

# Evaluating the Impact of Tandem Teaching with Coaches and Generalist Teachers on Primary School Students' Perceptions in Physical Education

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## ABSTRACT

*Tandem teaching is a collaborative model involving sports coaches and generalist teachers. This study examines the impact of tandem teaching on primary school students' perceptions of physical education (PE) within the Slovak educational context. The research involved 1957 students from grades 1–4, comparing an experimental group exposed to tandem teaching with a control group taught solely by generalist teachers. Data were collected through an electronic questionnaire, assessing student perceptions of their PE instructors, their attitudes toward PE, desired PE class frequency, and favorite school subjects. Data analysis employed descriptive statistics (percentage analysis) and the Chi-square (X<sup>2</sup>) independence test for contingency tables using SPSS to assess the significance of relationships between variables. Results revealed that students in the tandem group rated their coaches significantly higher in several instructional aspects compared to the control group's ratings of generalist teachers. However, both groups perceived their instructors as equally supportive and encouraging. Although tandem teaching did not substantially alter students' overall subject preferences, it was associated with a slightly increased preference for PE as their favorite subject. Despite a small effect size, statistically significant differences between the groups suggest that tandem teaching may enhance instructional quality and potentially foster a greater interest in PE among students. Future research should address limitations related to sample size and generalizability while exploring regional variations and comparing different tandem teaching models to further understand its effectiveness in diverse educational settings.*

**Key words:** tandem teaching, Physical Education, sports coach, generalist teacher, primary school, students, perceptions

## Introduction

In many European countries, physical education (PE) in primary schools (6 – 10 years) is predominantly taught by generalist teachers, who may not possess specialized training in physical education<sup>1</sup>. In Slovakia, recent legislation, specifically the Act No. 245/2008 Coll. on Education and Training and the State Educational Programme for Primary Education, allows for PE specialists to teach PE at the primary level. However, this practice is not widespread due to logistical constraints related to generalist teachers' required working hours. This situation underscores the need for innovative approaches to enhance the quality and effectiveness of PE instruction.

Tandem teaching, an approach involving two instructors collaborating to deliver instruction, has gained traction in various educational contexts<sup>2</sup> due to its potential to enhance student learning outcomes<sup>3,4</sup>. This approach has also been explored in settings, with studies in North Macedonia<sup>5,6,7</sup> suggesting that collaboration between generalist teachers and PE specialists can enhance the effectiveness of PE teaching. Popeska<sup>6</sup> highlights the positive experiences of teachers and the perceived benefits for learners in North Macedonia, while Popeska and Nikolovski<sup>7</sup> provide an overview of the organization, roles, benefits, and challenges of tandem teaching in this context.

Furthermore, research has highlighted the unique strengths that coaches bring to primary school settings. For instance, a study by Love et al.<sup>8</sup> found that coaches' expertise in skill development and their ability to create a positive and motivating learning environment significantly improved student engagement and motor skill competence in primary school PE classes.

Despite promising findings in other subject areas, initial positive results in PE settings abroad, and evidence supporting the strengths of coaches working with primary school children, research on tandem teaching in PE remains limited, particularly within the Slovak educational context. This study addresses this gap by investigating the efficacy of a tandem teaching model in PE within Slovak primary schools, specifically focusing on the collaboration between a sports coach and a generalist teacher. The "Coaches at School" program<sup>9</sup> which embeds sports coaches within school settings, provides a unique opportunity to examine the impact of this innovative approach on student perceptions, attitudes, and preferences regarding PE.

By comparing children's evaluations of coaches and generalist teachers, this study aims to shed light on the potential benefits of tandem teaching in PE, including its impact on instructional quality, learner engagement, and overall perceptions of the subject. Additionally, this research explores student preferences for the frequency of PE classes and their favorite school subjects, offering insights into the broader implications of the tandem teaching model on student attitudes towards physical activity and learning.

## Materials and Methods

### Participants

The research was conducted in the school year 2022/2023 in Slovakia and the sample consisted of 1957 pupils from the 1st to 4th grade of primary schools across the country. The pupils were divided into two groups:

- Experimental (tandem) group: 1664 primary school children (51.2% girls and 48.8% boys) who, during the 2022/2023 school year, had a coach in addition to the classroom teacher once a week during PE classes as part of the "Coaches at School" program.
- Control group: 293 primary school children (46.7% girls and 53.3% boys) who did not have a coach during PE classes and had traditional classes with a generalist teacher.

The "Coaches at School" program facilitated tandem teaching in physical education (PE) lessons within Slovakia during the 2022/2023 academic year. This initiative encompassed 192 schools, 950 classes, 152 qualified sports coaches, and over 22,000 primary school pupils. By pairing coaches with generalist teachers, the program aimed to enhance pupils' overall physical literacy. Coaches participating in the program received specialized training on teaching PE at the primary level. This collaborative mod-

el, wherein a coach and teacher form a tandem, is intended to improve the quality of PE lessons. Coaches do not supplant teachers but rather serve as co-instructors and potential sources of inspiration. Consequently, the program places significant emphasis on fostering collaboration with teachers and actively engaging them in the instructional process.

### Data collection

To evaluate the impact of tandem teaching, a researcher-designed electronic questionnaire was administered to students at the conclusion of the school year. The questionnaire primarily employed closed-ended questions using a 4-point Likert scale (ranging from "always" to "never") and included validation questions to ensure data reliability.

The same questionnaire was utilized for both the experimental (tandem teaching) and control groups, with the term "coach" replaced by "generalist teacher" for the latter. Students completed the questionnaire at home under parental supervision. Parents received instructions to read each question aloud, clarify its meaning with an example, and then permit the child to select a single response.

### Data evaluation

Data analysis involved calculating descriptive statistics (percentage analysis) and testing the significance of relationships between variables using the Chi-square (X<sup>2</sup>) independence test for contingency tables. Statistical software (SPSS) was used for data analysis. We chose the level of statistical significance  $\alpha=0.01$ . Cramer's V was employed to assess the effect size of significant relationships, with interpretations based on Cohen's<sup>10</sup> guidelines: .10 = small effect, .30 = medium effect, and .50 = large effect.

## Results

Table 1 presents a comparative analysis of student perceptions regarding their PE instructors – specifically, sports coaches within the experimental (tandem) group and generalist teachers within the control group. Overall, students in the experimental group rated their coaches more favourably than students in the control group rated their generalist teachers across most of the evaluated items.

Statistically significant differences ( $p < .001$ ) emerged in several key areas, often with small to medium effect sizes. Students in the experimental group reported their coaches were significantly more effective at explaining and demonstrating concepts ( $V = .12$ ) and providing clear guidance on task execution ( $V = .24$ ) compared to generalist teachers. Furthermore, these students perceived their coaches as more actively engaged in providing post-lesson feedback highlighting individual effort ( $V = .10$ ). The table also reveals a pronounced difference in the frequency with which coaches changed into gym attire ( $p$

< .001, V = .33), with the vast majority of students in the experimental group reporting this behavior as "always" or "often," compared to only half of the control group reporting the same for generalist teachers.

Interestingly, no significant differences were found in student perceptions regarding instructor praise for success or provision of assistance when facing difficulties. This suggests that both coaches and generalist teachers adequately addressed these aspects of student support, underscoring their shared commitment to fostering a positive learning environment.

Table 2 presents students' perceptions of PE in tandem and control groups. A majority of students in both groups reported positive perceptions of PE, with 73.3% of the tandem group indicating "very positive" and 21.0% indicating "positive" perceptions. Similarly, 66.6% of the control group reported "very positive" and 24.9% reported "positive" perceptions.

However, a chi-square test of independence revealed a statistically significant difference between the two groups ( $X^2 = 10.08$ ,  $p = .018$ ), with the tandem group demonstrating slightly more positive perceptions. Despite statistical significance, the effect size (Cramer's  $V = .07$ ) was small, suggesting that the practical difference between the two groups may be negligible.

**TABLE 2**  
STUDENTS' PERCEPTIONS OF PHYSICAL EDUCATION

Answers	Tandem group (n = 1664)	Control group (n = 293)	
Very positive	1219 (73.3%)	195 (66.6%)	$X^2 = 10.08^*$ $p = .018$ $V = .07$ (no effect)
Positive	350 (21.0%)	73 (24.9%)	
Neutral	87 (5.2%)	20 (6.8%)	
Negative or very negative	8 (0.5%)	5 (1.7%)	

TG – tandem group, CG – control group,  $X^2$  - Chi-square independence test value,  $p$  – value for Chi-square test,  $V$  – Cramer's  $V$  value, \* –  $p \leq .05$

Overall, the results suggest that both instructional approaches (tandem and control) foster largely positive perceptions of PE among learners, with the tandem group demonstrating a marginal yet statistically significant advantage in terms of overall positivity.

A comparison of student preferences for the frequency of PE classes per week is shown in table 3, differentiating between the tandem and control groups. A clear preference

**TABLE 1**  
STUDENTS' OPINIONS OF THEIR PE INSTRUCTOR (COACH / GENERALIST TEACHER)

Coach (in case of the tandem group) or Generalist teacher (in case of the control group)		Always	Often	Sometimes	Never	
Explains and demonstrates things in a way that I can understand easily	TG	1207 (72.5%)	374 (22.5%)	79 (4.8%)	4 (0.2%)	$X^2 = 28.20^{**}$ $p < .001$ $V = .12$ (small effect)
	CG	175 (59.7%)	84 (28.7%)	32 (10.9%)	2 (0.7%)	
Shows us what to do and how to do it	TG	1461 (87.8%)	144 (8.6%)	53 (3.2%)	6 (0.4%)	$X^2 = 113.65^{**}$ $p < .001$ $V = .24$ (small effect)
	CG	192 (65.5%)	53 (18.1%)	40 (13.7%)	8 (2.7%)	
Will acknowledge my successes with praise	TG	806 (48.4%)	392 (23.6%)	371 (22.3%)	95 (5.7%)	$X^2 = 0.98$ $p = .805$ $V = .02$ (no effect)
	CG	135 (46.1%)	76 (25.9%)	64 (21.8%)	18 (6.2%)	
Will help me if I encounter any difficulties	TG	999 (60.0%)	323 (19.4%)	266 (16.0%)	76 (4.6%)	$X^2 = 3.31$ $p = .346$ $V = .04$ (no effect)
	CG	168 (57.3%)	55 (18.8%)	59 (20.1%)	11 (3.8%)	
Provides feedback after each lesson, highlighting the efforts of those who actively participated	TG	746 (44.8%)	348 (20.9%)	345 (20.8%)	225 (13.5%)	$X^2 = 18.71^{**}$ $p < .001$ $V = .10$ (small effect)
	CG	96 (32.8%)	85 (29.0%)	75 (25.6%)	37 (12.6%)	
Changes into their gym clothes	TG	1449 (87.1%)	116 (7.0%)	63 (3.8%)	36 (2.1%)	$X^2 = 215.02^{**}$ $p < .001$ $V = .33$ (medium effect)
	CG	152 (51.9%)	64 (21.8%)	42 (14.3%)	35 (12.0%)	

TG – tandem group, CG – control group,  $X^2$  - Chi-square independence test value,  $p$ -value for Chi-square test,  $V$  – Cramer's  $V$  value, \*\* –  $p \leq .01$

for five PE classes per week was observed in both groups, with 49.6% of the tandem group and 40.6% of the control group selecting this option. The second most preferred frequency was three classes per week, chosen by 22.7% of the tandem group and 23.2% of the control group.

Despite a small effect size (Cramer's  $V = .09$ ), a statistically significant difference ( $X^2 = 14.30$ ,  $p = .014$ ) was found between the experimental and control groups regarding the desired frequency of PE lessons. Specifically, students exposed to tandem teaching (experimental group) expressed a stronger preference for more frequent PE classes per week compared to those in the control group.

Overall, both groups indicated a desire for a relatively high frequency of PE, with five classes per week being the most preferred option. While the effect of tandem teaching on this preference may be modest, the significant difference suggests that it may nonetheless foster a greater interest in more frequent PE participation among students.

**TABLE 3**  
STUDENTS' DESIRED FREQUENCY OF PE CLASSES PER WEEK

Hours / week [n]	Tandem group (n = 1664)	Control group (n = 293)	
5	826 (49.6%)	119 (40.6%)	$X^2 = 14.30^*$ $p = .014$ $V = .09$ (no effect)
4	109 (6.5%)	25 (8.5%)	
3	377 (22.7%)	68 (23.2%)	
2	299 (18.0%)	65 (22.2%)	
1	47 (2.8%)	12 (4.1%)	
0	6 (0.4%)	4 (1.4%)	

TG – tandem group, CG – control group,  $X^2$  – Chi-square independence test value,  $p$  – value for Chi-square test,  $V$  – Cramer's  $V$  value, \* –  $p \leq .05$

Table 4 reveals that while PE was the most favored subject in both the tandem and control groups, a statistically significant difference ( $X^2 = 13.00$ ,  $p = .043$ ) was found between the two. Specifically, a larger proportion of students in the tandem group selected PE as their favorite subject (38.3%) compared to the control group (33.1%). However, the small effect size (Cramer's  $V = .08$ ) suggests that the practical difference in subject preferences between the groups is negligible.

Following PE, Mathematics was the second most popular choice in both groups, although a higher proportion of control group students favored it (20.1%) compared to the tandem group (18.8%). The remaining subjects, including Arts, English, Slovak, Informatics, and a category encompassing other subjects with less than 5% preference,

exhibited relatively similar distributions between the two groups.

Overall, these results suggest that while the tandem teaching model did not substantially alter students' overall subject preferences compared to the control group, it may have slightly enhanced the appeal of PE as a favorite subject.

**TABLE 4**  
STUDENTS' MOST FAVORITE SCHOOL SUBJECT

School subjects:	Tandem group (n = 1664)	Control group (n = 293)	
Physical education	637 (38.3%)	97 (33.1%)	$X^2 = 13.00^*$ $p = .043$ $V = .08$ (no effect)
Mathematics	313 (18.8%)	59 (20.1%)	
Arts	196 (11.8%)	33 (11.3%)	
English language (as a 2nd language)	119 (7.1%)	25 (8.5%)	
Slovak language (as a 1st language)	96 (5.8%)	18 (6.1%)	
Informatics	95 (5.7%)	31 (10.6%)	
Other #	208 (12.5%)	30 (10.3%)	

TG – tandem group, CG – control group,  $X^2$  – Chi-square independence test value,  $p$  – value for Chi-square test,  $V$  – Cramer's  $V$  value, \* –  $p \leq .05$ , # – the sum of answers of other school subjects < than 5%

## Discussion

This study investigated the efficacy of a tandem teaching model in PE within the Slovak educational context, contrasting it with the traditional, single-instructor approach. The experimental "Tandem group" received instruction from both a sports coach and a generalist teacher, while the control group was taught solely by a generalist teacher. The subsequent analysis focuses on primary school student evaluations of the coaches participating in the "Coaches at School" program during the 2022/2023 academic year. These coaches provided PE instruction together with the generalist teacher once a week. To offer a comparative perspective, the opinions of students in the control group regarding their generalist teachers are also included, despite these students not having access to a coach.

The findings of this study contribute to the growing body of research supporting the potential benefits of tandem teaching in PE. The collaboration between coaches and generalist teachers, as implemented in the "Coaches at School" program, appears to enhance instructional quality, as evidenced by the significantly higher ratings given to coaches by students in the experimental group compared to the ratings given to generalist teachers by the control group. Learners perceived coaches as more ef-

fective at explaining and demonstrating concepts, providing clear instructions, and offering post-lesson feedback highlighting individual effort. These results align with previous studies<sup>5,6,7</sup> highlighting the positive impact of collaborative teaching models on student learning outcomes and engagement in PE.

The pronounced difference in coaches' propensity to change into gym attire compared to generalist teachers, coupled with students' positive perceptions of their coaches, underscores the potential influence of role modeling on student engagement and motivation<sup>8</sup>. This finding suggests that coaches' active participation in physical activities may create a more positive and encouraging learning environment, fostering greater enjoyment and participation in PE.

While both groups of students expressed largely positive perceptions of PE, the tandem group demonstrated slightly higher levels of overall positivity, which may be attributed to the enriched learning environment created by the presence of two instructors with diverse expertise. However, the small effect size of this difference suggests that the practical impact of the tandem model on overall student perceptions may be limited.

Interestingly, both coaches and generalist teachers were perceived as equally supportive and encouraging, as evidenced by the lack of significant differences in learners' perceptions of instructor praise and assistance. This finding highlights that both professionals can effectively foster a positive and nurturing learning environment, regardless of their specific background or expertise. For this reason, a co-teaching model, which combines the expertise of a PE specialist/coach with a generalist teacher, may be the most effective solution to achieve all the desired outcomes. This approach would leverage the strengths of both professionals, potentially leading to a more comprehensive and engaging learning experience for students.

This study has several limitations. The significantly smaller control group size compared to the experimental group may have affected the statistical power and generalizability of the findings. Additionally, the study's focus on Slovak primary schools restricts the applicability of the results to other educational settings or cultural contexts.

Furthermore, the study design, encompassing participants from various elementary grades (1st to 4th), might have influenced students' perceptions of tandem learning effectiveness. This is due to potential developmental differences across grade levels, which could impact students' ability to assess and articulate their experiences. Additionally, the reliance on parental assistance in completing

the questionnaires may have introduced bias into the data, as parental attitudes and interpretations could have influenced students' responses.

Future research should aim to address the limitations of this study and expand its scope. This includes recruiting larger and more balanced samples to enhance the statistical power and generalizability of the findings, as well as exploring regional variations in tandem teaching effectiveness within Slovakia. Additionally, investigating the impact of different tandem teaching models (e.g., PE specialist and generalist teacher, coach and PE specialist) could elucidate the most effective configurations for specific learning objectives and student populations.

Moreover, refining data collection methods by administering questionnaires directly to students at school under teacher supervision would minimize parental influence and enhance the reliability of the results, providing a more accurate assessment of tandem teaching's impact on student learning and engagement.

Incorporating qualitative methods, such as interviews or focus groups with students, teachers, and coaches, would further enrich our understanding of the tandem teaching experience and the factors contributing to its perceived effectiveness.

By addressing these areas, future research can contribute to a more comprehensive understanding of the factors influencing the effectiveness of tandem teaching in physical education and inform evidence-based recommendations for its implementation in diverse educational settings.

## Conclusion

Despite these limitations, this study provides valuable insights into the potential of tandem teaching in PE. The findings suggest that this innovative approach may enhance instructional quality, student engagement, and overall perceptions of the subject. By fostering a collaborative and supportive learning environment, tandem teaching can potentially contribute to improved student outcomes and promote lifelong physical activity and health.

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## EVALUACIJA UTJECAJA TANDEMSKE NASTAVE S TRENERIMA I UČITELJIMA OPĆEG SMJERA NA PERCEPCIJU UČENIKA OSNOVNE ŠKOLE U TJELESNOM ODGOJU

### SAŽETAK

Tandemska nastava je model suradnje koji uključuje sportske trenere i učitelje. Ova studija ispituje njezin utjecaj na percepciju učenika osnovnih škola o tjelesnoj i zdravstvenoj kulturi (TZK) u slovačkom obrazovnom kontekstu. U istraživanju je sudjelovalo 1957 učenika od 1. do 4. razreda, uključujući eksperimentalnu skupinu koja je bila izložena tandem nastavi i kontrolnu skupinu koju su poučavali samo učitelji općeg smjera. Podaci su prikupljeni putem elektroničkog upitnika za procjenu percepcije učenika o njihovim instruktorima TZK, njihovog stava prema TZK, željene učestalosti nastave TZK i omiljenih školskih predmeta. U analizi podataka korištena je deskriptivna statistika (analiza postotaka) i test neovisnosti hi-kvadrat ( $X^2$ ) za tablice kontingencije za procjenu odnosa između varijabli. Rezultati su otkrili da su studenti u tandem skupini ocijenili svoje trenere značajno višom ocjenom u nekoliko aspekata nastave u usporedbi s ocjenama kontrolne skupine učitelja. Međutim, obje skupine podjednako doživljavaju svoje instruktore kao podršku i ohrabrenje. Iako tandemska nastava nije značajno promijenila sveukupne predmetne sklonosti učenika, bila je povezana s blago povećanom sklonošću TZK-u kao omiljenom predmetu. Unatoč maloj efektivnoj veličini uzorka, statistički značajne razlike između skupina sugeriraju da tandemsko poučavanje može poboljšati kvalitetu nastave i potencijalno potaknuti veći interes za TZK među učenicima. Buduća bi se istraživanja trebala pozabaviti ograničenjima koja se odnose na veličinu uzorka i mogućnošću generaliziranja regionalnih varijacija i usporedbom različitih tandemskih modela poučavanja kako bi se bolje razumjela njihova učinkovitost u različitim obrazovnim okruženjima.