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Abstract	<p>The purpose of the present chapter is to describe how a systemic approach can be combined with the empirical detection of behaviour patterns by means of a systematic methodology and its utility of observing pedagogic communication. Of course, each teacher has his or her own paraverbal communicative style. However, the objective of this chapter is not to compare styles but, rather, to reveal the trends in this dimension of communication among teachers working in a similar naturalistic context. The observation of a natural context requires the use of the observational instrument, as well as the detection of temporal patterns in the transcribed actions. Therefore, despite the concrete and unique nature of each body it is possible to identify certain kinesic and proxemic functions and morphologies that are sufficiently generalised and which are of great interest with respect to teaching.</p>	

Chapter 2

The Teacher's Body Communicates. Detection of Paraverbal Behaviour Patterns



Marta Castañer and Oleguer Camerino

Abstract The purpose of the present chapter is to describe how a systemic approach can be combined with the empirical detection of behaviour patterns by means of a systematic methodology and its utility of observing pedagogic communication. Of course, each teacher has his or her own paraverbal communicative style. However, the objective of this chapter is not to compare styles but, rather, to reveal the trends in this dimension of communication among teachers working in a similar naturalistic context. The observation of a natural context requires the use of the observational instrument, as well as the detection of temporal patterns in the transcribed actions. Therefore, despite the concrete and unique nature of each body it is possible to identify certain kinesic and proxemic functions and morphologies that are sufficiently generalised and which are of great interest with respect to teaching.

2.1 Introduction

The different languages used by human beings generate a peculiar system of signs that have their own specific semiotics. This gives these signs their singular nature and offers humans the possibility of a wide range of expression. In this regard, poets are creators of metaphors through which they represent gestures of any kind and the reality that surrounds us. An example of this was beautifully expressed by Virginia Woolf: *My spine is soft like wax near the flame of the candle*. If we treat our gesturality as a form of writing, then the body can be said to reveal itself. As a result, there is much to be uncovered by researchers. Indeed, we experience our cultures not only through discourse, signs and meaning, but also through the movements of

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our bodies. “Ways of behaving, of moving, of gesturing, of interacting with objects, environments, technologies, are all cultural” (Wise 2000: 303).

Bodies are self-sustaining systems (Jordan and Ghin 2006; Streeck and Jordan 2009) and “are naturally ‘semiotic’ in that they are natural representations of their embodied contexts. In a sense, they ‘signify’ the multiscale contexts they embody.” (Streeck and Jordan 2009: 451). We believe that our approach and the findings of this chapter contribute to the work currently being carried out in body communication as a self-sustaining system. As pointed out many years ago by Goffman (1959), the stages on which the body ‘moves’ are always determined by coordinates of space and time, which are responsible for the contextualisation and evolution of our species. From a systemic point of view the body can be regarded as being inscribed upon continuous stages of space and time, on which multiple learning interactions take place in a flow-like manner.

Within these frameworks or stages of action we can distinguish three levels of interaction: With oneself (the inner world), with objects (the inanimate world) and with others (the animated/social world). Hence we are concerned with the capacity to act rather than to re-act, in other words, the ability to interact. This reality attributes to the body a singular nature amidst the multiplicity of ‘images’ that make up the universe in which we live, and each one of these three levels of interaction shapes a different concept of the body, namely: an identified body (with itself), an extended body (by means of objects and technology) and an objectified body (in relation to others).

Each of these forms of bodily existence is directly related to various dimensions set out in systemic approaches such as the organismic system theory of Ludwig von Bertalanffy (1969). These dimensions are, respectively, the *introjection*, the *extension* and the *projection*, and they characterise the intelligent human system that is capable of generating multiple and singular modes of *symbolisation* and *codification*, this being the origin of language and the different forms of human communication.

2.1.1 *Introjection, Extension and Projection of the Teaching Discourse*

In order to illustrate the *introjection dimension*, the phenomenology of the body from Merleau-Ponty (1962) to Michel Foucault (1982) helps us to avoid a restrictive view of introjection. Hence, this dimension can be contemplated in a wider sense, ranging from Merleau-Ponty (1962) concept of the lived body (*corps vécu*) to Foucault (1982) notion of the body as the product of cultural practices. The former alludes to the perceptual potential of the body and its capacity for action that enables it to open itself to the external world, whereas the latter alludes to the fact that the body is shaped by the various bodily constructions that to use the language of the computer age format it. The former notion is pre-conceptual and pre-cultural, and allows the body to be referred to in the first person, this being consistent with the use of reflexive

62 verbs such as 'to recognise oneself'. By contrast, the latter is conceptual and cultural,
63 and allows the body to be referred to in the third person, which, as we shall see, is
64 an aspect that is directly related to the projection dimension.

65 In the kinesic communication of the body this aspect can be witnessed on a daily
66 basis in the morphology of gestures, and each society, each professional group and,
67 therefore, each individual teacher will produce a particular set of gestures (Poizzer-
68 Ardenghi and Roth 2008). As such, the body acts like a crucible, a site in which
69 cultural constructions are filtered and a communicative language (both kinesic and
70 proxemic) is developed that both reflects these constructions and influences every
71 process of teaching and learning.

72 To illustrate the *extension dimension* of the body, Merleau-Ponty (1962) described
73 how the world of objects (which also includes technology) is incorporated into our
74 bodies. He does this by means of two examples: That of a blind man's cane, through
75 which his body can be extended and which, to a certain extent, becomes part of his
76 body, and secondly, that of a woman's feathered hat, which also extends her body
77 but without having to be manipulated as in the case of the walking cane. These are
78 quasi-extensions of the body that show how the material nature of technology and
79 the tactile aspect of our sensoriality underlie the human body's great potential for
80 extension in the social and three-dimensional world (Goldin-Meadow 2003).

81 In the body's kinesic communication, this extension is made possible through the
82 adaptive gestures that the teacher makes when coming into contact with objects or,
83 at times, the bodies of other people. However, given that they are produced uncon-
84 sciously these adaptive gestures are usually a form of extra communication, whereas
85 the real power of extending our communication this ways comes, paradoxically, from
86 gestures that do not require any kind of object, i.e. deictic gestures that have their
87 origins in the primordial gesture of those hominids who first used their hand for
88 indicative purposes.

89 In order to illustrate the idea of the *projection dimension*, Heidegger (1982) uses
90 classical phenomenology to show how the use of objects allows humans to project
91 themselves into their work practices. This, therefore, provides an interesting way of
92 illustrating this idea in crescendo, which goes from the introjection to the projection
93 dimension as the projection aspect entails interpersonal relationships creation.

94 As regards the objectified body, Sartre, in *Being and Nothingness*, considered
95 the power of the gaze that gives rise to the conflict between seeing and being seen
96 by an eye that objectifies interpersonal relationships. However, more than just a
97 conflict we regard this as a positive tension, since the negentropy in human relations
98 is achieved by establishing (and simultaneously regulating) the tensions between
99 opposing aspects. Becoming an object in the gaze of the other is one such aspect,
100 as discussed by Marcel in *Being and Having*, where he highlights the mutually
101 participative nature of this objectification in human relationships. Here, it should
102 not be forgotten that teacher and pupil are also two bodies that, in every context of
103 face-to-face teaching, repeatedly observe each other.

104 **2.1.2 The Non-linearity of Human Movement**

105 The body is what one sees, yet human movement vanishes in our everyday perception.
 106 Increasingly we need to understand how the geometry of our bodies is radiated and
 107 expressed in relation to others in any act of communication, including academic
 108 teaching practices. Speech can be viewed as the style of a given individual, in line
 109 with the idea of Italo Calvino (1974) when he said that signs create a language but not
 110 the language we know. Each language has its specific form of expression that allows
 111 an exhaustive taxonomy to be established, but above and beyond any taxonomy,
 112 languages coexist and become interwoven in a highly complex game. The text of the
 113 body has never been linear in the sequential sense. Its gestural kinesics and proxemics,
 114 or the use of space, all constitute constraints emerging in the majority of contexts.

115 Spoken language is usually imbued with a ‘tone’ that is embedded in a form of
 116 expressivity that transcends the verbal sphere, in line with what neurologists such as
 117 Oliver Sacks have discussed in their writings. This expressivity is spontaneous and, as
 118 such, cannot be easily faked in the way that words can be. As *Homo loquens*, human
 119 beings are able to specify what we could call the hidden meaning of words. “One can
 120 lie with the mouth”, Nietzsche (1954) writes, “but with the accompanying grimace
 121 one nevertheless tells the truth”. When the language used is derived from corporality
 122 and is also the object of study, one is faced with the paradox of understanding
 123 corporality as the *language of silence*.

124 Discourse is transformed into a series of movements within language in such a
 125 way as to give it meaning, and hence the body is revealed as a piece of writing. In
 126 this context, one must consider the semiotics of the body (Streeck and Jordan 2009;
 127 Lemke 2000), that of the *res extensa*, often translated as ‘corporeal substance’ by
 128 Descartes and whose textuality paves the way for the interpretations made by the
 129 reader who observes human movement. Following Foucault (1982) this provides a
 130 new and living *episteme* for semiotics that, for human movement, is enormously rich
 131 and communicative and, as such, revealing.

132 **2.1.3 Paraverbal Communication and Body Language**

133 Some literature reviews are organised around conceptual and methodological
 134 approaches used in the study and applications of non-verbal behaviour (Wolfgang
 135 1997). At any rate we think that it is important to clarify an aspect related to non-
 136 verbal and paraverbal concepts. In our view the use of the negative prefix implies that
 137 the terms ‘verbal’ and ‘non-verbal’ should be understood as being mutually exclu-
 138 sive, when in fact they refer to two forms of communication that go hand in hand with
 139 one another. Indeed, we experience our culture not only through discourse, signs and
 140 meaning, but also through the movements of our bodies. Paraverbal teaching style
 141 refers to the ways in which a teacher conveys his or her educational discourse, and
 142 this is why it is sometimes associated with the idea of expressive movement (Gallaher

143 1992). De Vries et al. (2009) also define communicative style as the characteristic
144 way a person sends verbal, paraverbal, and non-verbal signals in social interactions.

145 According to Gadamer (1980) good understanding lays not so much in listen-
146 ing to things said by others, but rather listening to ourselves in relation to others,
147 and the same applies to the processes of seeing ourselves and being seen in rela-
148 tion to our body language. Thus, paraverbal communication is subject to certain
149 social norms regarding gestural configurations (Roth 2001), both kinesic (Birdwhis-
150 tell 1970; Kendon 1993) and proxemic (Hall 1968), which cannot exist outside the
151 ethno-aesthetics of a given historical moment. In this context, kinesics is the study of
152 patterns in gesture and posture that are used with or without communicative meaning,
153 while proxemics is the study of how we use space in academic teaching practices.

154 These dimensions can appear simultaneously or concurrently, functioning in an
155 integrated and systemic way. If communication is to be effective, it is necessary to
156 ensure that all the paraverbal dimensions are congruent, i.e. that they seek to transmit
157 the same message, strengthening, confirming and heightening it in accordance with
158 the educational circumstances (Jones and LeBaron 2002). The present study focuses
159 on the paraverbal dimensions of proxemics and kinesics, and below be provide a
160 more detailed conceptual description of both of these.

161 **2.1.4 From Kine to Gesture**

162 At this point it seems relevant to clarify a conceptual aspect that continues to be
163 overlooked in the area of kinesic language based on human motor behaviour. Firstly,
164 it is necessary to distinguish between kine, posture, gesture and attitude associated
165 with the body (Castañer et al. 2010, 2016). Kine is the basic unit of movement,
166 comparable to the phoneme of verbal language; body posture denotes the static
167 nature of the body relative the position of its various osteoarticular and muscular
168 parts, body gesture refers to the dynamic nature of the body, without forgetting
169 that each gesture is comprised of multiple micro-postures; and body attitude is the
170 meaning that each social group gives to the emotional and expressive ways of using
171 postures and gestures.

172 The diverse, and at the same time, bilateral structure of our corporeity allows us to
173 generate bodily postures (dynamism), gestures (dynamism) and attitudes (meaning)
174 (Castañer et al. 2012) in a simultaneous way and also “gestures are often subsequently
175 replaced by an increasing reliance upon the verbal mode of communications” (Roth
176 and Lawless 2002: 285). Despite the concrete and singular nature of each body it is
177 possible to identify certain kinetic and proxemic functions and morphologies that are
178 sufficiently generalised, and which are of great relevance to the process of teaching
179 in the academic context, this being the aim of our research line. On the basis of
180 this initial clarification, gesture can be regarded as the basic unit of meaning for
181 constructing the paraverbal kinesic observational system. Consider the chart shown
182 in Fig. 2.1.

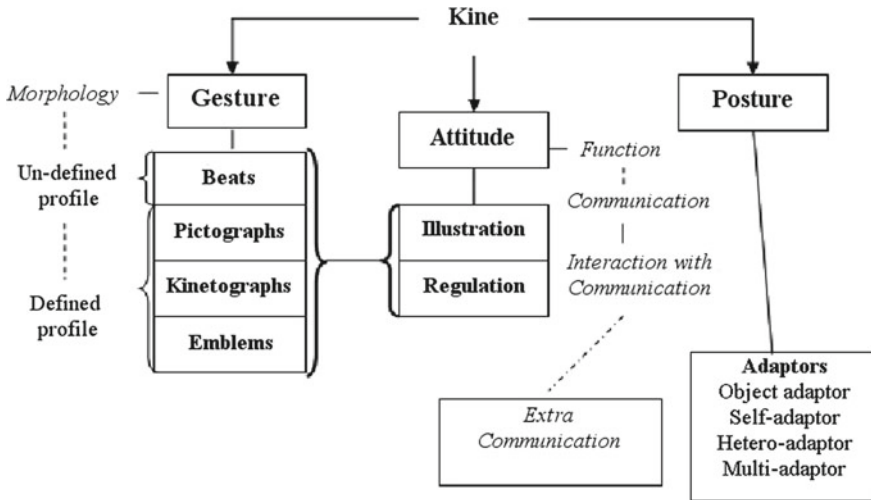


Fig. 2.1 Relationship between the morphology and function of kinesic gestures

183 As regards the *morphology* of the categories (see Fig. 2.1) we will define a con-
 184 tinuum that encompasses: gestures that offer a highly-defined profile and which are
 185 clearly observable by the recipient and gestures with a less well-defined and weaker
 186 profile.

187 A clear example of those kine that offer a well-defined gesture profile, are the
 188 emblem gestures (Ekman 1985). With regard to their *functionality* we establish a
 189 continuum that encompasses: Gestures with a purely communicative purpose, ges-
 190 tures whose purpose is communication with interaction and extra-communicative
 191 gestures, i.e. those without any explicit interactive or communicative purpose.

192 It should be mentioned that the structure presented is clear enough for carrying
 193 out empirical research of the kind proposed herein, not least because it is based
 194 on a long scientific tradition. For example, Wiener et al. (1972) made a distinction
 195 between gestures that have a communicative function and those that do not. This
 196 distinction has certain relevance in our present study. In their paper Wiener et al.
 197 argued that communicative gestures comprise those of a *pantomimic* kind (highly
 198 stylised and defined improvised movements that represent an object or an event),
 199 and the majority of gestures that *accompany words* in their semantic itinerary in
 200 order to reinforce the relationship between sender and receiver. Furthermore, they
 201 note that kinesic movements of the adaptor kind do not have a communicative func-
 202 tion. As for functional description there are other proposals such as that of Cosnier
 203 and Brossard (1984), who characterised six types of movement: *Quasi-linguistic*
 204 (equivalent to the emblems of Ekman and Friesen (1969), *expressive*, *regulatory*
 205 (organisation of social interaction), *co-verbal* (everything that can be considered as
 206 an illustrative gesture), *meta-communicative*, and *extra-communicative* (changes in
 207 posture, self-manipulation, object manipulation). Efron (1972) identified two kinds
 208 of gestures that were clearly linked to the expository process: Beats, which accom-

209 pany the melodic aspects and rhythm of language, and *ideographs*, whose function is
210 to describe everything that appears in thought. Subsequent research, mainly the result
211 of earlier work by Ekman and Friesen (1969) and Kendon (1969), was founded on the
212 triple functionality of kinesic gestures that is given by their *origin* (innate, natural or
213 cultural), their *coding* (arbitrary, iconic or intrinsic) and their *use*. These authors also
214 distinguished, among other categories, between illustrative and regulatory gestures.
215 Thus, the ongoing research of investigators such as Kendon (1993) in this area has
216 explored further the kinesic repertory and offers a description of different types of
217 gestures (deictic, beats, iconic and metaphoric), because body gestures are always
218 an integral component of language (McNeill 2005).

219 Although the adequate use of any source of illustration can foster learning, it is
220 worth noting the conclusion reached by a recent study about the effect of illustrations
221 in arithmetic problem-solving: "The results show that illustrations can have a detri-
222 mental effect on performance in arithmetic word problems, produced by irrelevant,
223 redundant or interacting sources of information" (Berends and van Lieshout 2009:
224 345). Paraverbal behaviour is largely unconscious and needs to be made conscious in
225 order to optimise it. The proximity between teachers and students can be perceived
226 by means of gaze, gestures and spatial location, all of which have an affective com-
227 ponent and which can influence the intrinsic motivation felt toward the material and
228 the educational setting (Rodriguez et al. 1996). As such it is feasible to achieve more
229 effective paraverbal communication in accordance with the objectives being sought.

230 An intrinsic part of all teaching activity is a constant communicational flow, in
231 which the spontaneous nature of communication is considered to be a habitual fea-
232 ture; Buck and VanLear (2002) even went as far as to define this as non-intentional
233 communication. The observation of students' reactions may thus be useful for opti-
234 mising this communication (Moore 1996). As such, there is good cause why com-
235 munication is regarded as an indicator of the communicator's emotional, as well as
236 symbolic experiences (Le Poire and Yoshimura 1999). Symbolic communication is
237 intentional communication that uses learned, socially-shared signal systems of propo-
238 sitional information transmitted via symbols. Furthermore, it should also be added
239 that "gestures support the development of verbal modes by decreasing the mental
240 effort required for producing communication" (Roth 2004: 2). Thus, observational
241 methodology is used due to the habitual nature of teachers' behaviour and the fact that
242 the context is a naturalistic one. The flexibility and rigour of this methodology makes
243 it fully consistent with the characteristics of the study and it has become a standard
244 approach in observational research, especially in the area of kinesic and paraverbal
245 communication (Izquierdo and Anguera 2001; Castañer et al. 2013, 2016).

2.2 Methods

2.2.1 Pattern Analysis and the Systemic Approach

In order to improve the scenarios to be managed in academic teaching practices, it is important to identify the essential aspects of communication such as gestures, voice quality and the use of teaching time and space which are associated with the teaching discourse. In this regard, it is clear that one of the keys in optimising academic teaching practices lies in paying close attention to how communicative and teaching styles are reworked over time. Through the detection of temporal patterns (T-patterns) we can observe and analyse all these pedagogical constraints, and this rigorous analytic procedure provides a holistic point of view that is consistent with the systemic approach taken so far. T-patterns can be detected and analysed with the *Theme v.5* software (Magnusson 1996, 2000, 2005). *Theme* not only detects temporal patterns but also indicates the relevance and configuration of recorded events. The approach is based on a sequential and real-time pattern type (T-patterns), which, in conjunction with detection algorithms, can describe and detect behavioural structure in terms of repeated patterns. It has been shown that such patterns, while common in behaviour, are typically invisible to observers, even when assisted by standard statistical and behaviour analysis methods. The T-pattern algorithm is implemented in the specialised software package, *Theme* (see www.patternvision.com and www.noldus.com). *Theme* also displays event frequency charts based on the occurrences of recorded events and the frequency of each category independently of the other categories. The detection of T-patterns has proven to be extraordinarily productive and fruitful for the study of the multiple facets or types of body movement (Sakaguchi et al. 2005), as well as for non-verbal communication (Blanchet et al. 2005; Haynal-Reymond et al. 2005; Castañer et al. 2013, 2016), sport (Borrie 2001; Borrie et al. 2002; Bloomfield et al. 2005; Jonsson et al. 2006) and motor skills (Castañer et al. 2018, 2009a, b; Casarrubea et al. 2018).

Our main line of research is based on observational methodology with the aim of identifying the kinesic and proxemic patterns used in discourse that are not strictly verbal. Our intention is not to explore in depth the hidden dimensions of academic discourse, but rather to study what is directly observable from an objective point of view.

2.2.2 Participants

We recorded classroom-based lessons on various subjects and taught by three experienced teachers offering pre-university courses. A total of twelve sessions (four lessons taught by each teacher) were analysed. Although, in this study, we obtained various data about the communicative style of each teacher, we were, in fact, only focused on identifying the overall communicative style of the teachers.

284 2.2.3 Instruments

285 The observation tool used was SOCOP, which allows the different levels of kinesic
 286 and proxemic response to be systematically observed. Kinesic responses were
 287 recorded by means of the Sub-system for the Observation of Kinesic Gestures
 288 (SOCIN; see Table 2.1), while proxemic gestures were recorded via the Sub-system
 289 for the Observation of Proxemics (SOPROX; see Table 2.2). Both sub-systems were
 290 successfully used in a previous study of observing the behaviour of teachers inter-
 291 acting with their students (Castañer et al. 2010, 2012, 2013, 2016).

292 We think that this tool offers greater applicability and flexibility than do other
 293 existing tools which, in our view, are hindered by a degree of analysis that is too
 294 complex; for example, the kinesic analyses of Birdwhistell (1970) in the field of
 295 non-verbal human communication, or the notation systems of Laban and Ullman
 296 (1988) provide a considerable amount of information but they are very difficult to
 297 use in many natural contexts where communicative teaching might be observed.

298 The SOCIN tool, for kinesic actions, according to the theoretical framework we
 299 have made above, is based on four variables (morphology, function, adaptor and situ-
 300 ation). Similarly, the SOPROX tool, for proxemic actions, is based on five variables
 301 (group, topology, location, orientation and transition). Observational methodology
 302 requires a clear and exhaustive definition of each of the categories included in the
 303 observation system or field format. Each of the criterion, categories and codes that
 304 form part of the SOCIN (Table 2.1) and SOPROX (Table 2.2) tools are defined below.

305 2.2.4 Materials and Procedure

306 The recording tool used to codify SOCOP was the LINCE program (Gabin et al.
 307 2012), which was constructed as a software package that automates the functions of
 308 the design of observational systems, video recording, the calculation of data quality
 309 and the presentation of results which can be exported in various formats, those of
 310 THEME, GSEQ, EXCEL and SAS. Sessions are digitised to make them available
 311 for frame-to-frame analysis and enable them to be coded in the LINCE program
 312 (Fig. 2.2). In all our sessions the behaviour of teachers is always observed continu-
 313 ously. The procedure was in line with APA ethics and was approved by the university
 314 departments involved. The project did not involve any experiments or manipulation
 315 of subjects. The results are based on data obtained from recordings of classroom ses-
 316 sions, but in line with the Belmont Report (National Commission for the Protection
 317 of Human Subjects of Biomedical and Behavioral Research, 1979) in order to assure
 318 that the subjects' rights have been respected. As such, the photo images shown in this
 319 chapter were created for the express purpose of illustration, not representing original
 320 persons.

AQ2

2.3 Results and Discussion

As regards the criteria defined by the SOCOP observation tool the results allow us to highlight a series of trends in both kinesic and proxemic communication, and also combinations of the two. The *Theme* program derived T-patterns (temporal patterns) that reveal the trends in kinesic and proxemic paraverbal communication from an ideographic perspective. As an example, let us consider a T-pattern that is of interest for to the generation of paraverbal communicative responses. Figure 2.3 shows the most complex T-pattern discovered from all the observational data files we have so far.

The *Function criterion* reveals that most teachers use the regulatory function 30% of the time, the remaining 70% corresponding to the illustrative function; in other words, actions that do not require an immediate response such as explaining or providing information account for the largest proportion of time less for regulatory actions, the latter expecting an interaction or response such as asking questions, giving orders and offering help.

Table 2.1 SOCIN: System of Observation for Kinesic Communication. (Castañer et al. 2013)

Dimension	Analytical categorization	Code	Description
Function It refers to the intention of the spoken discourse that the gesture accompanies	Regulatory	RE	Action by the teacher whose objective is to obtain an immediate response from recipients. It comprises imperative, interrogative, and instructive phrases with the seek of exemplifying, giving orders or formulating questions and answers
	Illustrative	IL	Action that does not aim to obtain an immediate response from the recipients (although possibly at some future point). It comprises narrative, descriptive and expository phrases with the aim of getting receivers to listen
Morphology It refers to the iconic and biomechanical form of gestures	Emblem	EMB	Gesture with its own pre-established iconic meaning
	Deictic	DEI	Gesture that indicates or points at people, places or objects
	Pictographic	PIC	Gesture that draws figures or forms in space

(continued)

Table 2.1 (continued)

Dimension	Analytical categorization	Code	Description
	Kinetographic	KIN	Gesture that draws actions or movements in space
	Beats	BEA	Iconically undefined gesture used exclusively by the sender and which usually only accompanies the logic of spoken discourse
Situational It 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
Adaptation It refers to gestures without communicative intentionality in which the teacher makes contact with different parts of their body, or with objects or other people	Object adaptor	OBJ	When the teacher maintains contact with objects but without any communicative purpose
	Self-adaptor	SA	When the teacher maintains contact with other parts of their 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 2.2 SOPROX: system of observation for proxemic communication. (Castañer et al. 2013)

Dimension	Analytical categorization	Code	Description
Group It 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
	Dyad:	DYA	When the teacher speaks to a single student
Topology It refers to the spatial location of the teacher in the classroom	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 It 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 It 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

(continued)

Table 2.2 (continued)

Dimension	Analytical categorization	Code	Description
	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 It 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

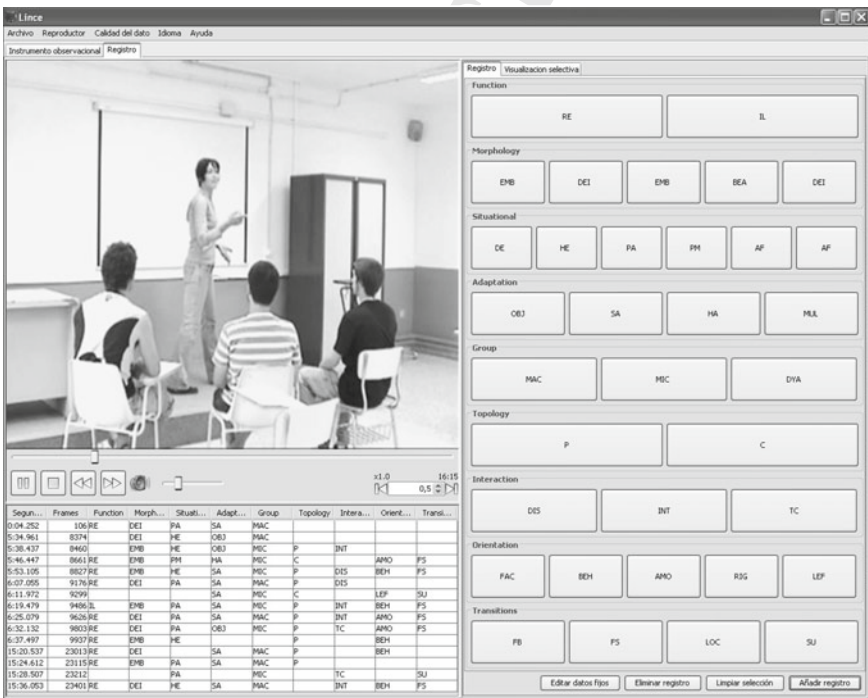


Fig. 2.2 Screen capture of LINCCE. (Gabin et al. 2012)

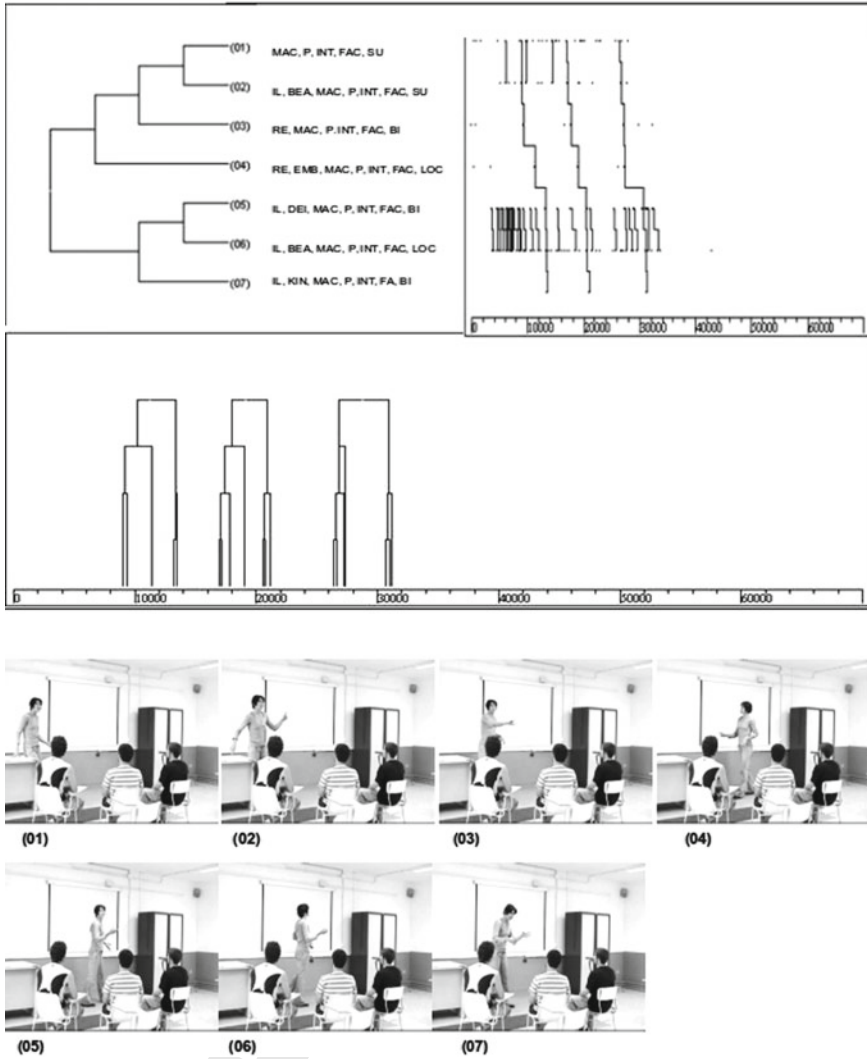


Fig. 2.3 (Continued)

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◀ **Fig. 2.3** This given T-pattern is one of the most complex of those detected. It consists of six levels and a sequence of seven events, each one of which is composed of a complex combination of codes (combinations formed by between five and seven codes), occurring on three occasions during the observation period with the same sequence of events and significantly similar time intervals between each event occurrences. The interpretation that can be derived from the seven steps of this T-pattern sequence can be described step by step as follows: (01) The teacher interacts with the whole group/class, she is located at the periphery of the classroom (P) and facing the group (FAC) with her body position supported by a table or chair (SU); she displays an integrative (IN) attitude, participating in the activity being carried out by the students. (02) Next, the teacher offers an explanation using the illustrative function (IL), making gestures in the form of beats (BEA) and maintaining her orientation with respect to the group, as well as the spatial location described in (01). (03) She continues to maintain this orientation, her position shifts from fixed bipedal (BI) and she ceases to illustrate in order to make a self-adaptor gesture. (04) She goes on facing the whole class and at the periphery, but ceases to remain still in a bipedal position and begins to move around (LOC), without speaking, although she does make use of an emblem gesture (EMB) with a regulatory function (RE). (05) She returns to a combination (02), but this time in a fixed bipedal position and uses deictic gesture (DEI), and in (06) she maintains this but then shifts to locomotion (LOC). (07) She returns to a combination (05), but this time, instead of deictic gestures (DEI) she uses a kinetographic gesture (KIN) that displays a given action of movement in space. The duality formed by (05) and (06) was found to be very frequent. In fact, these two combinations have identical codes, although referring to alternating bipedal positions (FB) of the teacher with periods of movement (LOC)

336 Concerning the combination of the criteria *Morphology* and *Function* of gestures
 337 it can be seen that emblems, deictic forms, pictographs, kinetographs and beats are
 338 used without distinction in order to convey each function, whether it be regulatory
 339 or illustrative; however, gestures that are less well-defined in terms of morphology,
 340 such as beats, are more likely to accompany the illustrative function, whereas most
 341 emblems and deictic forms, both of which are gestures with a well-defined morphol-
 342 ogy, tend to accompany more the regulatory function. In our view the *Adaptation*
 343 criterion is of less interest to us as it refers to extra communicative aspects associated
 344 with unconscious contact gestures made by the sender shown by their high frequency.

345 As for the *Transitions* criterion, fixed bipedal postures are usually alternated with
 346 periods of locomotion as the teacher moves from one area of the classroom to another.
 347 Occasionally one can observe support postures, generally in conjunction with tables
 348 or chairs, but when posture is static in the seated position this tends to be maintained
 349 for some time.

350 Concerning the relationship between the *Function* and *Transitions* criteria the
 351 results suggest a common association between the regulatory function and static
 352 bipedal postures, whereas the illustrative function is combined with locomotion or
 353 movement around the classroom. It appears that when giving an illustration, which
 354 does not require a gesture of interaction, the teacher feels freer to move around. In
 355 contrast, the regulatory function, which does call for gestures indicating interaction
 356 seems to require greater concentration on the part of a teachers and leads them to
 357 fix their posture and thus focus their vision on a single point while asking questions,
 358 making comments or giving orders.

359 With the *Orientation* criterion the predominant position tends to be facing the
 360 group. Teachers rarely take up a position behind the group. The *Group* criterion
 361 tells us that interaction mostly occurs with the whole group, followed by that with
 362 micro-groups and, occasionally, with dyads.

363 2.4 Conclusion

364 In this chapter, our purpose was to describe how a systemic approach can be merged
 365 with the empirical detection of behaviour patterns by means a systematic method-
 366 ology and its utility of observing pedagogic communication. As regards the verbal
 367 and paraverbal communication of teachers the introjection, extension and projection
 368 dimensions of the systemic approach presented are reflected in the communicative
 369 style of each individual teacher. More specifically, it can be seen in how he or she
 370 uses the functions of illustration and regulation, as well as in the meanings of the
 371 kinesic and proxemic repertoires that are employed.

372 Various interlinked body gestures may convey the idea of a short sentence, but they
 373 do not have the scope achieved by, for example, the language developed specifically
 374 for deaf people. In this regard, mime, as the art of body language, does seek to produce
 375 a sentence, whereas interpersonal or pedagogic communication does not always do
 376 so. However, this should not be taken to mean that there is no grammaticality in
 377 body language; rather, the highly malleable nature of body language means that
 378 it is circumscribed in a diversity of human communication, including pedagogic
 379 contexts, with which it acquires different levels of meaning as a self-sustaining system
 380 (Jordan and Ghin 2006; Streeck and Jordan 2009). Hence, the fact that the embodied
 381 contexts associated with human communication require further analysis underlines
 382 the importance of paraverbal communication in teaching enhancing the predominant
 383 linear and figurative narrative, thus fostering a sort of kaleidoscopic patterns. We
 384 firmly believed that the temporal patterns we have detected can successfully optimise
 385 teacher discourse.

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Chapter 2

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