Full Length Research Paper

Examination of teaching – learning process in swimming applying Chaffers' system of interaction categories

Melinda Bíró[1], Edit N. Biróné[2], Balázs Fügedi[1]*, László Révész[2] and Béla Szabó[1] László Honfi

[1]College of Károly Eszterházy, Institute of Physical Education and Sport Science – Eger, Hungary
[2]Semmelweis University, Faculty of Physical Education and Sport Science,- Budapest, Hungary

The focus of this research is to examine the role of student-teacher interaction during swimming lessons. Forty-nine (49) elementary school PE teachers, swimming trainers and instructors (28 females, 21 males) consented to participate in this study. A total of seventy-seven (77) swimming lessons were videotaped and coded with the Cheffers' Adaptation of Flanders Interaction Analysis System (CAFIAS). Altogether 177.434 tri-seconds were observed. In the lessons teacher's observation were most prevalent (31, 11%), teacher's explanation (19, 29%) and organization (13, 52%) seemed also notable. Students spend most of the swimming lessons with motor-related activities (77%). It is important to state that teachers who teach swimming develop a high level of non-verbal activity. From the analyses of the data, it can conclude that in this special area of teaching, the teacher – student interactions and communications that evolve are content specific and so different from those evolving in classrooms or PE lessons.

Key words: Interaction types, teacher effectiveness, field analysis; physical education; swimming instruction

INTRODUCTION

According to national surveys with Hungarian primary school students, swimming is considered a very popular sport activity to pursue (Biróné, 1990; Bognár et al., 2005). The foundation of the sport is constituted by the tens of thousands of children who learn to swim in the school system or during extracurricular sport activities (Szabó and Bíró, 2000; Szabó et al., 2000, 2003). The Hungarian National Core Curriculum lays an emphasis on swimming throughout the primary school years (Révész and Bognár, 2005; Salvara et. al., 2004). As indicated by research, swimming is invaluable leisure time activity, important for the maintenance of good health and also in the formation of a healthy way of living (Bognár et al., 2005). Swimming also has a significant means in acquiring excellent mental, social and physical condi-

tion at population of any age (Asim et al., 2005; Fox, 1999; Nielsen, 1978).

Teaching swimming requires specific process and methods from the teacher due to the unusual substance of water and also safety concerns (Bíró, 2000, 2003). The modes and means of teaching swimming and the necessary modifications due to water safety need intense and trustful relationship between teacher and learner and also particular communicational channels (Bíró and Hernádi, 2003). That is why the process of teaching and differs from classroom activities and even from the activities of other physical education activities (Bíró and Salvara, 2005).

This paper is an empirical study in the area of teacher-student interaction, which is specifically adapted to swimming. There is very little research focuses on sports and games utilizing Cheffers' Adaptation of Flanders Interaction Analysis System (CAFIAS), so the topic can be considered a new perspective in Education.

*Corresponding author. E-mail: fugedi@ektf.hu.

Interaction research

Flanders (1965) developed a special monitoring system (FIAS) for the description of classroom interaction which observed the teachers' and the students' verbal expressions (Flanders and Amidon, 1967). It is a deficiency of its system of categories that the process of teaching physical activity and its non verbal dimensions are difficult to observe because of its divergence from classroom activities (Miller et al., 1974; Salvara, 2003, 2004). Thus Flanders' monitoring system is either not or only partly applicable when observing the teaching of sports and games. Several authors expanded Flanders' categories to draw up their own monitoring systems.

The first specific systems of observation for physical education were Barrett (1971) and Fishman and Anderson (1971). The system used by Anderson and Barrette (1980) allowing them to describe four different groups of interactions. Cheffers (1977, 1983) elaborated his own system of categories (CAFIAS), in which non verbal communication based on facial expressions, gestures and other different movements were grouped. It this model special traits of the physical education lessons were categorized. Dougherty (1970) added a special category to the original FIAS system: non verbal activities directly caused by the teachers. Mancuso (1983) categorised several non verbal activities and developed a system to monitor verbal and non verbal interaction during physical education lessons. Piéron and Cheffers (1984) added two more categories to the monitoring system: feedback and presentation. Svoboda (1977, 1978) elaborated a system of categories in order to observe physical education more effectively through verbal and non verbal traits.

In Hungary Biróné (1988) carried out research in this field. By means of monitoring the specificities of interacttion based on twelve teacher and seven student activeties, she defined teacher – student activities, pairs of activities and their frequency. Within the structure of a lesson she observed different types of teacher – student interactions that are easily separable and concluded that the structure of classroom interaction cannot be transferred to physical education lesson activities without changes.

Swimming and swimming education

Swimming differs from other types of sports in several aspects. The first and maybe the most obvious difference is the peculiar substance of water. Submerged in water, the student is exposed to physical effects that s/he cannot experience during other motor acitivites (Counsilman, 1968).

Submerged in water, the organs of sense function differently. The student receives most of the information through sight and hearing. In learning swimming, the picture of motor activities has to be developed in the first place. Most of this information reaches us through our senses. Only a fraction of the information reaches us because water makes it difficult to understand acoustic or other sensory information.

The peculiarities of swimming call forth the adequate teaching methods. Contrary to other types of sports, in swimming we begin teaching with students' the acquaintance with water. Acclimatization processes have to be formed and protective reflexes have to be tamed. The literature calls this educational phase water habituation: the point of water habituation is the complete acclimatization to the new substance of water, the knowledge of the regularities and peculiarities of this substance, and as a result of this, perfect orientation, familiar behaviour and effective movement in water (Tóth, 2006).

In swimming the teaching and learning process can begin at an early age. The basics of water habituation in Hungary usually starts at the age of 4 and the swimming techniques can be taught at the age of 5 or 6. One of the reasons for this is that the crossed cyclical motions of front crawl and backstroke have a similar mobility structure to the crawling motion of a child. Because of the fact that acclimatization precedes the teaching of swimming movements, we can start teaching at the age of 4 or 5.

Based upon swimming literature is noticeable that the teaching-learning process has not yet been fully examined. Hence, the purpose of this study was to examine the role of student-teacher interaction during swimming lessons using Cheffers' Adaptation of Flanders Interaction Analysis System (CAFIAS).

METHOD

Subjects

With the help of a questionnaire we surveyed and defined all of the number of those individuals, who teach swimming to primary school students in Hungary, in the city of Eger. Physical education teachers (who have PE diploma), swimming instructors (they have or not special swimming licence), lifeguards (they have a lifeguard qualification but not any swimming teaching qualifications) and swimming coaches (who have swimming trainer qualifications). Reason of elect them that all of the individuals are liable for the swimming competence of school-aged children.

In the observed sample forty-nine (49) individuals: PE teachers (29), swimming trainers (2), swimming instructors (13) and lifeguards (4), all 28 females, 21 males consented to participate. They all taught elementary school students. 34.8% of them have a teaching experience of 1-3 years, 26, 1% of them have 4-9 years, 19, 6% of them have 10-19 years, 19, 6% of them have over 20 years of experience. 39, 1% of people involved in teaching swimming do not have special corresponding qualifications, 60.9% of them have swimming teaching qualifications.

All of the surveyed PE teachers (29) teach swimming in PE lessons, 57, 89% of the others do it as private entrepreneurs, 36, 84% of them do it within sports club sections and 21, 06% of them do not belong to any organizations.

Table 1. Teacher categories.

Organizing	O
Providing Equipment or preparing the environment	P
Instructing	I
Instructing and demonstrating	I/d
Instructing with assisting	I+
Encourage	E
Encourage with motor activities	E/m
Correcting	C
Correcting with assisting	C+
Assisting	+
Assessing	A
Assessing with assisting	A+
Questioning	Q
Disciplining	D
Educate	e
Observing	Ob
Participating in motor activities	M
Other Activities	Oa
Absent from swimming pool	None
Other	o
Listening	L

Legend: Lists and symbols of the teacher categories. These categories were generate by FIAS (Flanders, 1965), CAFIAS (Cheffers, 1983; Cheffers et al., 1974; Cheffers et al., 1976) and Svoboda (1977, 1978) systems, and modified specifically for a swimming situation by Bíró (2006).

Table 2. Student categories.

1 One student exercise
2. Two - three students exercise
3. Group of students exercise
4. Whole class exercise
5. Students observing, listening, they do not exercise
6. Noises
7. Students interrupt exercise
8. Answering, discussion
9. Organizing

Legend: Lists of the student categories with their marks (numerals). These categories were generate by Svoboda (1977, 1978) and Biróné & Svoboda (1988) systems, and modified specifically for a swimming situation by Bíró (2006).

were observed. Duration of swimming lessons was 60 min. Two observers analyzed video recorded swimming lessons, which were realized in previously defined periods of time, in every three seconds, and so in every minute twenty interactions were registered.

Statistical analysis

The raw data were organized by the categorized observation in a Flanders matrix and the frequencies of the data belonging to each cell were defined. According to Flanders' instructions (Teacher Influence, Pupil Attitudes, and Achievement, 1965), the quotients of each column belonging together were defined. Analyzing teacher – student interactions could establish hierarchy and the percentage distribution of the most frequent types of activities during swimming activities.

The rate of reliability was monitored in relation to the level of actual and random agreement between the two observers. To calculate reliability we used Scott's π value based on Flanders (1965). Inter-observer agreement percentage was established by dividing the number of agreements by the number of agreements plus disagreements and multiplying by hundred (Van der Mars, 1989). A high level of IOA was maintained throughout data collection, ranging from 86 to 92%.

Interaction categories were coded and grouped into themes in order to clarify the specific questions for the questionnaire and to discover significant areas to the study. With the quantitative data, descriptive and appropriate nonparametric statistics were used through SPSS 13.0 for Windows statistical package.

RESULTS

Type of Teachers' activity during swimming education

The observations showed the following: the swimming teachers walked at the side of the pool, stud in shallow water, watched the students' motor activity. He or she watched over the initial rough and poorly co-ordinated, inaccurate movements, and then helped to form the correct mobility structure with explanation and presentation. During practise the teachers followed the student's motor activity, observed the mistakes, and corrected them. During swimming activities observation

Measurements

To define the interaction and the activities realised between teacher and student the method of indirect monitoring were chosen. 21 teacher's categories (Table 1) were designed, adapted from FIAS (Flanders, 1965), CAFIAS (Cheffers, 1983; Cheffers et al., 1974, Cheffers et al., 1976) and Svoboda (1977, 1978) systems and modified by Bíró (2006). The system of categories was modified specially for a swimming situation and some categories were added.

While Flanders, Chaffers and Svoboda marked the teachers' categories with numerals, in this research to encode teachers' categories with letters to facilitate the attaining of the categories. The use of letters made it possible to apply relatively many, twenty-one categories. Students' categories contained 9 categories. These categories were generated by Svoboda (1977, 1978) and Biróné and Svoboda (1988) systems, and modified specifically for a swimming situation by Bíró (2006). Table 1 and Table 2 display teachers' and students' categories. Thus, behavioural categories along the instrument employed were composed of.

Experimental procedure

The experiment took place in the spring semester of 2005/2006. Participants were videotaped while teaching both in shallow water and in deep water. Totally 77 swimming lessons could be recorded. Getting acquainted and teaching of swimming strokes in shallow water (35 swimming lessons), in deep water (33 swimming lessons), and mixed shallow and deep water (9 swimming lessons)

Table 3. Analysis of codified teaching activities.

Ranking	Sign of categories	Teaching-instructing interactions	Total occurrence of teaching instructing interactions	Percentage distribution of total occurrence (n=77)
1.	Ob	Observing	27601	31,11%
2.	I, I+, I/d	Instructing	17118	19, 295%
3.	O, P	Organising	11999	13,525%
4.	Oa	Other Activities	9291	10, 472%
5.	C, C+	Correcting	8694	9, 799%
6.	A, A+	Assessing	4141	4, 667%

Legend: Dominant types of teachers' activity during swimming education (n=77). For explanation of the symbols see: **Ob** – Observing; **I** - Instructing; **I+** - Instructing with assisting; **I/d** - Instructing and demonstrating; **O** – Organizing; **P** - Providing Equipment or preparing the environment; **Oa** - Other Activities **C** – Correcting; **C+** - Correcting with assisting; **A** – Assessing; **A+** - Assessing with assisting. Total occurrence mean: how many 3 seconds teaching behaviors were during a sixty minutes swimming lesson.

(Ob) was ranked first (31,11%). Apart from the students' motor activities, the teachers observed their other activities, behaviour and even their emotions. This latter aspect – the observation of the students' emotional expressions – is classified as a different category – paying attention (L). These teachers' activity happened rarely during swimming lessons (1, 18%). Table 3 presents an analysis of teaching activities.

In the order, the dominant form of educational direction, the different types of teachers' explanation were ranked second (19, 29%). The observations proved that individuals chose a different form information channels (imitation, imitation and explanation). The teachers' explanation mainly consisted of verbal information (I-11, 92%, I+ - 1, 59%) but visual information attached to imitated presentation (I/d – 5.78%) the teachers' verbal explanation. It was complemented by the teachers' demonstration (E/d – 0, 51%).

Acclimatization to water and the teaching of swimming strokes cannot be executed without the teachers' direct demonstration. The teachers' demonstrations are a crucial factor in teaching swimming. However, the observations showed that teachers' direct and indirect demonstrations had little role (E/d – 0, 51%) and rarely happened during the activities.

The swimming pool and the surroundings of the pool are increasingly hazardous so when teaching swimming life protection and accident prevention are of primary concern. When organized swimming activities, the teachers' accident preventive and disciplinary activities are very important. Due to this issue, swimming requires a high level organization. The categories of organisation (O, P) were ranked third (13, 52 %.) Most of the organisational activities of the teachers made up of ensuring order and discipline (line up, standing at the side of the pool, seating by the pool) and the development of different forms of the activity, organising groups.

Organization (O) (10, 29%) followed along the whole lesson because of the peculiarities of swimming activi-

ties from the warm-up phase to game activities. This teacher activity was complemented by the preparation of equipment and educational tools (P) used in swimming education before, during and after the activity. To ensure order and discipline the teachers' tools included organization and disciplining (prohibition, punishment and disciplinary action) (1, 37%) which was rarely needed during the swimming activities was observed.

In connection with disciplining it was worth mentioning the category of education (E). The two categories appeared together during swimming activities, completed each other (Figure 1.) Education is a complex process, so the monitoring of this category was also complex. In this category the teacher activities where the teacher formulated educational and social values, raised the awareness of ethical requirements, encouraged acceptable behavior patterns, formulated norms that were in connection with health preservation and formulates the students' attitude were observed. Compared to other categories, the category of education represented a low percentage (0, 56%) in the total list of teachers' categories, it was the last.
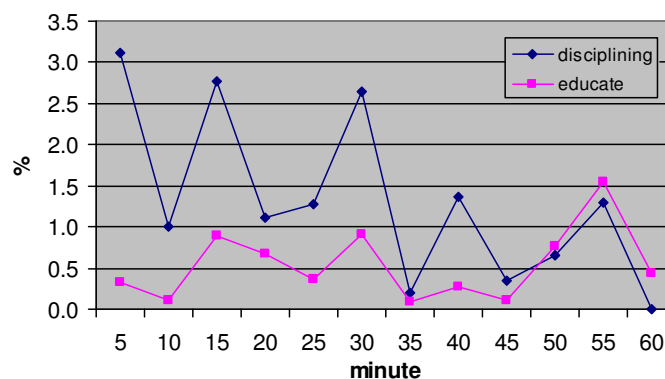

Figure 1. Percentage values of discipline – D**,** and education – E, and their distribution during a 60 min swimming lesson.

Very often the teachers acted in a different way in connection with education: they adjusted or helped students to put on goggles or a swimming cap. When teachers did something that was not connected with education, they actions belonged to the category of other activities (Oa). These activities were categorized as "active in a different way." The percentage of this category (10, 47%) made it earn the fourth rank in the list (Table 1.). The teachers' other activities were dominant during those periods of the lesson when the percentage of directing motor activities was decreased. During the main part of the swimming activity when the teachers directed motor activities (explanation, error correction, help, assessment and demonstration, etc.) other activities were rare. During the opening and the closing parts of the lesson, when directing motor activities did not have an important role, the number of teachers' other activities increased.

Error correction, revealing the causes of the error and perfection of the movement process were important moments when teaching motor activities. Error correction (C, C+) in motor education, thus, in swimming education also, played an important role and it was shown in the results (9, 79%).

It was essential that students received ongoing feedback on their performances, the momentary state of their activity and their progress. Assessment played a very important role in the formation of movement, the correction of movement errors, the perfection of the movement and in the complex development of personality. During the swimming activities assessment (A, A+) played an important role (4, 66%) and was ranked sixth (Table 3).

As we have already mentioned, water in itself can be a source of danger. Thus, when teaching swimming, teachers' help was not only important in the correct execution of a certain exercise, but it was also important in the prevention of accidents. The instructor can helped verbally, given rhythm, or they assisted and steadied without any kind of verbal statement. From the results of the investigation showed that helps in itself (+) did not represent a significant percentage (1, 92%) and rarely happened during the observed lessons. This did not clearly mean that teachers' help was rare during the activities. The instructors' activity was complex, while they helped, they also assessed, corrected errors and gave explanations were often experienced. In categorised observation the researchers usually categorise and mark the most dominant activity from the activities happening at the same time. Each of the teachers' activities happened simultaneously were important so the monitoring categories instead were modified. Thus, in these system of categories included complex categories such as explanation and help (I+,) error correction and help (C+), assessment and help (A+). As we have already stated, help is itself (+) (1, 92%) rarely occurred during the observed lessons. The different complex forms of help – with error correction (C+) (2,11 %) with

explanation (I+) (1,59%,) and with assessment (A+) (0,23%) altogether (+, C+, I+, A+) reached a more significant percentage (5,86%) so it may conclude that teachers' help was an important and frequent element of swimming activities.

Frequent teachers' activities of the classroom rarely happened during swimming activities. Because of the low percentage value of motivation (E) (1,12%) and teachers' questions (Q) (0, 96%) they were ranked 15th and 17th out of the 21 teacher categories. The teachers left the settings for a few minutes were rarely observed. This teacher activity was classified as the "not present" category. The observed individuals rarely played with the children and rarely did the exercises with them. The "participation in mobility activity" (M) category received a low percentage value and was ranked as one of the last categories. The teachers' activities during most of the swimming activities (98,5%) could be observed and categorised easily. Only a low percentage value (1, 52%) represented the "other" category. This category was used to define every activity that could not be put into any other category or when the individuals could not observed because of some reason.

Type of students' activity during swimming education

Analysing the results of students' categories (n = 77) the time spent in each category and their percentage values were defined. The students spend most of the swimming activities – 77%, which represent 46 min in case of a 60 min lesson – with motor activity based on Table 4. During most of the lesson (56%) most or all of the students were moved (categories 3 and 4.) During a shorter period (20, 85%) of the lesson only a few students were moved (categories 1 and 2.) The students usually spend eight minutes (category 5, 13%) in silence, waited for the instructors or listened to them. They spend almost three minutes (5, 36%) with getting into and out of the pool, moving to another pool or lining up. The results of the sixth category (noise, disorder) represented a low percentage value (2, 44%, which is almost one and a half minutes). Students' verbal activity (categories 7 and 8) was low, they spend most of their time with motor activity. Students spend the swimming activities mostly with motor activities, only a few verbal utterances, in an orderly way, in silence rather than being noisy.

Type of teacher – student interactions during swimming education

Observing the teacher – student activities it can defined which pairs of activities or types of interaction go together (Table 5). The most frequent pair was when the teacher observed and either all of the students (Ob/4) or

Table 4. Analysis of codified student activities.

Ranking	Sign of categories	Student interactions	Percentage distribution of total occurrence
1.	3	Group of students exercise	31,93%
2.	4	Whole class exercise	24,35%
3.	5	Students observing, listening, they do not exercise	13,03%
4.	2	Two - three students exercise	12,66%
5.	1	One student exercise	8,19%
6.	9	Organising	5,36%
7.	6	Noises	2,44%
8.	7	Students interrupt exercise	1,27%
9.	8	Answering, discussion	0,72%

Legend: Dominant types and ranking of students' activity during swimming lessons (n = 77).

Table 5. Analysis of codified teacher - student activities.

Ranking	Sign of categories	Teaching-instructing interactions	Student interactions	Total occurrence of Teacher - Student interactions
1.	Ob/4	Observing	Whole class exercise	10762
2.	Ob/3	Observing	Group of students exercise	9602
3.	I,I/d,I+/3	Instructing	Group of students exercise	5834
4.	I,I/d,I+/5	Instructing	Students observing, listening, they do not exercise	4628
5.	Oa/4	Other Activities	Whole class exercise	4208
6.	C,C+/3	Correcting	Group of students exercise	3715

Legend: Dominant types of teacher-student interactions during swimming education. For explanation of the symbols see: **Ob** – Observing; **I** - Instructing; **I+** - Instructing with assisting; **I/d** - Instructing and demonstrating; **Oa** - Other Activities **C** – Correcting; **C+** - Correcting with assisting. Results mean the total occurrence of the three – seconds' intervals of teacher - student interactions during a sixty minute swimming lesson.

a large group of them (Ob/3) moved. The teacher's explanation was paired with two different student activities. The most frequent was when the teacher gave an explanation to one student and the others did the exercise in the meantime (I, I/d, I+/3.) The second most frequent was when the teacher instructed the whole class and the students listened in silence (I, I/d, I+/5.) During the teachers' verbal explanation the students paid attention silently, they waited (I/5) during non verbal transmission of information most of them usually moved (I/d/3). The teachers' verbal explanation was general, aimed at the whole group of students while the nonverbal explanation was aimed at the individual.

Analyzing pairs of activities interesting conclusions were may drawn. The teacher's error correction occurred most often during the lesson at students' category 3 (the group of students was moving). This means that the teachers' error correction was not general and impersonal – just like during physical education lessons – but it was personalized (Table 5). Furthermore the peculiarrity of swimming education assessment was that it was

personalized or it was aimed at a small group of students.

The frequency values of the teachers' error correction, assessment, motivation and explanation were the highest at the third student category (the group of students is in motion). This means that the teacher's assessment, motivation and error correction were not general and impersonal as in the case of physical education lessons but personalized.

DISCUSSION

The activities of swimming instructors and teachers during swimming activities are rather dynamic and complex. Most of the instructors' activities were made up of six types of interaction. Teachers observed the students' movements, gave instructions, organized, prepared equipment, were active in other ways, corrected errors and assessed. Altogether, during swimming activities the expressly teachers' activity was rare (motivation, personal exemplification and demonstration) were conclude. They

Table 6. Teaching behaviors of the physical education teachers in the studies by Hardy (n = 4), by Spackman (n = 11) and by Bíró (n = 77).

Categories		Author		
		Spackman (1986)	Hardy (1993)	Bíró (2006)
Management		26,7%	21,6%	13,5%
Teaching		67,2%	78,4%	84,9%
Mode	**Audible**	67,8%	42,2%	14,8%
	Silent	18,7%	25,4%	32,3%
	Physical	0,6%	0,9%	3,3%
	Audible-Physical	10,9%	31,5%	22,9%

Legend: Comparison between Spackman's (1986) Hardy's (1993) and Bíró's (2006) study. While Spackman's observations did not include swimming lessons, the study by Hardy comprised of them, like Bíró's observations were merely swimming lessons.

rarely asked questions, the teachers' explanation dominated. They
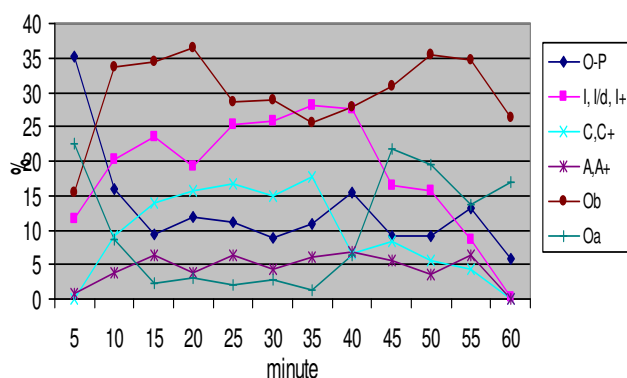

Figure 2. Percentage values of teachers' activities and their distribution during a 60 min swimming lesson, per 5 min. For explanation of the symbols see: **O** – Organizing; **P** - Providing Equipment or preparing the environment; **I** - Instructing; **I/d** - Instructing and demonstrating; **I+** - Instructing with assisting; **C** – Correcting; **C+** - Correcting with assisting; **A** – Assessing; **A+** - Assessing with assisting; **Ob** – Observing; **Oa** - Other Activities.

rarely took part in physical activity; they were rather outside observers of the game, than participants. The teachers' activities during swimming lessons can be categorised three main groups: observing motor activities, guiding for motor activities, and preparing for motor activities. (Figure 2).

Based on the Date Bank research project, Anderson and Barette (1978) reported teachers spending 36, 9% of the lesson on active instruction, 21, 2% silently observing pupils, 20, 4% on managing pupils and the environment. Spackman's study (1986) reported that teachers spending 67, 2% of the lesson on active teaching, 26, 7% on managing pupils and the environment. In a study by Hardy (1993) showed differences from those reported by Spackman (1986) in that there were more teaching

(78, 4%) than management (21, 6%) behaviours (Table 6). While Spackman's observations did not include swimming lessons, the study by Hardy did. In our study swimming lessons only were observed.

The average teaching behaviours for Spackman's and Hardy's teachers showed differences from those we observed in that there were more teaching (84, 9%) and less management (13,5%) (Table 6). The reasons for there being more teaching and less management were environment and the nature of activity. In the water, in that case students waiting for a long time without motor activity will cause feeling cold. It is encourages teachers to short, effective explanation, short "talk" less management, less non teaching activity and more silently observation. This type of activity more frequent at swimming education that observed during physical education lessons (Anderson és Barette, 1978; Bironé, 1988; Bironé and Svoboda, 1988; Gusthart, 1985; Spackman, 1986; Gusthart and Springs, 1989; Hardy, 1993). These reasons have manifestation to characteristics of effective or experienced teachers of motor skills (Table 7.) Teacher who teaches swimming develops these teaching characteristics, (Table 7).

The reasons for this speciality are the substance of water, its effect on teaching swimming and the modifying effects it exercises on communicational channels. That is why the process of teaching swimming differs from classroom activities and even from the activities of physical education lessons. (Bíró and Salvara, 2005) During our research we observed same special teacher methods. In the environment of the swimming pool, in the water, where receiving stimuli is more difficult, the students cannot perfectly hear the teacher's verbal instructions so information coming visually receives a more important role. A teacher who teaches swimming develops a higher level of non-verbal activity. According to our observations, the environment of education not only modifies the occurrence of certain teacher demonstration but also leads to the development of special

Table 7. Characteristics of effective or experienced teachers of motor skills based on Silverman (1991) and Mawer (1995) supplemented by Bíró.

Provide adequate time for student practice and minimize student waiting
Provide accurate and focused explanations with maximize technical content
Provide accurate and focused and short demonstration
More imitated demonstration and imitation rather than (instead of) demonstration
Provide imitated demonstration and imitation individualize
Usage of teaching methods simultaneously because of teaching time maximize exactly:
explanations – imitated demonstration
explanations – assisting
assisting – correcting
assessing - assisting
Maximize appropriate student practice or engagement

types of teaching methods. Hardy (1993) suggested that the reason for there being more verbal – non verbal simultaneous communication and less management during swimming lessons, it may be due to the environment and the nature of the activity. Hardy also indicated that the noise of the swimming pool encourages teachers to talk and demonstrate simultaneously. Our research verified his suggestions and in addition to this the modification demonstrational teaching method. Imitation and imitated presentation complemented with explanation are special means of demonstration that have an important role in swimming education. It developed because of the substance and because the teacher cannot get into the water every time to present the exercise in the right environment.

For the teacher it is time consuming to stop every student, to call the student ashore, to change clothes, get into the water and to demonstrate or to have a student demonstrate the exercise. After the teacher demonstrates an exercise, a student comes ashore; he or she has to dry him or herself, and may have to change clothes. It is time consuming and complicated so the observed individuals rarely do so – and only in justified cases (shallow or deep water pools, acclimatisation to water, teaching new material or a new stroke.) A further advantage is that it requires less organisation (there is no need to gather the students or to change the type of activity), it can be used with movements of a smaller stretch and also it can be applied in a personalised way (individually).

This investigation showed that most of the teachers' activities – explanation, assessment, imitation during explanation, motivation, error correction, demonstration, the teacher's questions, conversing and listening to what the student has to say – are personalised, which differs greatly from what has been observed during classroom activities or physical education lessons (Bironé, 1988; Svoboda, 1977, 1978; Bironé and Svoboda, 1988).

Altogether we can conclude that in this special area of motor learning, the teacher interactions and special teaching methods that evolve are different from those evolving in classrooms or PE lessons.

Spackman (1986) reported that teachers spending 39, 8% of the lesson on class teaching and, 32, 8% on group teaching and 24, 2% of the lesson on individualised teaching. In a study by Hardy (1993) showed differences from those reported by Spackman (1986) in that there were more class (43, 1%) and group teaching (35, 3%) teaching and less the individualisation (21, 6%) (Table 8). In our research the average class teaching behaviours were less (31, 52%) and there were more group (41, 3%) and individualised teaching (27, 1%) (Table 8). The reason for there being more personalised and group teaching and less class teaching were environment, the nature of swimming learning, which we have mentioned before. These reasons also have manifestation to characteristics of effective or experienced teachers of motor skills.

Students spend the swimming activities mostly with motor activities, only a few verbal utterances, in an orderly way, in silence rather than being noisy. Increasing the student motor engagement time during swimming lessons when the teachers use brief instructional cues with non verbal supplementation, and with longer observational periods. The substance of water, the nature of the movement and the peculiarities of the sport modify not only teachers behaviour, but the students' interactions also, so more motor activity develop during swimming activities than physical education lesson (Brunelle et al., 1980; Metzler, 1979; Shute et al., 1982; Silverman, 1985; Costello and Laubach, 1978; Lounsbery and Sharpe, 1999; Mcleish et al., 1981; Piéron and Dohogne, 1980; Piéron and Haan, 1980; Underwood, 1988).

Analysing the pairs of interactive activities – the joint teacher – student activities – we can conclude that the substance of water, the nature of the movement and the

Table 8. Teaching directions of the physical education teachers in the studies by Hardy (n=4), by Spackman (n=11) and by Bíró (n=77).

Categories		Author		
		Spackman (1986)	Hardy (1993)	Bíró (2006)
Management		26,7%	21,6%	13,5%
Teaching		67,2%	78,4%	84,9%
Direction	One	24,2%	21,6%	27,1%
	Group	32,8%	35,3%	41,3%
	Class	39,8%	43,1%	31,5%

Legend: Comparison of teaching directions between Spackman's (1986) Hardy's (1993) and Bíró's (2006) study. While Spackman's observations did not include swimming lessons, the study by Hardy comprised of them, like Bíró's observations were merely swimming lessons.

peculiarities of the sport modify the educational parties' interactions, so that during swimming activities, particular teacher activities and teacher – student interactions evolve.

CONCLUSION

Swimming is a special field of motor learning that differs greatly from classroom activities and even from the activities of physical education lessons, which is a result of the practical nature of the knowledge transferred and the substance of water, its effect on teaching swimming and the modifying effects it exercises on communicational channels. Our research establishes the importance of non-verbal interactions, such as imitating and non verbal instructing. From this point of view we recommend the following: if the choice of teaching -learning methods and teaching -learning strategies it should be taken it into consideration.

Teaching and learning motor activity is very complex. In that case the teaching – learning process would be better, the teachers' and students' activities should necessary to know. For that reason, while the importance of this research were emphasized.

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