

WCES-2010

Observing the paraverbal communicative style of expert and novice PE teachers by means of SOCOP: a sequential analysis

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Received November 15, 2009; revised December 3, 2009; accepted January 25, 2010

Abstract

The study sought to analyse the paraverbal communicative fluency of the teaching style used by expert and novice PE teachers. Twenty-four lessons were studied using the Observational System of Paraverbal Communication (SOCOP; Castañer et al., 2007; Castañer, 2009), an instrument that provides a clear analysis of how essential elements related to kinesic and proxemic behaviours can be used and taught. A subsequent analysis using SDIS-GSEQ (Bakeman & Quera, 1992) and the detection of T-patterns by means of Theme v.5 s (Magnusson, 2000) enabled us to obtain sequential analyses of the paraverbal behaviours used in the teaching styles.

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Keywords: PE teachers; SOCOP; sequential analysis; paraverbal communicative style; SDIS-GSEQ.

1. Introduction

Research on effective teaching highlights the importance of communication in instruction. Weinmann and Backlund (1980) noted that specific references to actual communicative behaviour are required to develop a model of communication competency (Mulholland & Wallace, 2001; Pence & Macgillivray 2008).

The paraverbal structure of communication will be addressed here according to two dimensions: kinesics, which centres on the gestural language of the body, and proxemics, which centres on the use of space (in this case, the teaching space). These dimensions of analysis have been considered for many years by key authors in the field (Ekman, 1957; Hall, 1968; Poyatos, 1983), and in the context of teaching discourse they can be defined as follows: Kinesics: the study of patterns in gesture and posture that are used by the teacher with or without communicative meaning. Proxemics: the study of how the teacher uses the space in which teaching takes place.

In light of the above the present study aims to: (1) identify the kinesic and proxemic behaviours of physical education (PE) teachers related to instructional tasks; and (2) to compare the communicative teaching styles of expert and novice teachers.

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2. Methods

Eight primary school PE teachers (four novice and four expert teachers) were observed using a category system that was adapted ad hoc from SOCOP for both kinesic and proxemic communication. Each criterion gives rise to a system of categories that are both exhaustive and mutually exclusive. Behaviours from the sessions were recorded using the Theme Coder software. The data were then imported into SDIS-GSEQ so as to obtain sequential analyses and into the THEME software in order to detect hidden T-patterns (the latter outlines a new approach to the analysis of time-based event records).

3. Instruments

The observation instrument used was SOCOP (Castañer et al., 2007; Castañer, 2009), which enables the different levels of kinesic and proxemic response to be systematically observed. Kinesic responses were recorded by means of the Sub-system of Kinesic Gestures (SOCIN; see Table 1), while proxemic gestures were recorded via the Sub-system of Proxemics (SOPROX; see Table 2). Both sub-systems have been successfully used in previous research to observe the behaviour of teachers in interaction with their students. Behaviours from the sessions were recorded using the Theme Coder software. The data were then imported into SDIS-GSEQ so as to obtain sequential analyses. In order to derive temporal patterns (T-patterns), SOCOP was also codified using the ThemeCoder software, (PatternVision, 2001).

Table 1. SOCIN: System of Observation for Kinesic Communication (Castañer, 2009).

Dimension	Analytical categorisation	Code	Description
Function Dimension that refers to the intention of the spoken discourse which the gesture accompanies.	Regulatory	RE	Action by the teacher whose objective is to obtain an immediate response from receivers. It comprises imperative, interrogative and instructive phrases with the aim of exemplifying, giving orders or formulating questions and answers.
	Illustrative	IL	Action that does not aim to obtain an immediate response from the receiver (although possibly at some future point). It comprises narrative, descriptive and expository phrases with the aim of getting receivers to listen.
	Emblem	EMB	Gesture with its own pre-established iconic meaning.
Morphology Dimension that refers to the iconic and biomechanical form of gestures.	Deictic	DEI	Gesture that indicates or points at people, places or objects.
	Pictographic Kinetographic Beats	PIC	Gesture that draws figures or forms in space.
		KIN	Gesture that draws actions or movements in space.
		BEA	Iconically undefined gesture used exclusively by the sender and which usually only accompanies the logic of spoken discourse.
Situational Dimension that refers to a wide range of bodily actions which usually coincide with parts of the teaching process that cover a certain period of time.	Demonstrate	DE	When the teacher performs in gestures that which he or she wishes the students to do.
	Help	HE	When the teacher performs actions with the intention of supporting or improving the contributions of students.
	Participate	PA	When the teacher participates alongside students.
	Observe	OB	Period of time during which the teacher shows an interest in what is happening in the classroom with the students.
	Provide material	PM	When the teacher handles, distributes or uses teaching material in accordance with the educational setting.
	Show of affect	AF	When the teacher uses an emotionally-charged gesture with respect to the students.
	Object adaptor	OB	When the teacher maintains contact with objects but without any communicative purpose.

Adaptation Dimension that refers to gestures without communicative intentionality in which the teacher makes contact with different parts of his/her body, or with objects or other people.	Self-adaptor	SA	When the teacher maintains contact with other parts of his/her body but without any communicative purpose.
	Hetero-adaptor	HA	When the teacher maintains bodily contact with other people but without any communicative purpose.
	Multi-adaptor	MUL	When several of these adaptor gestures are combined.

Table 2. SOPROX: System of Observation for Proxemic Communication. (Castañer, 2009)

Dimension	Analytical categorisation	Code	Description
Group Dimension that refers to the number of students to whom the teacher speaks.	Macro-group	MAC	When the teacher speaks to the whole class/group.
	Micro-group	MIC	When the teacher speaks to a specific sub-group of students.
Topology Dimension that refers to the spatial location of the teacher in the classroom.	Dyad	DYA	When the teacher speaks to a single student.
	Peripheral	P	The teacher is located at one end or side of the classroom
	Central	C	The teacher is situated in the central area of the classroom.
Interaction Dimension that refers to the bodily attitude which indicates the teacher's degree of involvement with the students.	At a distance	DIS	Bodily attitude that reveals the teacher to be absent from what is happening in the classroom, or which indicates a separation, whether physical or in terms of gaze or attitude, with respect to the students.
	Integrated	INT	Bodily attitude that reveals the teacher to be highly involved in what is happening in the classroom, and in a relation of complicity with the students.
	Tactile contact	TC	When the teacher makes bodily contact with a student.
Orientation Dimension that refers to the spatial location of the teacher with respect to the students.	Facing	FAC	The teacher is located facing the students, in line with their field of view.
	Behind	BEH	The teacher is located behind the students, outside their field of view.
	Among	AMO	The teacher is located inside the space occupied by the students.
	To the right	RIG	The teacher is located in an area to the right of the classroom and of the students, with respect to what is considered to be the facing orientation of the teaching space.
	To the left	LEF	The teacher is located in an area to the left of the classroom and of the students, with respect to what is considered to be the facing orientation of the teaching space.
Transitions: dimension that refers to the body posture adopted by the teacher in space.	Fixed bipedal posture	FB	The teacher remains standing without moving.
	Fixed seated posture	FS	The teacher remains in a seated position.
	Locomotion	LOC	The teacher moves around the classroom.
	Support	SU	The teacher maintains a support posture by leaning against or on a structure, material or person.

4. Results

The analyses revealed key trends in paraverbal communicative behaviour that were related to the expertise of teachers. As regards the sequential analysis, the SDIS-GSEQ program shows that novices use more kinesic behaviours than do expert teachers; furthermore, the adjusted residuals at lag 0 are more significant and, therefore, more balanced. In novice teachers the SDIS-GSEQ program reveals a highly significant co-occurrence of emblems and adapters ($\text{radj}=17.96$), of adapters and illustrators ($\text{radj}=6.85$), of regulators and situational markers ($\text{radj}=5.73$), and of adapters and regulators ($\text{radj}=4.20$). For expert teachers the same program showed significant co-occurrences of emblems and adapters ($\text{radj}=12.03$), of adapters and illustrators ($\text{radj}=3.43$), of adapters and regulators ($\text{radj}=3.43$), and of regulators and situational gestures ($\text{radj}=2.98$). These results reveal that novice teachers tend to use a greater number of gestures and make more kinesic demonstrations when teaching than do expert teachers.

Given		Determined				
		Emblem	Adapter	Regulat	Illustra	Situati
Emblem	0.00:	17.96	-3.39	-5.52	-6.15	
Adapter	0.00:	-14.48	4.20	6.85	1.88	
Regulat	0.00:	-2.31	-1.93	-3.15	5.73	
Illustra	0.00:	-0.62	-0.52	-0.85	1.54	

Table 1. Adjusted residuals for the combination of kinesic behaviours at lag 0 of novice teachers. The significant adjusted residuals ($p<0.05$) are highlighted and show a strong association between emblems and adapters ($\text{radj}=17.96$), adapters and illustrators ($\text{radj}=6.85$), regulators and situational gestures ($\text{radj}=5.73$), and between adapters and regulators ($\text{radj}=4.20$)

Given		Determined				
		Emblem	Adapter	Regulat	Illustra	Situati
Emblem	0.00:	12.03	-2.95	-2.87	-3.02	
Adapter	0.00:	-10.38	3.42	3.43	1.14	
Regulat	0.00:	-1.04	-1.36	-1.53	2.98	
Illustra	0.00:	-0.36	-0.47	-0.53	1.04	

Table 2. Adjusted residuals for the combination of kinesic behaviours at lag 0 of expert teachers. The significant adjusted residuals ($p<0.05$) are highlighted and show a strong association between emblems and adapters ($\text{radj}=12.03$), adapters and illustrators ($\text{radj}=3.43$), adapters and regulators ($\text{radj}=3.43$), and between regulators and situational gestures ($\text{radj}=2.98$).

The same method of sequential analysis also shows that the same occurs when we cross the molecularised kinesic behaviours with the proxemic ones in which it can be seen that when the activity is done by the macro-group, novice teachers are likely to be situated in the centre, whereas expert teachers prefer to be situated at the periphery. When the activity is done by a micro-group a similar trend is observed, although expert teachers also relate to the micro-group when they are in the centre of the teaching area.

Based on the above sequential analyses, Figures 3 and 4 show two T-patterns derived from a similar teaching situation with a macro-group (MAC), in which the abovementioned differences are revealed. Both dendograms show three levels of concurrence of paraverbal communicative behaviours. Figure 3 corresponds to the novice teacher and it can be seen that he uses more demonstration (DE), self-adapters without a communicative purpose (SA) while he observes (OB) and regulatory gestures (RE) in the form of deictics (DEI), whose function is to indicate. Figure 4 corresponds to an expert teacher and shows how he doesn't need to demonstrate, only observe (OB), before moving on to regulate (RE) by means of the quality of his emblematic gesture (EMB), but without the need for any self-adapter; he later moves into the central area of the room in order to help (HE).

Table 3. Dendrogram of a novice teacher

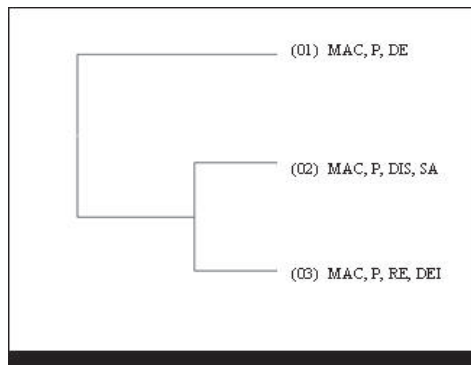
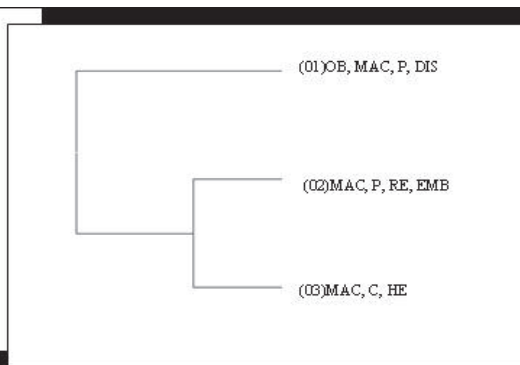


Table 4. Dendrogram of an expert teacher



Just as we have done in previous research that has aimed to optimise the observation of motor skills (Castañer et al., 2009), the present study has sought to offer a way of optimising teaching styles by using the *Theme* software to perform sequential analyses and obtain T-patterns based on the kinesic and proxemic behaviours observed in teachers. With respect to the criteria of the observation sub-systems (SOCIN and SOPROX) a number of relevant T-patterns can be obtained. A good example would be that regulatory gestures (RE) are morphologically coded predominantly by means of emblems (EMB) and deictic forms (DEI); illustrative gestures (IL) are coded through beats (BEA), pictographs (PIC) and kinetographs (KIN); and, finally, regulatory gestures (RE) are usually made while the teacher is in a static position (especially bipedal (BI), although also seated (S)).

5. Discussion

The observation of a natural context (Anguera, 2003) requires the use of the above-mentioned observational instrument, as well as the detection of temporal patterns (T-patterns) in the transcribed actions. The *Theme* program grouped together all the recordings of each teacher (nomothetic view) and derived T-patterns that reveal the trends in kinesic and proxemic paraverbal communication from an ideographic perspective. The results show that in comparison with expert teachers, novice teachers make not only a more quantitative use of gestures and various uses of space, but also that their teaching style is less qualitative, in that they fail to take full advantage of certain gestures, such as emblems and kinetographs, or certain uses of space, such as their position with respect to the group. For teachers, having an optimum paraverbal communicative style (both kinesic and proxemic) in combination with effective verbal communication is important in terms of the efficacy of instruction. We firmly believe that the optimisation of these communicative styles would have a direct positive effect on students' learning.

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