities for professional development, but did not quantify how these challenges vary between school environments. In contrast, the present study identified significant urban–rural differences in teachers' reported perceptions of barriers, support, self-efficacy, and policy-practice alignment. Given the cross-sectional design, these associations should be interpreted as perceived differences across contexts rather than as causal effects, and they suggest perceived inconsistency in the conditions supporting PE curriculum implementation across school environments. This represents a meaningful extension of prior findings and provides quantitative evidence that school location is associated with teachers' perceptions of curriculum implementation conditions in the Macedonian context.

Age-related patterns further contribute to the understanding of teacher perceptions. Younger teachers reported higher curriculum implementation than the oldest group, with a small but statistically significant effect. Although the differences are modest, one possible interpretation is that they may relate to differences in teacher preparation, including exposure to competence-based curricula, motor-development frameworks, and contemporary pedagogical approaches. Given the cross-sectional nature of the data, this interpretation should be regarded as tentative and explored further in future longitudinal or cohort research.

The strong intercorrelations among Enablers and Support, Self-Efficacy, and Policy-Practice Alignment suggest that these perceived domains are closely connected. Teachers who reported stronger support and confidence also perceived curricular expectations as more realistic and achievable, whereas higher perceived barriers were associated with weaker reported implementation, support, self-efficacy, and policy alignment. These associations are consistent with theoretical perspectives proposed by Ennis (2011), Tinning (2009), and Whitehead (2010), who argue that high-quality PE is supported when teacher confidence, institutional support, and curricular coherence reinforce each other. Because the present design is cross-sectional, the observed relationships are correlational and do not establish directionality. These results may nonetheless be especially relevant in contexts that lack comprehensive monitoring and feedback systems, such as those implemented in SloFit and FitBack Europe (Jurak et al., 2022; Ortega et al., 2023).

This study makes several original contributions to the field. First, it introduces and validates the PET-MDCI, the first instrument designed specifically to assess PE teachers' perceptions of motor development curriculum implementation in a post-communist South-Eastern European context. Second, it provides the first quantitative evidence that school location is associated with perceived implementation conditions in North Macedonia, with moderate to large effect sizes on support, self-efficacy, and policy-practice alignment. Third, it reveals age-related patterns that may reflect generational shifts in teacher preparation and curriculum exposure. Fourth, by integrating five conceptually distinct domains within a single validated framework, it offers a multidimensional perspective that previous regional studies have not provided. Together, these contributions extend prior regional work, situate national evidence within broader European frameworks, and establish a foundation for ongoing, evidence-based monitoring of PE quality in North Macedonia and comparable settings.

Limitations

Several limitations should be acknowledged. First, although the study included a geographically broad sample, the findings may not fully represent all Macedonian PE teachers, particularly those from smaller rural schools. Second, as a self-reported survey, results rely on teachers' perceptions rather than direct observation of practice, and may be subject to social desirability and recall biases. Third, the cross-sectional design precludes causal inference and does not capture changes in teachers' perceptions over time. Fourth, the Cronbach's α for the Barriers subscale (α = .55) was below the conventional .70 threshold, reflecting the multi-dimensional nature of that construct; results involving this subscale should be interpreted with caution. Future research should include larger and more diverse samples, employ longitudinal and mixed-method designs, and combine teacher self-reports with classroom observation to validate and expand these findings.

Conclusion

This study offers the first quantitative, multidimensional examination of how physical education teachers perceive the implementation of motor development elements of the national curriculum in North Macedonia, using a newly validated instrument purpose-built for this context. Teachers reported generally positive levels of curriculum implementation and strong confidence in their professional abilities, suggesting a teaching workforce that perceives itself as prepared and capable. At the same time, teachers reported meaningful barriers and identified a substantial perceived gap between curricular expectations and practical conditions in schools.

The results show that school context is associated with important differences in teachers' perceptions. Rural teachers reported more barriers than their urban colleagues, together with lower support, lower self-efficacy, and weaker policy–practice alignment. These differences highlight the need for targeted measures that promote more equitable access to resources, professional development, and institutional support across school environments. Age-related differences may reflect generational or professional differences that warrant further investigation.

Overall, the findings indicate that Macedonian PE teachers report confidence and perceived readiness to deliver motor development–oriented education, while also indicating that the broader system does not always provide the conditions necessary for consistent implementation. Strengthening professional support structures, improving resource availability, and enhancing the clarity and practicality of curriculum guidelines may help reduce the policy–practice gap. The newly developed PET-MDCI instrument offers a useful framework for ongoing monitoring and may support evidence-based improvements in physical education across the country.

Ultimately, strengthening physical education in North Macedonia requires sustained commitment to quality teaching, equitable resources, and consistent monitoring. Future progress will depend on how well policy ambitions translate into everyday classroom realities and meaningful experiences for students.

Practical Implications

The results highlight the importance of sustaining support structures for teachers through targeted professional development, especially in rural areas. Programs focusing on curriculum innovation, digital resources, and inclusive practice may help strengthen teachers' perceived self-efficacy and alignment with policy objectives. The PET-MDCI instrument can serve as a diagnostic tool for periodic monitoring and comparison, contributing to evidence-based development of physical education curricula and teacher preparation in North Macedonia.

Declarations

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Statement

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Statement

This article is derived from an approved doctoral research project. The project was approved by the institutional Teaching and Scientific Council (No. 0201-748/5, dated 28 May 2024). The study was carried out in accordance with the ethical standards of the institutional research committee and the Declaration of Helsinki and its later amendments. Participation was voluntary and anonymous, and informed consent was obtained from all participants prior to participation.

Author Contributions (CRediT Taxonomy)

Conceptualization: A.A.; Methodology: A.A.; Formal analysis: A.A.; Investigation: B.B.; Data curation: B.B.; Writing – original draft preparation: A.A.; Writing – review and editing: A.A.; Supervision: B.B. Both authors have read and agreed to the published version of the manuscript.

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