

EXPLORING THE PERSPECTIVES OF BASIC PUPILS' MOTOR AND SWIMMING COMPETENCIES IN THE DEVELOPMENT OF QUALITY PHYSICAL EDUCATION IN PRIMARY SCHOOLS

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ORIGINAL SCIENTIFIC ARTICLE

DOI: 10.5937/ATAVPA25006B

Abstract: *This study investigated the level of basic motor and swimming competencies in younger school-age children (grades 1–3, 1st cycle of primary school) to address recognized global deficits in Quality Physical Education (QPE), particularly the lack of specialized teacher training for accurate skill assessment. Two standardized test batteries were employed: the MOBAK test battery for motor skills (n=258, ages 6–9) and the Water Basic Competence (WABAC) test battery for swimming competency (n=1,875, grades 1–3). MOBAK results indicated complex, non-linear developmental trends in motor skills. While participants showed proficiency in Self-Movement skills (Mean 6.10/8), a chronic deficit was found in Throwing (stagnant low scores), and an unexpected performance decline after age seven was observed in Jumping and Catching. Conversely, WABAC results demonstrated a clear and significant improvement in swimming competence across all test items with increasing grade and age (mean item scores rose from 2.00–2.52 in Grade 1 to 2.41–2.68 in Grade 3), confirming the importance of systematic instruction. The findings affirm the suitability and efficacy of the MOBAK and WABAC batteries as tools for accurately differentiating pupil competency levels, highlighting specific skill deficits, and informing targeted interventions to improve QPE in primary schools.*

Key words: motor competencies, swimming competencies, primary school, quality physical education

INTRODUCTION

Quality Physical Education (QPE) is defined as the planned, progressive, and inclusive learning experience that forms an integral part of the curriculum across early years, primary, and secondary education. In this capacity, QPE serves as the foundation for a lifelong engagement in physical activity and sport, helping children and youth acquire the psychomotor skills, cognitive understanding, and social and emotional competencies required to sustain a physically active life (UNESCO 2015).

International organizations frequently implement projects to monitor QPE development and quality globally. The most significant recent project was the 4th PE Worldwide Survey on QPE, administered by UNESCO in cooperation with FIEPS and Loughborough University (2017–2024). The key findings, presented at the MINEPS VII conference in June 2023 and published in the official UNESCO report *The Global State of Play* (UNESCO 2024), identified four critical global deficits in the provision of QPE:

- Lack of Funding: 63.8% of countries allocate less of their education budget to PE.
- Lack of Time: Only 32.2% of upper secondary and 34.7% of lower secondary students meet the minimum criteria of 180 minutes of PE per week, while 52.6% of primary school students meet the minimum of 120 minutes per week.
- Lack of Inclusion: One in three students with disabilities lacks access to PE.
- Lack of Training: Only 44.7% of primary school PE teachers are specialists.

This lack of specialist training is directly related to the inadequate preparation of teachers to accurately assess basic motor and specific swimming competencies in pupils. Concepts for assessing the competences of the school population and their development are gaining increasing traction across the European context, often based on specific standardized models.

Assessment of Basic Motor Competencies

For the standardized assessment of basic motor competencies, the MOBAK test battery is widely used in European countries (Herrmann et al., 2015; Hermann, Gerlach, and Seeling, 2015; Scheuer et al., 2017; Herrmann, 2018; Scheuer, Herrmann, and Bund, 2019). The MOBAK battery provides a standardized and economical evaluation of the fundamental motor skill level for children aged 4–9 years in both preschool and primary school settings. The test captures basic motor competencies across two main domains:

Movement with One's Own Body and Movement with Equipment (Masaryková and Labudová 2018, Masaryková 2021).

The MOBAK test battery consists of four coherent, age-specific versions: MOBAK KG (kindergarten, ages 4–6), MOBAK 1–2 (primary school, grades 1–2, ages 6–7), MOBAK 3–4 (primary school, grades 3–4, ages 8–9), and MOBAK 5–6 (age 10–11). Given that the test battery was designed for co-educational teaching, differences between boys and girls do not need to be considered during assessment (Boržíková, 2020; Mačura et al., 2020; Šeflová, 2021).

Assessment of Basic Swimming Competencies

A specific and critical area of motor competence is basic swimming competence, which directly impacts aquatic safety and reflects differences in drowning rates (Stempski et al., 2015). The shift from focusing merely on "swimming skills" to the broader concept of "water competence" (Stallman et al., 2017) emphasizes the role of schools in fostering aquatic safety and competence. Swimming also serves as a gateway to recreational pursuits, promoting a lifelong appreciation for physical activity and leisure (Merica and Pacanovská 2020; Labudová, 2024).

For the assessment of swimming competencies, the Water Basic Competence (WABAC) test battery is used (Labudová et al., 2024). The WABAC battery was specifically developed to evaluate the fundamental swimming skills and abilities crucial for ensuring safe aquatic movement among younger school-age children. This assessment tool comprises seven distinct test items: front floatation, 12.5-meter flutter kick using a kickboard, water entry via jumping, retrieving a submerged object, back floatation, submersion with controlled exhalation, and front gliding.

Aim of the Study

The primary aim of this study was to investigate the level of basic motor and swimming competencies in younger school-age children (grades 1–3, corresponding to the 1st cycle of primary school). By applying the MOBAK and WABAC test batteries, the study sought to demonstrate their availability and suitability as effective tools for assessing and differentiating the level of basic motor and swimming competencies among pupils at the primary level of education.

METHOD

Basic Motor Competencies: Participants and Data Collection

Testing was organized for a project focused on tandem teaching in primary school PE, specifically examining its impact on students' motor, cognitive, and emotional development. Data were collected at the beginning of the school year, in October 2025, from three primary schools located in the Bratislava region-Slovakia. The initial sample included students from grades 1 through 3. The final analysis focused on a cohort of 258 participants aged 6 to 9 years. The small number of older children (10-year-olds, $n=7$; 11-year-olds, $n=1$) was excluded to create a more focused and developmentally consistent dataset. Descriptive statistics for the entire cohort revealed a mean BMI of 16.22 kg/m², suggesting the participants were, on average, within a healthy weight-for-height ratio. The participants were divided into four distinct age groups for developmental trend analysis as follows:

- Age 6: 73 participants ($n=73$)
- Age 7: 74 participants ($n=74$)
- Age 8: 57 participants ($n=57$)
- Age 9: 54 participants ($n=54$)

Basic motor competencies were assessed using the MOBAK test battery, which evaluates eight distinct motor skills (Hermann et al., 2015). The assessment is structured into two main composite areas, each with a maximum score of 8 points:

- Self-Movement (Movement with One's Own Body): Consists of Balancing, Rolling, Jumping, and Running.
- Object Movement (Movement with Equipment): Consists of Throwing, Catching, Dribbling, and Bouncing.

A child's overall performance is summarized by a Total MOBAK Score, which is the sum of both competency areas, yielding a maximum score of 16 points.

All individual skills were scored on a scale of 0 to 2 points. The specific scoring mechanisms varied slightly by skill type:

- Skills Scored on Two Attempts (Binary Success):

For the skills of Dribbling, Rolling, Balancing, Jumping, Running, and Bouncing, the final score was determined by the number of successful attempts.

- 0 points: Zero successful attempts.
- 1 point: One successful attempt.
- 2 points: Two successful attempts (maximum score).

- Skills Scored on Six Attempts (Range of Success):

For the skills of Throwing and Catching, participants completed six attempts.

- 0 points: 1 to 2 successful attempts.
- 1 point: 3 to 4 successful attempts.
- 2 points: 5 to 6 successful attempts (maximum score).

The assessment of the composite basic motor competencies (Self-Movement and Object Movement) was calculated by summing the scores obtained from the four individual test items within each area (4 tests times 2 points = 8 points).

Swimming competencies: Participants and Data Collection

The study included 1,875 pupils from grades 1 to 3 of primary schools in Slovakia, who participated in organized swimming courses during 2023–2024 in cooperation with the *Sport Institute*. The participants had no prior systematic swimming instruction. Data was collected in indoor 25-meter pools during the first two lessons of each course. All testing procedures were supervised by certified swimming instructors trained in a unified protocol. The final sample consisted of 360 first-grade pupils (mean age = 7.2 years), 704 second-grade pupils (mean age = 7.9 years), and 811 third-grade pupils (mean age = 8.7 years).

The *Water Basic Competence* (WABAC) test battery was developed to assess fundamental swimming skills and abilities essential for safe aquatic movement in children of younger school age. Each test task was evaluated using a three-point rating scale reflecting the level of task performance: 1 point – not performed / unsuccessful, 2 points – partially performed / in progress, and 3 points – fully performed / successful. Thus, each participant could achieve a minimum total score of 7 points and a maximum of 21 points. The frequency and percentage analyses were used to evaluate the performance success of pupils across grade levels for each test item.

RESULTS AND DISCUSSION

Basic motor competencies

The analysis focused on a cohort of 258 participants aged 6 to 9 years, excluding the small number of 10- and 11-year-olds ($n=7$; $n=1$, respectively) to create a focused dataset. Descriptive statistics for this cohort were computed across anthropometric measures and motor skill scores using MOBAK test battery, assessing basic motor competencies (maximum score of 2 for individual skills, 8 for composite scores).

Overall, participants demonstrated strong proficiency in Self-Movement skills (Mean 6.10; Mode 6), but performance was lower in Object Movement skills (Mean 4.62; Mode 5). The mean BMI of 16.22 kg/m² suggests the cohort is, on average, within a healthy weight-for-height ratio (Table 1).

Table 1 Measures Descriptive Statistics for Anthropometric and Motor Skills (Ages 6–9)

Category	Mean	Median	SD	Mode
Height [cm]	129.28	130	8.22	-
Weight [kg]	27.29	27.1	5.62	-
BMI [kg/m ²]	16.22	15.74	2.31	-
Balancing [score]	1.8	2	0.46	2
Jumping [score]	1.03	1	0.8	1
Throwing [score]	0.64	1	0.68	0
Dribbling [score]	1.28	1	0.8	2

Age-Specific and Developmental Trend Analysis

Height and Weight show the expected consistent, linear increase across all four years. Nine-year-olds were, on average, 15.77cm taller and 7.47kg heavier than 6-year-olds. The BMI remained stable, indicating proportional growth (Mean 15.98 at 6 years vs. 16.46 at 9 years).

Interestingly, analysis of the four distinct age groups revealed that motor proficiency does not always improve linearly with age (Table 2). Results in all 8 tests of basic motor competencies by year of age are presented in Table 3.

- **Peak Performance at 7 Years:** The overall Total Object Movement Score (Mean 5.38) and individual skills like Catching (Mean 1.84) and Throwing (Mean 0.87) reached their highest mean scores at 7 years old.
- **Stagnant Deficit:** Throwing proficiency was a chronic deficit. Despite a brief peak at 7 years, the mean scores at 8 and 9 years remained low (mean approximately 0.50), with the Mode consistently at 0 for 6, 8, and 9-year-olds.
- **Unexpected Decline:** After peaking at 7 years, Jumping and Catching experienced a significant decline in performance, with the mean score dropping and the Mode shifting to 0 (lowest score) by 9 years for both skills (e.g., Catching Mean 1.84 at 7 years to 0.98 at 9 years).
- **Consistent Improvement:** Only Running, Dribbling, and Bouncing demonstrated clear, sustained improvement or maintenance of high performance across the 6-to-9 age range, with the Mode stabilizing at 2 for 9-year-olds in these skills.

Table 2 Comprehensive Age Trend Comparison (Mean and Mode for Ages 6, 7, 8, and 9)

Category	Mean (6 years)	Mode (6 years)	Mean (7 years)	Mode (7 years)	Mean (8 years)	Mode (8 years)	Mean (9 years)	Mode (9 years)
Height [cm]	121.6	-	127.92	-	133.23	-	137.37	-
Weight [kg]	23.7	-	26.84	-	28.82	-	31.17	-
Self-movement [score]	6.3	6	6.33	8	5.71	6	5.94	6
Object movement [score]	4.15	3	5.38	5	4.44	5	4.35	6

Table 3 Basic Motor Competencies by Age (6 to 9 years old)

Age 6 (n=73)	Balancing [score]	Rolling [score]	Jumping [score]	Running [score]	Self- movement [score]	Throwing [score]	Catching [score]	Dribbling [score]	Bouncing [score]	Object movement [score]
Median	2	2	1	2	6	0	2	1	1	4
Mean	1,80	1,79	1,23	1,48	6,30	0,55	1,51	0,95	1,15	4,15
Maximum	2	2	2	2	8	2	2	2	2	8
Minimum	0	0	0	0	0	0	0	0	0	0
Std. dev.	0,48	0,55	0,69	0,70	1,44	0,61	0,71	0,86	0,75	2,02
Mode	2	2	1	2	6	0	2	0	1	3

Age 7 (n=74)	Balancing [score]	Rolling [score]	Jumping [score]	Running [score]	Self- movement [score]	Throwing [score]	Catching [score]	Dribbling [score]	Bouncing [score]	Object movement [score]
Median	2	2	1	2	7	1	2	2	1	5
Mean	1,85	1,65	1,24	1,69	6,33	0,87	1,84	1,36	1,30	5,38
Maximum	2	2	2	2	8	2	2	2	2	8
Minimum	0	0	0	0	0	0	0	0	0	1
Std. dev.	0,40	0,59	0,76	0,58	1,74	0,73	0,44	0,75	0,75	1,66
Mode	2	2	2	2	8	1	2	2	2	5

Age 8 (n=57)	Balancing [score]	Rolling [score]	Jumping [score]	Running [score]	Self- movement [score]	Throwing [score]	Catching [score]	Dribbling [score]	Bouncing [score]	Object movement [score]
Median	2	2	0	2	6	0	1	2	2	5
Mean	1,90	1,59	0,75	1,56	5,71	0,50	1,15	1,44	1,35	4,44
Maximum	2	2	2	2	8	2	2	2	2	8
Minimum	1	0	0	0	0	0	0	0	0	0
Std. dev.	0,30	0,75	0,84	0,70	1,66	0,61	0,72	0,70	0,79	1,90
Mode	2	2	0	2	6	0	1	2	2	5

Age 9 (n=54)	Balancing [score]	Rolling [score]	Jumping [score]	Running [score]	Self- movement [score]	Throwing [score]	Catching [score]	Dribbling [score]	Bouncing [score]	Object movement [score]
Median	2	2	1	2	6	0	1	2	2	5
Mean	1,63	1,73	0,78	1,70	5,94	0,55	0,98	1,42	1,42	4,35
Maximum	2	2	2	2	8	2	2	2	2	8
Minimum	0	0	0	0	1	0	0	0	0	0
Std. dev.	0,61	0,61	0,82	0,54	1,60	0,69	0,82	0,79	0,74	2,03
Mode	2	2	0	2	6	0	0	2	2	2

Additionally, comparing the youngest and oldest groups revealed clear differences in physical size and a varied trajectory in motor skill acquisition. Firstly, nine-year-olds were significantly larger than 6-year-olds, with a mean increase of 15.77cm in height and 7.47kg in weight. The proportional increase meant that the mean BMI was only marginally higher for the older cohort (16.46 vs. 15.98). Secondly, throwing proficiency was a consistent and significant area of weakness, showing no change in mean score (0.55) or Mode (0) between 6- and 9-year-olds. This suggests a persistent lack of skill acquisition over three years. Thirdly, clear developmental gains were observed in Dribbling (Mean 0.95 to 1.42) and Bouncing (Mean 1.15 to 1.42). The Mode for both skills shifted to 2 (maximum score) for the 9-year-olds, indicating greater mastery. Fourthly, counter-developmental trends were noted in Jumping (Mean 1.23 to 0.78, Mode 1 to 0) and Catching (Mean 1.51 to 0.98, Mode 2 to 0). This surprising drop in performance suggests specific difficulties with the administered tasks for the older, larger cohort. Finally, the Total Self-Movement Score was slightly higher for 6-year-olds (Mean 6.30) than for 9-year-olds (Mean 5.94). Conversely, the Total Object Movement Score was marginally higher for 9-year-olds (Mean 4.35 vs. 4.15), driven primarily by improved Dribbling and Bouncing scores.

To sum up, the results provide a robust picture of motor development, clearly distinguishing between skills that demonstrate consistent gains (Running, Dribbling, Bouncing), those with a stagnant deficit (Throwing), and those exhibiting a counter-developmental decline after age seven (Jumping, Catching). These non-linear trends, particularly the decline in Jumping and Catching, represent the most surprising and significant findings.

Swimming competencies

A total of 1,875 pupils from grades 1 to 3 completed the WABAC testing. The results showed a clear improvement in performance across all test items with increasing grade and age (Table 4).

Table 4 Frequency and percentage analysis of success in WABAC test items

		number	mean age	average	n 1p	% 1p	n 2p	% 2p	n 3p	% 3p
T1 Floating on the front	1. grade	360	7,2	2,22	62	17,22	156	43,33	142	39,44
	2. grade	704	7,9	2,41	119	16,9	177	25,14	408	57,95
	3. grade	811	8,7	2,61	49	6,04	215	26,51	547	67,44
T2 12.5 m flutter kicking with a kickboard	1. grade	360	7,2	2,12	132	36,66	51	14,16	177	49,16
	2. grade	704	7,9	2,21	222	31,53	113	16,05	369	52,41
	3. grade	811	8,7	2,66	96	11,83	82	10,11	633	78,05
T3 Jump into the water	1. grade	360	7,2	2,34	87,00	24,16	65	18,05	208	57,77
	2. grade	704	7,9	2,38	190,00	26,98	54	7,67	460	65,34
	3. grade	811	8,7	2,67	110	13,56	48	5,91	653	80,51
T4 Catching an object from the depth	1. grade	360	7,2	2,00	129	35,83	102	28,33	129	35,83
	2. grade	704	7,9	2,10	247	35,08	137	19,46	320	45,45
	3. grade	811	8,7	2,41	175	21,58	126	15,54	510	62,89
T5 Floating on the back	1. grade	360	7,2	2,16	78	21,67	148	41,11	134	37,22
	2. grade	704	7,9	2,24	173	24,57	192	27,27	339	48,18
	3. grade	811	8,7	2,53	110	13,56	163	20,1	538	66,34
T6 Immersion and exhalation in water	1. grade	360	7,2	2,52	67	18,61	38	10,56	255	70,83
	2. grade	704	7,9	2,47	129	18,32	117	16,62	458	65,06
	3. grade	811	8,7	2,68	82	10,11	94	11,59	635	78,3
T7 Gliding on the front	1. grade	360	7,2	2,11	86	23,88	150	41,66	124	34,44
	2. grade	704	7,9	2,20	186	26,42	194	27,55	324	46,02
	3. grade	811	8,7	2,51	96	11,83	207	25,52	508	62,63

In grade 1, the average point scores for each item ranged from 2.00 to 2.52. The lowest performance was recorded in *Catching an object from the depth* (mean = 2.00), while the best result was achieved in *Immersion and exhalation in water* (mean = 2.52). The proportion of fully successful performances (3 points) varied between 34% and 71%, indicating that only about one-third to two-thirds of younger pupils were able to complete each task successfully.

In grade 2, the average point scores for each item ranged from 2.10 to 2.47. The percentage of fully successful performances increased in most areas, ranging from 46% to 65%. The highest success rates were found again in *Immersion and exhalation in water* (65%) and *Floating on the front* (58%).

In grade 3, pupils reached the best overall results, with mean scores between 2.41 and 2.68. The proportion of fully successful performances exceeded 60% of all test items. The most successful tasks were *Jump into the water* (80.5%), *Immersion and exhalation in water* (78.3%), and *12.5 m flutter kicking with a kickboard* (78.1%).

Overall, the results confirm a steady and significant improvement in swimming competence with higher school grades and age. The most easily mastered skills were *jumping into the water* and *basic breathing and immersion*, while the most demanding tasks for younger pupils were *Catching an object from the depth*, *floating on the front*, and *Gliding on the front*, which required effective body control and buoyancy management. These skills showed the lowest mean scores and the smallest proportion of fully successful performances across all grades.

The findings demonstrate a clear developmental progression in basic swimming competencies among primary school pupils. Performance across all WABAC test items improved consistently from grade 1 to grade 3, indicating both maturation effects and increasing aquatic experience. These results are consistent with previous studies emphasizing the gradual development of aquatic motor skills during early school age (Stallman et al., 2017).

The highest success rates were observed in *Jump into the water* and *Immersion and exhalation in water*, suggesting that elementary water orientation and breathing control are acquired relatively early. Conversely, tasks such as *Catching an object from the depth* and *Floating on the front* required more complex motor control and confidence, resulting in lower achievement rates, particularly among younger pupils.

The WABAC test battery proved effective in distinguishing between competence levels, confirming its potential as a valid assessment tool for evaluating swimming proficiency in children. The results underscore the importance of systematic early swimming instruction as a foundation for water safety and the development of lifelong aquatic competence.

CONCLUSIONS

This study successfully achieved its primary aim by investigating the developmental level of basic motor and swimming competencies in younger primary school pupils (Grades 1–3) and demonstrating the utility of the MOBAK and WABAC standardized test batteries as effective assessment tools. The findings provide objective, evidence-based data crucial for informing curriculum development and improving the QPE provision.

The analysis of motor competencies in the 6-to-9 age cohort revealed a complex, non-linear developmental trajectory, highlighting critical areas of concern within the current QPE structure:

- The MOBAK battery proved effective in differentiating performance, demonstrating that while pupils generally maintain high scores in Self-Movement skills (e.g., Balancing), significant weaknesses exist in Object Movement skills (Mean 4.62/8).
- The data identified a persistent and stagnant deficit in throwing proficiency across all age groups (mean score remaining near 0.55), indicating a systematic failure of current instruction to adequately develop this foundational gross motor skill in pupils between the ages of six and nine.
- The most surprising finding was the unexpected decline in performance in jumping and catching after the age of 7. This counter-developmental trend suggests either a lack of skill retention or an inadequacy in the task criteria or instructional methods for physically larger, older children.

The assessment using the WABAC battery on a large cohort (n=1,875) clearly confirmed the positive impact of systematic instruction:

- There was a clear, significant, and consistent improvement in all seven basic swimming competencies from Grade 1 through Grade 3, validating the effectiveness of organized swimming courses in building fundamental water competency.
- Analysis of the WABAC results identified the most challenging tasks for younger pupils, specifically Retrieving a submerged object and buoyancy control skills (Front floatation and Front gliding), as demonstrated by their lowest success rates. This crucial data allows instructors to strategically target teaching resources toward these demanding, safety-critical skills.

In conclusion, the ability of the MOBAK and WABAC batteries to generate reliable, granular, and differentiating data fulfils a major requirement for addressing the UNESCO-identified deficit in QPE quality, particularly concerning the lack of teacher specialization and skill assessment. Implementation of these standardized diagnostic tools is crucial for moving QPE from general activity provision toward data-driven, targeted interventions, ensuring that all primary school pupils acquire the essential motor and aquatic competencies necessary for lifelong physical engagement and safety.

ACKNOWLEDGEMENT

The study is supported by Agency of the Ministry of Education, Research, Development and Youth of the SR with project VEGA: 1/0213/23 and title "Teaching of Tandem Physical and Sports Education in Primary School and its Impact to Motor, Cognitive and Emotional Development of Pupils" and with project VEGA: 1/0427/23: Swimming Competencies of the School Population and their Assessment".

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