

Influence of pe teachers' qualifications on the motor abilities of early school-age children

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Annotation:

Purpose: The aim of the study was to determine the differences in 7-9-year-old children's motor abilities based on the qualifications of their elementary school P.E. teachers. **Material:** The two groups of teachers analyzed were graduates of the faculty of physical education and sports science (fully qualified physical education teachers) and those of the faculty of pedagogy, specialized in early education (early education teachers). The studies were conducted in 12 elementary schools in northeastern Poland and involved a group of 1,205 7-9-year-old students. Eleven motor tests were used to adequately assess the levels of the children's motor abilities. **Results:** The study results confirmed that teaching qualifications influence motor abilities of children of both sexes although, more significantly in boys, which may stem from their higher ecosensitivity. **Conclusions:** The highest number of significant differences between the results of individual motor trials occurred among third graders, with students of fully qualified teachers achieving better results. This may be connected with the longer period of participating in well-thought-out P.E. lessons.

Подставки Роберт, Бoryславски Кристоф. Влияние квалификации учителя физического воспитания на двигательную активность школьников начальной школы. Цель: определить различия двигательных способностей у детей 7-9 лет на основе квалификации учителей физического воспитания в начальной школе. **Материал:** Две группы учителей были выпускниками факультета физического воспитания и спортивной науки (высококвалифицированные преподаватели физического воспитания) и группа профессорско-преподавательского состава педагогики, специализирующиеся на начальном образовании (учителей раннего образования). Исследования проводились в 12 начальных школах в северо-восточной Польше и была собрана группа из 1205 школьников 7-9 лет. Одиннадцать двигательных тестов были использованы для адекватной оценки уровня детских двигательных способностей. **Результаты:** Результаты исследования подтвердили, что квалификация учителя влияла на двигательные способности детей обоих полов, хотя, более значительно на мальчиков, у которых ярче выражена способность к быстрому реагированию. **Выводы:** Наивысшее число различий между результатами индивидуальных двигательных испытаний среди третьеклассников в достижении лучших результатов было у школьников, которые занимались с квалифицированными преподавателями. Это может быть связано с более длительным периодом работы с квалифицированными преподавателями физического воспитания.

Подставки Роберт, Бориславски Кристоф. Вплив кваліфікації вчителя фізичного виховання на рухову активність школярів початкової школи. Мета: визначити відмінності рухових здібностей у дітей 7-9 років на основі кваліфікації вчителів фізичного виховання у початковій школі. **Матеріал:** Дві групи вчителів були випускниками факультету фізичного виховання і спортивної науки (висококваліфіковані викладачі фізичного виховання) і група професорсько-викладацького складу педагогіки, що спеціалізуються на початковій освіті (учителів раннього освіти). Дослідження проводилися в 12 початкових школах у північно-східній Польщі і була зібрана група з 1205 школярів 7-9 років. Одиннадцать рухових тестів були використані для адекватної оцінки рівня дитячих рухових здібностей. **Результати:** Результати дослідження підтвердили, що кваліфікація вчителя впливала на рухові здібності дітей обох статей, хоча, більш значно на хлопчиків, у яких яскравіше виражена здатність до швидкого реагування. **Висновки:** Найвище число відмінностей між результатами індивідуальних рухових випробувань серед третьокласників у досягненні кращих результатів було у школярів, які займалися з кваліфікованими викладачами. Це може бути пов'язано з більш тривалим періодом роботи з кваліфікованими викладачами фізичного виховання.

Key words:

motor, fitness, teaching, qualifications, children

двигательная, подготовленность, квалификация, учитель, дети.

рухова, підготовленість, кваліфікація, вчитель, діти.

Introduction

Physical education constitutes an integral part of bringing up children. A child's parents or guardians play a key role in establishing his or her motor habits. Without a doubt the majority of parents care deeply about the health of their children and it is highly unlikely that they would consciously teach them or enforce harmful behaviors. However, they often have bad habits themselves which are then passed on to their young ones. That is why the children themselves and even more so, the teachers should take responsibility for developing their motor fitness.

Children can and should be encouraged to improve their level of motor fitness and think about their well-being, which in turn requires a mentor, such as a teacher who possesses appropriate qualifications and predispositions (Ball, Thames, & Phelps, 2008; Dodds, 1989; Rink, 1996). Such teachers can establish permanent and conscious habits concerning health and fitness by actively involving students in fun and well-prepared P.E. lessons (Borich, 1996; Olivia & Pawless, 2001; Pagnano & Langley, 2001).

Research regarding the qualifications of P.E. teachers involves many aspects and has been conducted mainly in public schools (Mawer, 1995). According to college applicants planning to study physical education, a P.E. teacher should be characterized above all by the love of sport and physical activity (Dodds, 1989; Dodds et al., 1992; Smith, 1993). This may suggest that most P.E. teachers are former athletes or at the very least physically active people. According to the respondents, an adequate level of knowledge and professionalism is necessary, in addition to the passion for sport, to teach various forms of physical activity. Moreover, they believe that P.E. teachers should possess an adequate level of motor fitness and serve as a role model to their students (Melville & Cardinal, 1997; Melville & Maddalozzo, 1988; Pagnano & Langley, 2001). On the other hand, some of these teachers feel that by having a love of sport and active lifestyle they already possess the desired traits and therefore, gaining additional qualifications is superfluous (Graber, 1989; Lawson, 1983). Such attitudes may stem from the fact that P.E. teachers make decisions regarding education based on their personal success in physical education and sport (Hutchinson, 1993; Lawson, 1983), which doesn't

always carry over to accomplishments when working with young children. It is also interesting to note that university students who aspire to be P.E. teachers are characterized by poorer academic achievements than those of other faculties (Education Testing Service, 1999; Lawson, 1983).

The above presented research indicates wide-ranging views as to what constitutes adequate qualifications for P.E. teachers. They neither confirm nor go against the fact that such qualifications should be gained during P.E. studies and supported by many years of practice. Most observations regarding the effectiveness of physical education pertained to issues such as: engaging pupils, lesson planning, teaching methods, and teachers' behaviors and rapport, but did not assess the relationships between teachers' qualifications and their teaching effectiveness (Bischoff, Plowman, & Lindenman, 1998; Hickson & Fishburne, 2005). As a result of this, little is known on the topic of effective P.E. teaching and the knowledge we have is based on a small number of studies (Pagnano & Langley, 2001). Therefore, the research presented in this work focuses on determining the influence P.E. teachers' qualifications on the level of early-school-aged children's motor abilities.

The aim of the study is to identify possible relationships between 7-9-year-old children's levels of motor abilities and the two types of teaching qualifications approved for P.E. teachers by the Polish Ministry of Education.

Hypothesis: the levels of motor abilities among children attending P.E. lessons conducted by teachers who are graduates of the faculty of physical education and sports science are higher than those of children having P.E. with graduates of pedagogy specialized in early education.

Methods

Participants

The research was conducted in 12 elementary schools located in northeastern Poland (Warmińsko-Mazurskie and Pomorskie voivodeships – fig. 1) and encompassed 97% of students in grades I-III. A total of one thousand two hundred and five 7-9-year-old children, including 584 boys and 621 girls, took part in the studies. The motor tests were conducted during obligatory P.E. lessons in the autumn of 2008. In order to ensure a broad range of social-economic status of the analyzed children's families, the studies covered schools located in villages, towns, and cities located within the analyzed region. Only those children attending the obligatory P.E. lessons, held three-times a week for 45 minutes, and not involved in any additional sports activities were taken into account, since the engagement of study subjects in other sports activities could have significantly altered the obtained results. This results from the widely known fact that children who participate in sports are characterized by a superior level of motor development (Haga, 2009). Therefore, considering the high number of participants, homogenous (narrow) and relatively developmentally stable age group, as well as diverse urbanization status, the gathered study material can be treated as representative for these types of studies

Procedures

The research program was approved by the Bioethical Committee of the Warmińsko-Mazurski University in Olsztyn (UWM), as well as principles at each of the analyzed schools. It is in accordance with the Helsinki Human Rights Declaration. The qualifications of the teachers were confirmed by principles of the respective schools with the teachers' written permission provided that their anonymity be preserved in the study.

Instruments

The qualifications of teachers conducting lessons with children attending grades I-III were accepted as the independent variables. All P.E. teachers fell into one of two categories:

a) Fully qualified P.E. teachers (FQPET) – teachers who completed a five-year Master's degree program at the Faculty of Physical Education and Sport Sciences (specializing in Physical Education),

b) Early education teachers (EET) – graduates of a five-year Master's degree program at the Faculty of Pedagogy (specializing in Early Education).

The results obtained by students in the individual motor tests constituted the dependent variables. Eleven motor tests were applied: the standing long jump [cm], 4x10 m shuttle run [s], skipping with clapping of hands – 8 s [number of claps], sit-ups – 30 s [number of sit-ups], medicine ball (2 kg) forward throw [cm], medicine ball (2 kg) backward throw [cm], bent-arm hang on bar [s], downward bend from standing position [cm], sit and reach [cm], and the Burpee test – 1 and 3 min. [number of cycles]. The accuracy and reliability of the above specified motor tests has been confirmed by numerous studies on the topic (Pilicz, 1997; Pilicz, Przewęda, Dobosz, & Nowacka-Dobosz, 2002; Szopa, 1998; Szopa, Chwała, & Ruchlewicz, 1998). Each of the students was instructed on the proper technique of executing the given motor tasks during lessons preceding the actual tests and given ample time to practice them. Prior to performing the actual tests the participants took part in a 10-minute warm-up. The experiment was conducted during the last two weeks at the turn of September and October 2008.

Statistics

The results were calculated using the Statistica Pl. v. 7.0. Software package. Descriptive statistics, including the mean and standard deviation, were calculated from the data obtained for each of the six age/sex categories. Additionally, the position of each individual in his or her age/sex category was calculated as Z-scores (0;1 normalization). The Z value constitutes the quotient of the distance of an individual's result from the mean in a given category and its standard deviation. This allowed us to eliminate the impact of age (connect all age categories) and just analyze the numerically greater sex categories. Thus, average values of Z and SD_z were calculated for each of the sexes individually.

The 0;1 normalization enables a clearer interpretation of average values and variability, since the expected average value of $Z = 0$ and $SD_z = 1$. If the average Z value is negative, then the result in the given group is lower

than average, and higher in the case of a positive Z value. When the value of SD_z is lower than 1, the variability of the given group is lower (it is more homogenous), whereas a value higher than 1 implies greater variability. Differences between the means of absolute values of the analyzed motor traits as well as average Z values were evaluated using the t -Student's test, recording the significance level with a precision of 0.0001.

In addition, the number of superior vs inferior results was analyzed for both sexes of students in relation to the teacher's qualifications. The differences were evaluated using the sign test, calculating the χ^2 test function value for $df=1$.

Results

Prior to carrying out the analysis, it was checked whether there is a relationship between the teachers' level of qualifications and the urbanization status of the place where the elementary school is located. This was done because one could assume that the higher the urbanization status of the school the more likely that better qualified teachers would be employed. If this was the case, the obtained results would be inaccurate and connected with the nature of the location rather than the teachers' qualifications. However, such a relationship wasn't observed.

The majority of analyzed motor abilities in all three age categories of boys were characterized by higher results achieved by students in classes conducted by FQPETs than those conducted by EETs (Tab. 1). The dominance of better results is statistically significant ($\chi^2=6.82$, $p\leq 0.01$) for all age categories, although only the differences in the results of the standing long jump were found to be highly significant, and in the case of the seven- and nine-year-olds, also those of the medicine ball throws (both, forwards and backwards) and bent-arm hang on bar trials. Moreover, these nine-year-old boys were characterized by a higher trunk flexibility in the midsagittal plane (downward and forward bends). The number of trials significantly differentiating the two groups of students was the highest in the oldest age category. It is important to note that the number of cycles performed in the 3-minute Burpee test by seven-year-old boys under the supervision of FQPETs was significantly higher than that of their counterparts instructed by EETs, but that this tendency was reversed in the case of nine-year-olds.

When analyzing the results of girls, a significant difference in better over worse results in the combined age categories was not observed in relation to teaching qualifications ($\chi^2=1.48$, $p>0.05$). However, similarly to boys, the results of the standing long jump trial revealed highly significant differences, with better results obtained by students of FQPETs (Tab. 2). The remaining results do not display any clear tendencies. The highest number of significant differences was observed among girls in the oldest age category, though not as many as for boys (5 vs 7). The number of cycles performed during the 3 minute Burpee test by girls attending P.E. classes with FQPETs was lower.

To eliminate any accidental differences, such as those related to the cross-sectional nature of the material, between the analyzed abilities of both groups of

students, an additional analysis was performed on the 0;1 normalized values (Z scores). As previously noted, this has allowed us to eliminate the age of respondents as an independent variable and thus increase the size of the study group (Tab. 3).

Upon eliminating age as an independent variable, certain observations from the previous analysis were confirmed. In the case of both sexes, the most significant difference occurred between the lengths of the standing long jump, with better results obtained by students instructed by FQPETs. A smaller, though still significant difference observed in both sexes applied to the medicine ball forward throw and in the case of boys, additionally the medicine ball backwards throw and time they were able to hang with bent arms on a bar. Moreover, boys taught by FQPETs performed better in all the remaining motor trials, although the differences were not found to be significant.

This was also true for all of the remaining trials performed by boys, although the differences were not statistically significant. On the other hand, the number of cycles completed by girls in the 3-minute Burpee test was higher in classes conducted EETs. The amount of significant differences (2) observed in the groups of girls was lower than in those of boys.

Discussion

Effectiveness is an important issue to consider when analyzing the work of teachers and educators (Bellon, Bellon, & Blank, 1992; Rink, 1996). Although the effectiveness of teaching is difficult to precisely define (Kirchener & Fishburne, 1998), teachers tend to be seen as effective when their students attain the intended results (Brophy, 1979; Harris & Henderson, 1999; Mawer, 1995; Rosenshine, 1987). It is possible to list several basic elements which influence the effectiveness of teaching, such as: planning and preparing lessons, class organization and management, establishing and maintaining discipline (Chase, Lirgg, Miami, & Sekalos, 2003; Collier & Hebert, 2004; Dunne & Wragg, 2003), as well as personal traits like honesty and adaptability (McCullick, 2001). In the case of physical education, proper training and the assessment of progress are the key to success (Siedentop & Tannehill, 2002). Effective teachers try to minimize the time of needed for organization (at the beginning of each lesson) to make the best use of the time available and promote active involvement (Momodu, 2000; Vasiliadou, Vassiliki, Nikiforos, & Kyriaki, 2009). Using time ineffectively has a negative effect on the students' attitudes towards physical activity (Silverman & Scrabis, 2004). Not surprisingly, the inappropriate preparation of lessons has been identified as the main obstacle preventing the proper and effective implementation of physical education programs at schools (Lu & De Lisio, 2009).

When looking at the issue from a child's perspective, we must keep in mind that preschool and the early school period are characterized by a carefree attitude and the inability to carefully consider the consequences of assumed actions. That is why, it is not only parents but also the teachers who are responsible for the proper development

Table 1

Statistical characteristic of boys' motor trial results in relation to teaching qualifications

Motor trial	[1] FQPET			[2] EET			Difference [1] – [2]	
	N	\bar{X}	SD	N	\bar{X}	SD	t-Student	p
Boys 7 years								
Standing long jump [cm]	128	112.44	19.18	57	90.58	23.15	+6.704	0.000
Sit-ups 30 s. [number of sits]	129	12.05	4.94	57	11.63	5.77	+	ns
4x10 m shuttle run [se]	129	13.12	1.99	57	12.92	1.95	–	ns
Skipping with clapping of hands – 8s. [number of claps]	129	16.36	6.21	57	16.60	4.59	–	ns
Downward bend from standing position [cm]	129	0.42	5.22	57	0.00	4.88	+	ns
Sit and reach [cm]	127	0.67	6.04	57	0.94	4.55	–	ns
Medicine ball backward throw [cm]	129	227.64	76.64	55	160.45	72.58	+5.529	0.000
Medicine ball forward throw [cm]	129	219.13	59.94	55	189.64	58.28	+3.081	0.002
Bent arm hang [s]	129	5.61	5.32	57	3.79	3.86	+2.330	0.021
1 minute Burpee test [number of cycles]	122	13.63	4.85	57	13.11	3.57	+	ns
3 minute Burpee test [number of cycles]	121	41.77	13.41	57	36.49	10.77	+2.602	0.010
Boys 8 years								
Standing long jump [cm]	97	122.03	17.18	103	109.14	20.80	+4.764	0,000
Sit-ups 30 s. [number of sits]	97	15.88	5.64	102	15.26	5.66	+	ns
4x10 m shuttle run [se]	97	12.96	1.43	103	12.77	1.73	–	ns
Skipping with clapping of hands – 8s. [number of claps]	97	19.02	4.93	102	18.12	3.85	+	ns
Downward bend from standing position [cm]	97	-0.80	5.66	103	-0.39	5.71	–	ns
Sit and reach [cm]	96	-0.17	6.03	103	0.13	4.83	–	ns
Medicine ball backward throw [cm]	97	303.89	104.50	103	300.11	94.09	+	ns
Medicine ball forward throw (cm)	97	289.90	75.29	103	278.12	72.80	+	ns
Bent arm hang [s]	97	8.03	5.50	103	6.67	5.35	+	ns
1 minute Burpee test [number of cycles]	87	20.53	7.74	103	19.39	6.25	+	ns
3 minute Burpee test [number of cycles]	89	53.40	12.07	103	52.15	12.54	+	ns
Boys 9 years								
Standing long jump [cm]	146	138.89	21.27	52	114.87	23.38	+6.811	0.000
Sit-ups 30 s. [number of sits]	146	18.44	4.29	52	18.94	5.98	–	ns
4x10 m shuttle run [se]	146	12.51	1.61	52	13.07	2.64	+	ns
Skipping with clapping of hands – 8s. [number of claps]	145	19.61	6.74	52	19.10	7.24	+	ns
Downward bend from standing position [cm]	145	1.14	5.60	52	-1.15	4.10	+2.698	0.008
Sit and reach [cm]	144	1.73	5.72	52	-0.83	4.73	+2.890	0.004
Medicine ball backward throw [cm]	146	402.25	112.75	52	302.60	105.64	+5.562	0.000
Medicine ball forward throw [cm]	146	344.08	69.25	52	305.38	71.54	+3.430	0.001
Bent arm hang [s]	146	13.38	14.20	52	8.07	10.79	+2.452	0.015
1 minute Burpee test [number of cycles]	129	21.07	5.98	52	22.33	6.31	–	ns
3 minute Burpee test [number of cycles]	134	53.96	9.84	52	57.56	11.37	–2.139	0.034

Explanations: “+” and “-” signs were used to represent better and worse results respectively. *t*-Student test values are given only for statistically significant differences, ns – non significant, FQPET – fully qualified physical education teachers, EET – early education teachers

and health of children. Their engagement, however, is not the only thing that affects effective teaching; the skills of teaching staff must also be given high importance (Borich, 1996).

According to the Polish law, there are two types of teachers who are certified to conduct physical education lessons in preschool and grades I-III of elementary school. These are graduates of five-year Master's degree programs at the faculty of Physical Education and Sports Science (Specializing in Physical Education) and the Faculty of Pedagogy (specializing in Early Education). There are, however, significant differences between these two types of teachers in their approach to the broad topic of physical culture, which may stem from the following:

1. The curriculum of physical education students completing their Master's degree includes a minimum of 1,900 hours of practical and theoretical lessons during

undergraduate studies to get the Associate's degree along with an additional 900 hours during their postgraduate studies. The general curriculum includes subjects such as: anatomy, anthropology, physiology, biochemistry, biology, and the theory of teaching physical education. Specialized subjects include, but are not limited to: kinesiology, biomechanics, the methodology of teaching physical education, swimming, posture correction, individual and team sports, and movement activities and games. Moreover, students of such studies are obliged to take part in winter and summer sports camps during which they learn new skills and fitness existing ones.

On the other hand, the knowledge and experience of early education teachers regarding physical culture obtained during their studies is limited to lessons on the methodology of physical culture, which total merely 45 hours (30 hours – practical, and 15 hours – theory). To

Table 2

Statistical characteristics of girls' motor trial results in relation to teaching qualifications

Motor trial	[1] FQPET			[2] EET			Difference [1] – [2]	
	N	\bar{X}	SD	N	\bar{X}	SD	t-Student	p
Girls 7 years								
Standing long jump [cm]	74	103.18	16.22	132	86.46	18.08	+6.601	0.000
Sit-ups 30 s. [number of sits]	74	13.01	3.55	133	11.13	5.73	+2.569	0.011
4x10 m shuttle run [se]	74	13.62	2.51	133	13.08	1.71	–	ns
Skipping with clapping of hands – 8s. [number of claps]	74	15.72	4.88	132	15.38	3.43	+	ns
Downward bend from standing position [cm]	74	1.68	6.50	133	1.46	5.21	+	ns
Sit and reach [cm]	74	3.21	7.38	133	1.77	5.54	+	ns
Medicine ball backward throw [cm]	74	182.77	99.26	131	172.45	88.71	+	ns
Medicine ball forward throw [cm]	74	185.28	63.26	131	156.44	75.58	+2.779	0.006
Bent arm hang [s]	74	3.78	2.94	133	3.39	3.21	+	ns
1 minute Burpee test [number of cycles]	61	14.66	5.25	133	14.63	2.57	+	ns
3 minute Burpee test [number of cycles]	65	40.03	12.94	133	43.42	9.21	–2.118	0.035
Girls 8 years								
Standing long jump [cm]	64	114.17	19.22	122	105.33	19.78	+2.925	0.004
Sit-ups 30 s. [number of sits]	64	15.22	6.45	122	15.76	6.01	–	ns
4x10 m shuttle run [se]	64	13.91	1.95	123	13.13	1.48	–3.065	0.003
Skipping with clapping of hands – 8s. [number of claps]	63	18.30	6.78	122	18.62	4.50	–	ns
Downward bend from standing position [cm]	64	-0.31	6.93	122	-1.26	7.17	+	ns
Sit and reach [cm]	60	0.54	6.66	122	0.90	5.74	–	ns
Medicine ball backward throw [cm]	64	252.83	68.85	122	277.40	82.60	–2.037	0.043
Medicine ball forward throw (cm)	64	241.22	51.98	122	245.44	48.59	–	ns
Bent arm hang [s]	64	7.62	6.81	123	7.38	6.34	+	ns
1 minute Burpee test [number of cycles]	54	18.96	6.55	123	18.80	5.61	+	ns
3 minute Burpee test [number of cycles]	49	45.98	11.70	123	52.28	10.62	–3.409	0.001
Girls 9 years								
Standing long jump [cm]	101	119.10	21.37	126	94.40	20.92	+8.757	0.000
Sit-ups 30 s. [number of sits]	101	15.61	5.21	126	18.67	6.36	–3.889	0.000
4x10 m shuttle run [se]	100	13.35	2.20	126	13.73	1.96	+	ns
Skipping with clapping of hands – 8s. [number of claps]	98	18.74	6.98	126	20.86	7.01	–2.241	0.026
Downward bend from standing position [cm]	99	2.40	6.62	126	0.96	5.50	+	ns
Sit and reach [cm]	99	2.55	6.89	126	1.00	6.42	+	ns
Medicine ball backward throw [cm]	100	269.63	83.34	126	228.18	102.97	+3.265	0.001
Medicine ball forward throw [cm]	101	249.64	61.89	126	237.78	77.68	+	ns
Bent arm hang [s]	100	7.40	10.32	126	8.62	10.39	–	ns
1 minute Burpee test [number of cycles]	85	19.78	7.24	126	18.80	5.67	+	ns
3 minute Burpee test [number of cycles]	93	48.53	12.71	126	51.81	11.24	–2.020	0.045

Explanations: “+” and “–” signs were used to represent better and worse results respectively. *t*-Student test values are given only for statistically significant differences, ns – non significant, FQPET – fully qualified physical education teachers, EET – early education teachers

make matters worse, the Polish ministry of Education has removed useful subjects pertaining to physical development from the curriculum, including the biological development of humans which was eliminated in 2005.

2. Candidates applying for admittance to the faculty of Physical Education and Sports Sciences in Poland must already exhibit a given level of motor fitness and skills in selected sport disciplines. This is assessed during entrance exams. During their study years, they learn the techniques, tactics and methodology behind teaching the majority of popular sports disciplines. They are provided up to four semesters to master some of these.

On the contrary, future early education teachers are not subjected to selection in the form of entrance exams, and can even be physically disabled and/or possess doctor release notes excusing them from all physical exercise during the course of their studies. Although these students could theoretically gain physical abilities and skills on their own, in reality the vast majority's contact with physical education is limited to taking part in lessons regarding the methodology of physical education teaching and attending the obligatory P.E. lessons (which, moreover, are not obligatory for part-time students). In addition to this, graduates of such studies (mainly women) often focus on teaching subjects other than physical education (Podstawski, Górnik, & Romańczuk, 2012) and are

characterized by a poor level of motor fitness (Podstawski, Boraczyński, & Romańczuk, 2012).

The above presented facts lead to the conclusion that early education teachers are not adequately prepared to conduct physical education classes which children despite possessing the qualifications required by the government to do so. This was confirmed by the results of our studies which revealed there to be significant differences in the level of various motor abilities displayed by children connected with the qualifications of teachers who they attended P.E. lessons with. Children supervised by FQPETs achieved better results in the majority of motor trials when compared to children instructed by EETs.

An exception to this was the 3 minute Burpee test in which, in the majority of cases, the opposite situation was observed. This phenomenon can be explained by the fact that abilities such as speed, strength, flexibility, and coordination require a specific set of exercises in order to develop properly. Such exercises require the P.E. teacher to possess adequate knowledge and practical experience which would allow them to be properly implemented and serve their purpose. On the other hand, abilities such as endurance (one of the main abilities influencing the results obtained in the 3-min Burpee test) can be developed by just about any aerobic activity, under the condition that is performed for an extended period of time. Teachers do

Table 3

Statistical characteristics of Z-scores of boys' and girls' motor trial results in relation to teaching qualifications

Motor trial	[1] FQPET			[2] EET			Difference [1] – [2]	
	N	\bar{X}_z	SDZ	N	\bar{X}_z	SDZ	t-Student	p
Boys 7 – 9 years								
Standing long jump [cm]	371	0.291	0.857	212	-0.509	1.026	+10.069	0.000
Sit-ups 30 s. [number of sits]	372	0.012	0.941	211	-0.021	1.093	+	ns
4x10 m shuttle run [se]	372	-0.003	0.912	212	0.006	1.136	+	ns
Skipping with clapping of hands – 8s. [number of claps]	371	0.031	1.050	211	-0.054	0.899	+	ns
Downward bend from standing position [cm]	371	0.043	1.026	212	-0.076	0.946	+	ns
Sit and reach [cm]	367	0.035	1.065	212	-0.061	0.870	+	ns
Medicine ball backward throw [cm]	372	0.177	0.977	210	-0.314	0.961	+5.855	0.000
Medicine ball forward throw [cm]	372	0.127	0.984	210	-0.225	0.987	+4.149	0.000
Bent arm hang [s]	372	0.113	1.042	212	-0.198	0.885	+3.650	0.000
1 minute Burpee test [number of cycles]	338	0.014	1.052	212	-0.022	0.908	+	ns
3 minute Burpee test [number of cycles]	344	0.023	0.993	212	-0.037	1.007	+	ns
Girls 7 – 9 years								
Standing long jump [cm]	239	0.488	0.895	380	-0.307	0.937	+10.461	0.000
Sit-ups 30 s. [number of sits]	239	-0.061	0.893	381	0.038	1.059	–	ns
4x10 m shuttle run [se]	238	0.092	1.149	382	-0.057	0.889	–	ns
Skipping with clapping of hands – 8s. [number of claps]	235	-0.064	1.141	380	0.039	0.899	–	ns
Downward bend from standing position [cm]	237	0.087	1.076	381	-0.054	0.944	+	ns
Sit and reach [cm]	233	0.092	1.096	381	-0.056	0.931	+	ns
Medicine ball backward throw [cm]	238	0.067	0.948	379	-0.042	1.028	+	ns
Medicine ball forward throw [cm]	239	0.103	0.924	379	-0.065	1.038	+2.038	0.042
Bent arm hang [s]	238	0.005	0.993	382	-0.003	1.003	+	ns
1 minute Burpee test [number of cycles]	200	0.045	1.231	382	-0.024	0.853	+	ns
3 minute Burpee test [number of cycles]	207	-0.232	1.105	382	0.126	0.913	-4.220	0.000

Explanations: “+” and “-“ signs were used to represent better and worse results respectively. *t*-Student test values are given only for statistically significant differences, ns – non significant, FQPET – fully qualified physical education teachers, EET – early education teachers

not need to be fully engaged or prepared to implement such activities during P.E. lessons. In practice, it is often observed in situations where teachers have the children participate in team sport for the duration of the lesson with the role of the teacher limited to that of a passive observer.

The conducted research revealed that the qualifications of P.E. teachers influence the motor performance of boys more significantly than that of girls, which may result from the higher ecosensitivity of males (Podstawski & Boryslawski, 2012). The most significant differences were observed in the standing long jump trial where children taught by fully qualified teachers achieved much better results. This higher level of lower limb muscle power may stem from these children doing more focused exercises, directed at developing speed, agility, and strength (shuttle runs, jumping, gymnastic exercises, obstacle courses, etc.), which tend to be implemented by FQPETs rather than EETs.

No other research concerning the relationship between teaching qualifications and the level of children's motor abilities to which our research can be compared were found. Other studies, analyzing the dependences between fit and unfit P.E. teachers and the performance of their students did not reveal significant differences (Bischof, Plowman, & Lindenman, 1988). Still other studies revealed that P.E. teachers consider their lessons successful if students are occupied, happy, and well-behaved (Placek, 1983), without giving as much priority to aspects of teaching such as developing a lifelong positive attitude towards physical activity (Hickson & Fishburne, 2002).

Nevertheless, physical educations programs developed for early school-aged children should provide them with the necessary knowledge, practical experience, basic motor skills, and a positive attitude towards physical exercise, which will accompany them throughout their school years as well as later, into their adult life (Kirk, 2005).

Practical Implications

The results of our studies clearly indicate that teaching qualifications are not indifferent to the motor development of early-school-aged children. That is why we should consider raising the qualifications for becoming a P.E. teacher. The Ministry of Education should establish minimum programs containing different types of physical exercises which develop a wide scope of motor skills and hire only those teachers, whose qualifications enable them to execute them properly. Moreover, teachers should be regularly assessed by testing their student's progress. This can easily be done, for example, by a set of trials commonly applied to assess motor abilities, carried out at the beginning and end of each semester. In addition to this, the students' motor skills should also be subjected to regular assessment. This would enable us to determine whether teaching qualifications do in fact go hand in hand with the physical development of students and in the long run improve the quality of teaching P.E. lessons.

This is especially important since researchers, basing their findings on the theory of sensitive and critical periods, agree that the early school period is especially favorable for the development of motor coordination and agility (Hirtz & Starosta, 2002; Sylva, 2002). It should also be noted, however, that it is equally important to develop other motor abilities during this age (Borms, 1986; Häkkinen, Mero, & Kauhanen, 1989; Matos & Winsley, 2007).

The results presented in our study show a clear correlation between teaching qualifications and the level of students' motor abilities. They should be expanded to cover schools in other regions of Poland as well as other countries to confirm these findings and draw appropriate conclusions which can then lead to practical application.

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