

Practice schedule analysis and pedagogical feedback in swimming classes

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Abstract:

The way swimming teachers instruct is one of the determining factors for how students will learn the discipline. This study identified the contents of the practice schedule and its influence over types of pedagogical feedback during the process of teaching, learning, and training swimming. We filmed twelve classes of six different swimming teachers instructing swimming stroke styles for initiation. As an instrument, we applied the assessment of organizations, types of practice, and pedagogical feedback by using data observations of classes and quantifying the frequency of occurrences of pedagogical feedback types, organizations, and types of practice. We used a descriptive analysis of the mean, relative and absolute frequencies, the statistical Chi square test and the analytical multilayer perceptron neural network. To investigate reliability of intra- and inter-observer, we used the Cohen's Kappa Coefficient, which showed an agreement of 0.95 and 0.84, respectively. Regarding the observation of the classes, we collected 468.9 min of effective time of pedagogical work by the instructors and 8,532 pieces of information with an average of 1.58(±0.61) feedback/min per class. We verified the prevalence of pedagogical feedback as its prescriptive objective (57.8%), as the verbal type (63.9%), directed to one student (82.8%), and as the performance criterion (78.6%). Regarding the nature of the tasks, the organization, and types of practice, there was a prevalence of teaching of the technique (68.5%) with a fractioned organization (59.7%) and practice in blocks (92.6%). We concluded that activities in blocks and a simplified way of teaching the technique influenced the types of pedagogical feedback provided by the swimming teachers who took part in this study.

Keywords: training, teaching, learning, technique.

Introduction

Swimming has been a sport with an increasing development in Brazil in the past years and, according to a survey performed by the Ministry of Sports, it is the third discipline practiced as a first sport (4.9%), behind soccer (59.8%) and volleyball (9.7%) (BRASIL, 2016). This sport discipline stands in the development of swimming techniques, in a competitive way, by aiming to reach an ideal model of movement. Classic authors of sports practice as Maglisco (2010) utilizes characteristics of swimming as a discipline, which focus on technical and physical performance, in order to exemplify how the teaching process is organized in different types of efficiency.

Bearing in mind the pursuit of efficiency and a predominantly classification of motor skills, the question that resides is: what is the current state of the art of pedagogical tools that contribute in the process of the teaching of swimming? More specifically, this question focuses on a pedagogical knowledge of the content, which, according to Costa, Valeiro, and Villa Lobos (2016), relates to teaching efficiency when it comes to “what to teach” and “how to teach” to promote the development of the apprentices. Hence, it becomes mandatory that the teacher masters the contents and the processes involved in teaching-learning swimming, which, in this research, focuses on the schedule practice and on the types of feedback.

Freudenheim et al. (2016) confirm that the teaching-learning process in swimming proposes decision-making regarding the objectives of learning, practice schedule and feedback. The objective of the practice schedule is to sequence it in a range of tasks, which aims optimization and learning. In this conception, Lage et al. (2007) suggest a structural sequence of the practice using simple tasks carried out in a research facility: start with constant practice to benefit behavior stability, then in blocks, and then random. Besides, different combinations of practice schedules also drive different levels of cognitive development (LAGE et al., 2015). Schedule and types of practice in teaching and training situations happen together, even though they are presented separately (UGRINOWITSCH & BENDA, 2011). Furthermore, the authors show that we must consider if participants are beginners or skilled in order to identify how teachers will teach that skill, once skilled

individuals tend to present a more stable movement pattern to execute a task in a context where there is a more variable interference when compared to beginners.

Studies on the teaching of swimming that part of the existing literature aim to analyze include: the structure and the organization in sports (MEIRA, BASTOS & BÖHME, 2015); the organization and the teaching methodology, mainly using questionnaires (MURCIA & PÉREZ, 2019; COSTA et al., 2012; GREGOLI & LIMONGELLI, 2011; ROCHA et al., 2014); the pedagogical proposals in a multidisciplinary context (CANOSSA et al., 2007); the role of the teacher in the teaching process (TROTIER & ROBITAILLE, 2014); the assessment of the effect of different teaching methods (BORGES & MURCIA, 2018; L'UBOMÍRA & MATÚS, 2017; NISSIM et al., 2014). This study, also allocated in the area of the teaching of swimming, intends to contribute to identify the different processes of teaching, learning, and training in relation to an *in loco* practice schedule. The practice schedule distinguishes itself as an independent variable in studies developed in a motor control area and illustrates, for instance, in laboratorial conditions, how learning happens when considering several population groups. Therefore, Tani et al. (2004) consider the practice schedule as one of the factors that influence the development of motor learning, as well as learning through observation, knowing the outcome, the establishment of objectives, and motivation.

The learning process along with the schedule and the types of practice receive the influence of the feedback and, according to Reid et al. (2007), its main function is to motivate, reinforce, and inform the students so they can reach a certain goal. This feedback stands out for its multidimensional perspective, which makes it possible to analyze objective, type, direction, and criterion. In soccer, Mesquita et al. (2009) verified that twelve coaches mainly applied more offensive techniques in content for beginners (from 6 to 12 years old), as well as verbal feedback and use of individual direction. Even though Lagestad, Saether & Ulvik (2017) do not highlight which contents they applied in eight assessed sessions, they investigated feedback of direction and objective from six soccer coaches of 46 junior players and did not find differences between elite and amateur coaches.

In artistic gymnastics, Aleixo and Vieira (2012) confirmed the same preferences, having teachers using mostly the technical nature of the task with beginners in this discipline, and assessing objective, type, and direction. In volleyball, Pereira et al. (2010) also found the use of technical contents by teachers of 28 teams, including verbal, verbal/visual, and performance criterion types of feedback. Soares (2008) identified that teachers used more performance criterion feedback with beginners than juniors. Still in volleyball, Ghorbanzadeh et al. (2017) analyzed visual, verbal, and verbal/visual feedback during serve and bump skill practice including students from 11 to 13 years old for a year. The results showed an increase in level of technique success for the three types of feedback they studied.

So far, studies related to feedback in swimming have intended to characterize types of pedagogical feedback during a class (PESTANA, 2006) and have distinguished the types of feedbacks while learning or improving the technique regarding backstroke, breaststroke, and front crawl (BURZYCKA-WILK, 2010; FERRACIOLI, FERRACIOLI & CASTRO, 2013; GIANNOUSI, MOUNTAKI & KIOUMOURTZOGLOU, 2017).

Based on the aforementioned investigations, we can observe that the application of the content, having its majority in the technical nature of the task, will determine objective, type, direction, and criterion feedback. Therefore, we work on the hypothesis that the practice schedule, which characterizes the application of low contextual interference techniques during the stage of strokes diversification in swimming initiation, influences the types of pedagogical feedback.

Therefore, identifying and understanding how teachers schedule practice and feedback *in loco* and during real classes will collaborate with new theoretical and practical studies in the area of Physical Education, mainly, when the topic is the pedagogical knowledge of the content used in the teaching of swimming. Based on that, we aim to identify how the practice of contents is scheduled and its influence when considering the types of pedagogical feedback in the process of teaching-learning swimming.

Material & methods

This is an observational, descriptive study, once we observed and described a phenomenon in its natural environment and we registered how it occurred, as a quantitative observation. This study was submitted to the Human Research Ethics Committee by the Federal University of Mato Grosso and obtained consolidated report number 1.868.086.

Participants

This was a non-probabilistic and intentional sample selection, according to Pires et al. (2006). Considering the search proceeded along with the Regional Council of Physical Education, it showed a total of nine institutions registered in the city of Cuiabá, state of Mato Grosso, Brazil. However, one institution did not authorize the study and two others – one because of pool renovations and another because of an injured teacher – could not take part in the research.

Then, six swimming teachers with an age average of 28.8 years and 4.3 years of professional experience participated in this study. All of them needed to hold a degree in Physical Education and a registration in CREF, besides the fact that they needed to be working in initiation classes and diversity of strokes. We observed 12

classes, two of them per teacher, adding up to 468.9 minutes of material. On average, we observed 39 minutes per class and 8,532 pieces of information, which represents an average of 711 pieces per class.

Instrument

As an instrument, we selected the assessment of types of practice schedule and pedagogical feedback – APFP – for swimming (Box 1), proposed by Monteiro et al. (2020). The instrument consists of subscales of the nature of the tasks, the pedagogical feedback, the practice schedule and its variables that are filled by the frequency of occurrence given the observation of previously registered classes, and the obtention of content validity of 0.89 (clarity of language), 0.88 (practice relevance), 0.90 (theoretical relevance), and agreement of 0.95; and 0.84 for the intra- and inter-observer analysis, respectively, by Cohen’s Kappa Coefficient.

The elaboration of the instrument involved definitions presented in artistic gymnastics studies (ALEIXO & VIEIRA, 2012) and volleyball (PEREIRA et al. 2010), both in the scope of pedagogical feedback and the nature of the task. The concepts of Schmidt and Wrisberg, (2010), Magill (2011), and Aburachid et al. (2019) proposed the schedules and types of practice.

The nature of the task embraces general information of the task and it is divided in technical information and information about physical conditioning and rules. The pedagogical feedback is divided in four categories, such as: the objective (the teacher assesses or describes the performance, showing what the student must do to improve it in another future attempt); the type (the teacher resorts to several types of communication to inform the student’s feedback); the direction (to whom information will be delivered); and the referential (the objective is to distinguish if the teacher is centering in the performance knowledge or the performance result). Below, there is a table with the instrument’s subscales and categories.

Box 1: Instrument – Assessment of the practice schedules and its types in swimming classes.

Nature of the task			
<ul style="list-style-type: none"> ● Technique ● Physical and rules 			
Pedagogical feedback			
Objective	Type	Direction	Criterion
<ul style="list-style-type: none"> ● Prescriptive ● Descriptive correction ● Descriptive error ● Evaluative positive ● Evaluative negative ● Interrogative 	<ul style="list-style-type: none"> ● Kinesthetic ● Visual ● Verbal ● Verbal/ Visual ● Verbal/ Kinesthetic ● Visual/ Kinesthetic ● Verbal/ Visual / Kinesthetic 	<ul style="list-style-type: none"> ● Individual ● In pairs ● Group 	<ul style="list-style-type: none"> ● Performance criterion ● Result criterion
Practice schedules			
<ul style="list-style-type: none"> ● In blocks; In series; Varied; Constant 			
Practice types			
<ul style="list-style-type: none"> ● As a whole; Fractioned; Segmented; Simplified 			

Procedures

We recorded two classes of each teacher, based on the study conducted by Pestana (2006), using a digital video camera (DCR-SR68 SONY) and a GoPro (HERO5-SESSION), in order to observe without influencing a spontaneous behavior of the participants. We positioned the camera in the pool’s diagonal, in a certain distance that would capture the pool in its totality; and we attached the GoPro to the teacher’s head during the class.

After filming it, it was possible to observe, codify, register, and analyze the situations that occurred in a natural context regarding the behaviors and the frequency of occurrence in the items designed in the instrument proposed, the APFP. We utilized Match Vision Studio Premium (Castellano, Perea & Alday, 2005), a software to analyze systematic observation of the practices of the sport.

Statistical Analysis

For the descriptive analysis (mean, relative and absolute frequency), the inferential (qui-square test) and the analytical one (a multilayered perceptron neural network – MLP), we used the SPSS 20.0 software. To investigate reliability intra- and inter-observer of the observations of the classes, we used the Cohen’s Kappa Coefficient.

Results

In order to maintain the methodological rigor, we have attended 10% of all videos, according to Tabachnick and Fidell (2012), in order to measure the reliability of data collected from the items observed in swimming classes that compose this instrument. Out of the twelve videos of the classes, two evaluators with a minimum of ten years of theoretical and practice experience analyzed two videos and, after ten days, the same evaluators reanalyzed these videos. Intra- and inter-observer results showed an agreement of 0.95 and 0.84, respectively.

The observation of the twelve classes generated a total of 468.9 minutes of effective teaching time of teachers with their respective students and 8,532 pieces of information. Those six teachers issued an average of 1.58(±.61) FB/min per class, in which those average results from minimum to maximum per teacher varied between 1.29 FB/min and 2.61 FB/min (Chart 1).

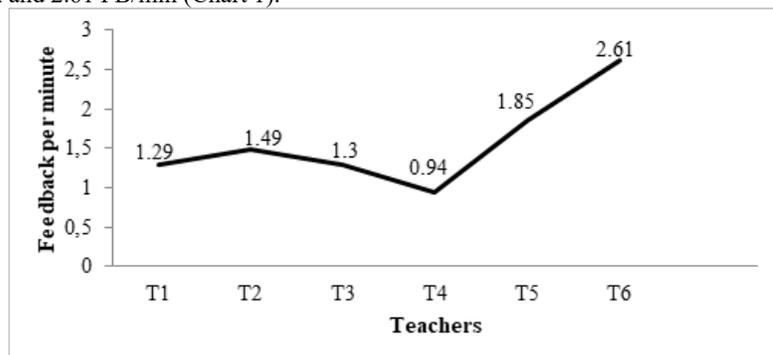


Chart 1. Average of feedback/minute (FB/min) per class and teacher. T1 to T6 = Teacher 1 to 6.

In this study, we observed, by the occurrence of frequencies, the practice schedules, the types of practice and the nature of the tasks (Table 1, below). The practice schedule in blocks stood out when compared to the others, with 92.6%, followed by low frequencies of practice, both in series and constant. Considering the types of practice, the fractioned one (59.7%) was the most used by teachers, followed by the types: as a whole (22.1%) and simplified (18.1%). Regarding the nature of the task, the information related to the technique was the most used by the teachers (68.5%) and then, the information related to the physical (information regarding physical performance), and rules of discipline totalizing the remaining 31.5%.

Table 1. Practice schedule's absolute and relative frequency, types of practice, and nature of the tasks.

	Practice schedules		Types of practice		Nature of the tasks			
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
In blocks	138	92.6	Fractioned	89	59.7	Technique	102	68.5
In series	6	4	Segmented	0	0	Physical and rules	47	31.5
Varied	0	0	Simplified	27	18.1			
Constant	5	3.4	As a whole	33	22.1			
Total	149	100	Total	149	100	Total	149	100

f= frequency; %= percentage.

By applying the qui-square, we found significant differences between the observed and the expected frequencies for the practice schedule in blocks ($X^2=235.6$; $p\leq 0.001$), the fractioned type of practice ($X^2=47.0$; $p\leq 0.001$), and about the technique ($X^2=20.3$; $p\leq 0.001$), demonstrating the predominance of these items.

For the frequency of the feedback regarding the objective, we verified, in classes, the prevalence of the use of prescriptive feedback (57.8%). With respect to the type, the verbal feedback was the most frequent (63.9%); regarding the direction, most of the feedback were focused on one student only (82.8%) and then the direction of a group (11.8%) and in pairs (5.4%). As the criterion, the highest percentage occurred in the performance criterion of feedback (78.6%) while the result criterion obtained the rate of 21.4% (Table 2, below).

Table 2. Feedbacks' absolute and relative frequency according to objective, type, direction, and criterion.

Objective			Type		
	<i>f</i>	%		<i>f</i>	%
Prescriptive	1232	57.8	Kinesthetic	0	0
Descriptive correction	2	0.1	Visual	10	0.5
Descriptive error	182	8.5	Verbal	1362	63.9
Evaluative positive	360	16.9	Verbal/ Visual	327	15.3
Evaluative negative	127	6	Verbal/ Kinesthetic	421	19.7
Interrogative	230	10.8	Visual/ Kinesthetic	2	0.1
			Verbal/ Visual / Kinesthetic	11	0.5
Total	2133	100	Total	2133	100
Direction			Criterion		
	<i>f</i>	%		<i>f</i>	%
Individual	1767	82.8	Performance criterion	1677	78.6
In pairs	115	5.4	Result criterion	456	21.4
Group	251	11.8			
Total	2133	100	Total	2133	100

f= frequency; %= percentage.

By applying the qui-square, we also found relevant differences between the observed and the expected frequencies, which determined the predominance of the prescriptive feedback as its objective ($X^2=2788.4$; $p\leq 0.001$). Regarding the type, there was a predominance of verbal feedback ($X^2=3885.1$; $p\leq 0.001$), regarding the direction of the feedback the prevalence for each individual was ($X^2=2365.6$; $p\leq 0.001$), and concerning the performance criterion, this one was the most applied feedback ($X^2=698.9$; $p\leq 0.001$).

To verify the influence of different schedules and types of practice related to the content – when considering different types of pedagogical feedback – we created a model of multilayered perceptron neural network (which estimates the rate of the variable from the pattern of synapses; paths generated by the connection of predicting variables) by inserting the prediction of the highest rates of occurrence to detect the probability of each feedback to happen, according to the schedules and types of practice, besides the nature of the tasks applied by the teachers (Table 3, below).

Table 3. Influence of different schedules and types of practice and nature of the tasks on different types of pedagogical feedback.

		Prescriptive Objective	Verbal Type	Individual Direction	Performance Criterion
		%			
Practice schedule	In blocks	44.2*	60.6*	23	63.7*
	In series	37	31.1	61.1*	30.1
	Constant	18.8	8.3	15.9	6.2
Type of practice	Fractioned	9.2	79.9*	30.6	10.4
	Simplified	65.8*	5.9	44.5*	52.5*
	As a whole	25	14.2	24.9	37.1
Nature of the tasks	Technical	50.1*	73.9*	79.7*	58.6*
	Physical & rules	49.9	26.1	20.3	41.4

*: higher influences of practice schedule, types of practice, and nature of the tasks on pedagogical feedback.

The model allowed us to estimate that the feedback related to the prescriptive objective has a higher probability to be applied in activities organized in blocks, in a simplified practice and of a technical nature of the task. The verbal feedback had a higher probability of occurring in activities organized in blocks, in a fractioned practice and of a technical nature of the task. Considering the feedback directed individually, it had a higher probability of occurring in activities organized in series, in a simplified practice and of a technical nature of the task. Finally, the feedback as its performance had a higher probability of occurring in activities organized in blocks, in a simplified practice and, again, of a technical nature of the task.

Discussion

Taking into account that our objective was to identify how the practice of contents is scheduled and its influence when considering the types of pedagogical feedback in the process of teaching-learning in swimming, Caetano and Gonzalez (2013) affirm that the methods of teaching-learning this sports discipline have evolved in the last years and that the sport is losing its technicist feature because of that. However, it does not correspond to the discoveries of this study. It is evident that the classes observed presented activities with emphasis on the teaching of the technique, by the predominance of a practice schedule in blocks, fractioned and with its content turned to the technical tasks.

Pestana (2006), by characterizing the pedagogical feedback of ten swimming teachers of beginner levels verified a rate of 1.13 FB/min. and, in this study, these teachers gave out a higher rate computing 1.58 FB/min. Morouço and Amaro (2013) reinforce the existence of feedback as one of the negative aspects in swimming initiation classes. As a way to complement information, Rink (2013) affirms that the issuing of feedback in the learning process should be frequent to help students in the acknowledgement of their result and performance of movement. In other sports, such as volleyball, these rates are higher. Soares (2008) shows that teachers of initiation classes issue 3.43 FB/min., in a junior category, and Perreira et al. (2010), inform that teachers issue 3 FB/min. It becomes possible to see a difference in the rate of feedback per minute. According to Soares (2008), the characteristics of the disciplines explain it. While the volleyball teacher gives out continuous information, the swimming teacher needs to stop the activities in order to share information with the students. Once they are water-based, there are difficulties in comprehending feedback if one is in motion.

The predominance of feedback related to the prescriptive objective, the verbal type, an individual direction, and the performance criterion in the teaching of swimming resembles the results in swimming by Pestana (2006) in which the same types of feedback, except the performance criterion that was not analyzed, prevailed in two classes given by ten of the observed teachers.

The studies of Burzycka-Wilk (2010); Ferracioli, Ferracioli and Castro (2013), and Giannousi, Mountaki and Kioumourtzoglou (2017) identified the types of feedback in learning or an improvement of technique considering backstroke, breaststroke, and front crawl, respectively. Regarding backstroke, Burzycka-Wilk (2010) affirms that the visual feedback is more efficient than the verbal one. This declaration comes from a 1954-----

comparison of a group of apprentices that received visual feedback every time they performed an incorrect movement and another group that received verbal feedback when they needed corrections. The group that received visual feedback presented a more accurate technique of movements. Regarding breaststroke, Ferracioli and Castro (2013) showed that the group that received verbal feedback improved their performance when in comparison to the one that received feedback through video and to the one that had not received any feedback. When it came to front crawl, Giannousi, Mountaki and Kioumourtzoglou (2017) showed that participants who received feedbacks regarding their performance, through a video, presented more efficacy in the improvement of the technique when compared to those groups that observed images of specialists or those that received verbal feedbacks. In this study, we have not measured learning or improvement of technique of the participants, though we have identified types of pedagogical feedback in the process of teaching-learning swimming. Nevertheless, previously cited studies serve to reinforce that types of feedback vary according to the type of swimming strokes they are teaching.

In artistic gymnastics, Aleixo and Vieira (2012) confirmed the same preferences of pedagogical feedback considering teachers with female students aged between 9 and 12 years old who are beginners in the discipline. The authors have analyzed the impacts of these feedbacks on the teaching of artistic gymnastics certifying the preference of feedbacks with descriptive error objective (29.5%), followed by the prescriptive one (28.5%), the verbal type (65.9%), directed to one student (47.4%), and the performance criterion (56.4%). These characteristics relate to the need for efficiency of movement in the execution of these disciplines' motor tasks.

Concerning volleyball, Soares (2008) has identified that, for beginners, teachers issue more performance criterion feedback than in the junior category, 47.2% and 39.3%, respectively. The percentage decreases as experience and time of practice increase. Pereira et al. (2010) also found prevalence on performance criterion pedagogical feedback (45.5%), though the results are not categorized, once the sample was composed of teachers of 28 teams with students aged between 12 and 18 years old.

However, the results on volleyball about the prevalence of feedback related to efficiency of movement diverge from the principles of practice applied to sports initiation and from the studies about sports efficiency and efficacy. According to Greco and Roth (2013), the study of the technique must not be started precociously, so they lead to a delayed learning, mainly in the wide context of the discipline as well as a motivational consuming of the student. Furthermore, Mesquita, Marques, and Maia (2001), by determining the level of functional dependency between efficacy and efficiency of the jump service and the bump, affirmed that the process of teaching-learning in volleyball is necessary to discern what is really important to teach, since not every technical principle is a synonym of success, given the age range of that study (13 and 14 years old). Despite that, in a proposal of development of aquaticity, swimming goes beyond the technical learning of the four competitive strokes, which gives an opportunity to a diversification of practice that stimulate the multidisciplinary of water sports, in order to elevate the student's level of motor experimentation (VARVERI, et al. 2016; CANOSSA, et al. 2007).

When analyzing the highest frequencies of occurrences to detect the probability of each feedback to happen, the lack of studies related to swimming drives this discussion one more time to the study conducted by Pereira et al. (2010) in volleyball. In order to verify the predicting effect of type and referential of pedagogical feedback about the nature of the tasks given by the teacher, the authors indicate, as a result, that verbal feedback and verbal/visual feedback influence the application of contents of technical nature applied by the teacher in 83.8%. This result validates the discoveries of this study, in which verbal feedback presented 73.9% of probability also for contents applied with the technical nature of the tasks. About the referential in volleyball, the understanding of the result influences the nature of the individual tactic tasks in 75.6% and the team tactic tasks in 59.4%. In swimming, the understanding of the performance presented 58.6% of probability of occurrence in the technical nature of the tasks. This is down to the characteristics of team sports, because the tactic has a dynamic influence over other factors in the game (sociomotor sports) and in individual sports where there is no high context interference, also called psychomotor sports (ABURACHID et al., 2019). Yet, Vancini et al. (2015) complemented that in team sports there is an intense adaptation of techniques by apprentices facing the situations that demand decision-making in the game. In individual sports, one usually spends more time training in order to perfect the technique and motor and coordinative skills, which characterizes the distinction amongst the appearance of feedback related to its referential.

This study showed the participants' limitation once only six out of nine institutions accredited by CREF agreed to join the research, besides the fact that we could only bring one teacher per institution. Due to the scarcity of studies that include pedagogical feedback in the teaching-learning swimming, we also reached for research on other sports disciplines to discuss the results. Another difficulty was the availability of financial resources to collect data in all state territory, which limited the possibility of a wider investigation.

Conclusions

Considering the objective of this study, we concluded that statistically significant differences between observed and expected frequencies unfolded the hegemony of the practice schedule in blocks, as a fractioned type of practice, a technical nature of the task. In addition, of the feedback and its prescriptive objective, its

verbal type, its individual direction, and the performance criterion when it comes to teaching-learning swimming according to its respective criteria. These results demonstrate that, in the classes we observed, teachers directed their feedback to previous instructions of contents focused on the technique, a result that confirms the hypothesis of this study. Thus, the proposal of this study contributes to the understanding of what really occurs in the practice during the teaching-learning phase of competitive swimming strokes. As a future inquiry, looking forward to complementing information on the theme, we have the intention to identify if the offered practices to distinct levels of learning are of quality, determined by the analysis of the experts. In addition, if the students reach their objectives through validated tests, considering different perspectives of teaching-learning of swimming nowadays, like the analytical and progressive nature of traditional teaching, and the new approaches towards the comprehension of aquatic motor skills.

In the classes we observed, the prescriptive feedback has more chances of happening in activities organized in blocks, simplified and of technical nature; the verbal feedback in activities in blocks, fractioned and of technical nature. We also observed that the individual direction happens in activities in series, simplified and of technical nature; and the performance criterion in activities in blocks, simplified and of technical nature. These characteristics indicate that activities performed in blocks and a simplified teaching of the technique influence the kind of information issued by the teachers. Containing practical contributions, this study intends to collaborate with new researches in the area, aiming to positively provoke the verification and quality improvement in teaching, for it will become possible to test new technologies of teaching (methods), besides assisting teachers about the pedagogical knowledge of the content currently applied in classes, when considering the learning level of swimming strokes

Conflicts of interest

The authors declare no conflict of interest.

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