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Daniel Bosmans¹

Haute Ecole Pédagogique Bejune²

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¹Lecturer in English Didactics & Researcher in Semiology of Educational Activity and Language Pedagogy

²Chemin de la Ciblerie 45, 2503 Bienne, Switzerland



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Daniel Bosmans¹, Haute Ecole Pédagogique Bejune²

¹Lecturer in English Didactics & Researcher in Semiology of Educational Activity and Language Pedagogy

²Chemin de la Ciblerie 45, 2503 Bienne, Switzerland

Email :daniel.bosmans@hep-bejune.ch

ABSTRACT

This project focuses on self-regulated learning in early primary education. The aim is to identify the teacher's gestures of support for self-regulated learning to happen and it is the continuation of preliminary work on the forms of creative collaboration between pupils and on the support of a reflective activity in class by the teacher. The project was carried out through a collaborative research methodology, in partnership with primary schools in Switzerland and in the United Kingdom. Several research sessions were conducted with teachers and the school administration to identify the educational objectives of each lesson. The participants were children aged 7 to 9 years old being taught in three flexible classes and were followed through lesson observations and group interviews of teachers with the researchers over 18 months, yielding data which was analyzed through pre-determined themes. The practical objectives were to develop flexible pedagogical scenarios for the development of transversal competencies in the disciplinary fields of a primary school curriculum. These scenarios will subsequently be reported on in a professional journal. On a more theoretical perspective, the present study offers a better understanding of the professional teacher's gestures, resulting in a very useful taxonomy, with repercussions for the initial training and continuing education of primary school teachers.

Keywords:Teacher's professional gestures, self-regulated learning, collaboration, reflection, communication, primary school

INTRODUCTION

A teacher's professional gestures can arise from their questions about their actions, their relationship with their students, their search for meaning, their dialogue in class and their investment based on definite values (Jorro, 1998). A teacher's gestures can be considered as a gesture of support, advice or accompaniment (Jorro, 2002). Preliminary observations made by Giglio (2015, 2016a, 2016b) of several interactions between children and the teacher, and between children show that a collaborative activity in class requires support with very distinct teacher professional gestures. Studies on gestures supporting the development of collaboration, communication and reflection during self-regulated learning in the classroom are few and need extending.

The scope of this project is to understand better the gestures by which a teacher can promote self-regulated learning in the primary school classroom, highlighting the communicative, collaborative or reflective nature of children's actions in class as well as the support and professional gestures of the teacher. The study takes into account some particularly acute tensions in self-regulated learning amongst learners. In addition, our research will be enhanced through the exploration of the way the teacher can mobilize the performance of tasks without interrupting their communicative, collaborative and reflective dynamics in children. How do they ensure the progressive autonomy of each group of children? How do they organize the flexible classroom environment? How do they introduce children to learning in a group situation?

The teacher's Gestures to Support Self-Regulated Learning

One of the contradictions facing the teacher, in the sense that Engeström (1987) gives to the term, is on the one hand, the aim to develop autonomy in their learners and, on the other hand, the almost overwhelming urge to intervene in order to help children to complete a task or an activity. This contradiction does not have to be a dichotomous one but can easily sit on a continuum of teachers' professional gestures carried out to support self-regulated learning at different times during the activity. Giglio (2016a) identifies a series of teacher's gestures which foster positive conditions for the development of creativity within a collaborative task between children. During this type of collaborative activity, the teacher's role can no longer be limited to the transmission of knowledge but they now take on a role of accompaniment and facilitation. The interdependence of self-regulated

learning with collaboration, communication, and reflection become fundamental in the setting up and the completion of each step of the activity.

Previous studies conducted by Perret-Clermont and Giglio (2009) and Giglio and Perret-Clermont (2011a) show that in order to help children to acquire the ability to collaborate creatively with others, the teacher must master the few professional gestures that are essential to aid children in their various roles as leaders, collaborators and learners when engaging in self-regulated learning group activities. We will describe in our findings what types of interactions between teacher and children are essential to promote certain self-regulated learning strategies to complete activities in groups (Lubart, 2010). Some of the teacher gestures presented in the present study are identical to those found by Giglio (2016a, Table 8.2, p. 148) but three more have been added to delineate more precisely what the teacher does when undertaking to scaffold a collaborative, communicative, and reflective activity.

Even before the teacher starts to scaffold learning during the activity, other gestures are needed in order to organise and set up the group endeavour itself. According to several authors (Littleton & Light, 1999; Perret-Clermont, Pontecorvo, Resnick & Zittoun, 2004; Schwarz, Perret-Clermont, Trognon & Marro Clément, 2008; Littleton & Howe, 2010; Howe, 2010), it is fundamental to create the right circumstances for interactions between children to emerge, interactions which will provide evidence that collaboration, communication and reflection in self-regulated learning is happening. From the point of view of Vygotsky (1925/1971; 1931/1994), young children can hardly teach themselves, whilst teachers can engage their learners in this type of collaborative activities and support them in developing autonomous learning. Indeed, it would be hard to believe that a child can learn as an individual in order to complete a collaborative activity without sharing their ideas with their mates, without communicating them and without socializing the objects created, i.e., the planned outcome of the task (Bruner, 1996).

In fact, the different moments of these group interactions can all be identified and this categorization has been started by Giglio (2016a). Collaboration requires from children a series of moments to distribute the tasks amongst themselves, to focus on individual work, to manage ideas with either agreements or conflicts, to focus on the reading, writing or speaking work during the activity, as well as the sharing of techniques, knowledge or enjoyment (see Giglio, 2016a, table 8.1, p. 138). For Bucheton and Soulé (2009), scaffolding is a central teaching action in an activity co-constructed by both teacher and children. These various forms of help that the teacher gives to children to support each one of their steps, their thinking, and their understanding are essential, but the teacher should have as a goal to step back as soon as the child is starting to become autonomous in these procedures. From a didactic perspective, the child should acquire knowledge going from a form of adult dependence to quasi-complete independence and autonomy (Sensévy, 2008), going back to our idea of a continuum rather than a dichotomy.

Autonomy or Self-Regulated Learning

Autonomous or self-regulated learning is an essential concept to consider as early as during primary school years, as Fleisher (2009, p.1) puts it: 'learning is enhanced as students become in charge of their learning by being supported in autonomy as well as the development of academic competencies'. The phrase 'being supported in autonomy' indicates that self-regulated learning does not mean 'no teaching' but a different kind of teaching and teacher's gestures, which are identified and itemized more fully in the present study.

Self-regulated learning is an intricate process which incorporates metacognitive, cognitive and affective variables. It has produced a robust body of literature over the past 20 years but these pieces of research include a lot of similar features (Zeidner, Boekarts, & Pintrich, 2000). Pintrich (2000, p. 453), a leading figure in the field of self-regulated learning, defines it as 'an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment'. Acknowledging the variety of definitions in the literature, Pintrich and De Groot found three main components in self-regulated learning:

First, self-regulated learning includes students' *metacognitive strategies* for planning, monitoring, and modifying their cognition [...]. Students' *management and control* of their effort on classroom academic tasks has been proposed as another important component [...]. A third important aspect of self-regulated learning that some researchers have included in their conceptualization is the actual *cognitive strategies* that students use to learn, remember, and understand the material. (1990, p.33, *our italics*)

They add, though, that cognitive and metacognitive elements are not enough to explain learners' engagement and ultimate achievement. Motivation has to be taken into the equation and they further unpack this affective element into three components, expectancy, value and emotional reactions to the task. It is indeed essential to look at affect in general and motivation in particular, in relation to self-regulated learning as Cleary and Zimmerman (2004) found that adolescents need to feel autonomous but teachers do not seem to provide them with enough opportunities to try out self-regulated activities resulting in a lot of frustration and demotivation. Admittedly, we are dealing with younger children in the present study but the lack of auto-motivation and 'teacher motivating talk' in our findings show that this is not sufficiently addressed by teachers in the primary sector either.

Zimmerman and Campillo's model (2003) used to analyze data in the present study incorporates all three cognitive and motivational components identified by Pintrich and De Groot (1990) but they listed them more practically and in a temporal fashion in relation to the various activity phases. Zimmerman (2002, p. 64) tells us that few teachers currently prepare students to learn on their own. Almost 20 years on and flipped classrooms and flexible learning environments have addressed this problem but there is still a long way to go, and here comes yet another rationale for promoting autonomous learning. Classrooms are getting increasingly populated with children with very spiky profiles, as a result of immigration or due to increasingly diagnosed special learning needs. He makes the point that it is up to teachers to be aware of children's strengths and limitations but it would be more useful for children themselves to be mindful of those, to become self-aware of their differences and to learn how to develop the capability to self-regulate. This will prepare them for the world of work where a lot of skills have to be learned informally, as Zimmerman (2002, p. 66) contends that 'self-regulation is important because a major function of education is the development of lifelong learning skills.' Moreover, Zimmerman (2002, p.69) states that 'recent research shows that self-regulated processes are teachable and can lead to increases in students' motivation and achievement'. Children achieving their grades and enjoying the process is certainly the best justification for promoting self-regulated learning which will set them right for the future. This leads us to the research question for the present study:

How can teachers support self-regulated learning in primary schools?

This question can be more clearly unpacked through three further questions as follows:

1. How is self-regulated learning perceived by teachers?
2. How much should a teacher intervene in an activity deemed to be autonomous?
3. How can the teacher's professional support gestures be categorized?

The data gathered to address these questions was yielded through a collaborative methodology described next.

METHODOLOGY

Research Design

The underlying ontology for the present study can be described as a 'transformative ontology of collaborative praxis' (Stetsenko, 2016, p. 174) where 'people collaboratively and purposefully transform their world' (p. 173) changing themselves and their world by their own transformative practices in different educational contexts and activities. This leads us on to a post-constructivist epistemological position taken here for two reasons. Lémonie and Grosstephan (2021) explain that Engeström's work on Expansive Learning (1987) shows participants creating a new culture and developing themselves as individuals, but not only. They share in societal and cultural development, going thus further than what constructivism gives us. The participant contributes in the building of an instrument which will determine the way they perform their own activities.

The present research is carried out at every stage with the teachers, but not only. The participants and activities are seen through children's eyes when their iPad films show their own selection of what ought to be observed. This type of collaboration between teachers, teacher-trainers, researchers and school children themselves is the methodological cornerstone on which this project, loosely inspired by Engeström's change laboratories (CL) and firmly underpinned by his Expansive Learning model (1987). It matches closely our epistemological position, as Sannino et al. (2016) describe it as a process of learning what is not yet there. We thus arrive at a new educational proposition by analysing newly created situations which, in turn, get refined, consolidated and tried out. In this project, each successive observed session was co-analysed with the teachers involved, with a new and sharpened focus for subsequent lessons. This iterative process thus enabled us to establish a precise taxonomy of the teacher's gestures when supporting autonomous learning through group activities in the classroom.

This project brings together different methodological approaches. As previously mentioned, a collaborative approach was used to co-construct professional knowledge that engages participating teachers to adopt different postures. We situate these approaches in collaborative research as proposed by Desgagné (1997, 2007) when targeting the research object with the practitioner. For each teacher, participation in this collaborative research can offer them the opportunity for professional development through a continuous learning process (Donnay & Charlier, 2006). Inspired by the "predict, act and observe" methodology developed by Giglio and Perret-Clermont (2012), we used group interviews in self-confrontation of participating teachers to conduct research and development in an iterative process between professional knowledge and professional practice. This methodological approach focuses as much on the description of flexible teaching environments as on the observations of the children's communicative, collaborative or reflective actions in the classroom. The support and teaching gestures emerging when the teacher follows children's activities are looked at particularly with regard to professional gestures of support and accompaniment of self-regulated learning during a collaborative activity between children (Kohler, Boissonnade & Giglio, 2015; Giglio, Boissonnade & Kohler, 2017).

Participants

Along with three filmed classroom lessons, two children were asked to film the activity with a tablet in Switzerland and one child was asked to do the same in the United Kingdom. The two Swiss children received

much more specific instructions from their teacher (who were free to give their instructions as they pleased) but the British child was left to their own devices, with the simple instruction of walking around and filming what they thought was important. This slight difference in data collection instrument made all the difference as discussed in the findings section.

The project sample selected is made up of children from primary schools in two different countries (Cercle scolaire de Val-de-Ruz in the Canton of Neuchâtel, Switzerland and Kings Road Primary School in Old Trafford, United Kingdom) aged between 7 and 9. The three teachers are of course included in the participants but they also took on a role of co-researchers when analyzing the film excerpts.

Data Collection Tools

Three observations (2 in Switzerland and 1 in the UK) of lessons were filmed using a stationary camera on a tripod at the back of the classroom and a lapel microphone for the teacher, as well as about 100 short films by two children on tablets for all lessons being observed. The co-analysis meetings of selected excerpts with the three teachers were also carried out and recorded for each lesson and these were transcribed, analyzed and fed into the taxonomy. Three pedagogical scenarios were then drafted in collaboration with teachers from the UK and trialed by the Swiss teachers, enhancing thus the partnership outlook of this project. These are discussed in the findings below.

Data Analysis

Thematic analyses of the data were carried out by taking up the theoretical aspects of competencies, support, professional gestures and interactions between teachers and children and between children themselves. On three occasions the teachers met in order to observe and analyze the video extracts selected by the researchers, citing the flexible environment and the gestures, and looking at classroom events in relation to

- what was planned
- what could be done next
- what would need to be changed
- what could have been done to better promote self-regulated learning

Pre-established themes stemming from earlier work were chosen, namely work by Giglio (2016a) where a taxonomy of the teacher's gestures was established after having analyzed and catalogued what the teacher did to scaffold a creative activity completed in collaboration with other members of various groups of children.

The second theoretical framework selected for data analysis was the Zimmerman and Campillo's model (2003, please see above in the literature review) showing three phases in the completion of a self-regulated problem-solving activity, each divided into two subphases and further expanded into finer descriptors. The teacher's professional support gestures were then matched to one of the six subphases and labelled with one of the descriptors. A matrix was then drafted to figure out which of Giglio's teacher's gestures (+ three supplementary gestures coming from the data) would occur more often and more logically in each subphase of Zimmerman and Campillo's model.

Findings and Discussion

Various findings on autonomy became salient in the co-analysis carried out with the teachers, particularly around what is meant by autonomy, thus answering our first research sub-question. Our comprehension of what autonomy is and what it is not is therefore a useful point of departure before embarking on the correlation of the various aspects and phases of self-regulated learning to the teacher gestures. For instance, one teacher remarked that 'autonomy is not merely telling them what they need to do and then leaving them to it'. Quite a few decisions have to be made by the teacher, particularly at the setting up stage. Other teachers' comments related to the limiting of possible choices, the plurality of autonomies rather than autonomy, and the progressive building up of autonomy layers. One of the teachers then came to define autonomy as 'to be able to complete a task on your own in a pleasant environment and with clear steps given to the child'. Other factors were deemed to influence the degree of autonomy a child can work in, such as their family environment or educational level with the particular suggestion not to start too early. They added that 'children may not be ready yet, emotionally speaking'. Whatever the issues, autonomy was deemed one of the most important qualities to acquire in a rapidly changing world and the teacher should 'encourage children to invest in interactions as well as the task at hand'.

In order to address our second sub-question, there seems to be a choice to be made between autonomy or self-regulated learning and the completion of the activity. Children were sometimes seen to do something entirely different than engaging in the activity, and this, not only when early finishers had already completed it. A certain amount of flexibility was found important to cater for these children, perhaps letting them choose their next activity and thus carrying on the autonomous theme. Other choices had to be made in terms of the level of difficulty sought for. The more autonomous the teachers wanted the children to become, the simpler the activity or the stimuli had to be.

Dichotomies other than process vs. product were found too. For instance, would the activity be centered around the acquisition of subject knowledge or the practicing of a transversal competency such as creativity, self-reflection or collaboration? It was repeatedly found that one had to be compromised in favor of the other and that is a choice the teacher had to make when setting it up. Other tensions were felt between the demands of the curriculum and what the teacher wanted to do in their classroom, particularly in the UK with the new content-heavy and knowledge-rich national curriculum.

Self-regulated learning had also some drawbacks when children were either taking the lead and leaving the other ones behind or, on the contrary, when children were taking a back seat. The lack of teacher's intervention was found to be a problem when promoting 'total' autonomy as it may have been better for the teacher to address these problems, thus making the activity a little less autonomous. For a child not to be left behind, the teacher had to take on a role of 'ski slope closer' or 'hunt herder' to encourage the inclusion of all group members in the activity, the easy riders as well as the children who preferred to work individually. Follows now findings on how the teacher scaffolded an activity aiming to develop self-regulated learning, helping us to answer our third research sub-question.

Teachers' Gestures

In order to analyze our data, we used themes already identified in Giglio (2016a) which describe teachers' scaffolding gestures during the completion of a creative task, a study centered around the development of creativity (Giglio, 2016a, p.134). The idea was to get children to work on collaboration, communication, and reflection whilst engaging in autonomous learning. The first phase of Zimmerman and Campillo's model is all about communication between children to unpack the activity at hand. The second phase made them work on collaboration, whilst the last phase focused almost entirely on reflection. As well as the development of these skills being embedded in our data collection instrument, these are being explored further in the pedagogical scenarios drafted as a practical application of the present study as can be seen in the *Conclusion* section below.

Although we used pre-determined themes identified in a previous study, it is important to describe what these gestures are in the context of self-regulated learning. Not only our data added three kinds of gestures not identified in earlier studies, but also, richer meaning came out of the films shot in both the Swiss and English classrooms. Follows Table 1 with examples for each of these gestures identified in the data made up of the films and the recordings of the co-analysis sessions held with the teachers.

Table 1: Scaffolding during self-regulated learning: teachers' gestures and further descriptors

Teacher's gestures from Giglio (2016a)	Description in Self-regulated Learning Context
Orienting	Determining objectives with examples Diverting attention from the reference adult (the teacher) Using questions to elicit the right strategies to be chosen Suggesting to think first individually then to share thoughts Keeping some information from the children Redirecting them at regular intervals
Announcing	Warning that no strategies will be given Telling the children that the teacher is their safety net Setting time limits Reminding them to use the timer Introducing more autonomy over time and telling them about it
Engaging	Encouraging peer reformulation of instructions Encouraging the use of imagery to understand task objectives Asking for verbalization of what they are doing at regular intervals Using routines Encouraging reflective practice Promote peer evaluation of proposed solutions
Checking	Checking the children have understood the task Checking that all possibilities have been given Asking for a written trace of their work Asking for an oral report Asking to justify process rather than product
Observing	Gauging the level of support to be given Gauging the amount of control to leave to children Gauging the timing of support to be given Gauging when to keep quiet Applying the aquarium technique, half the class is observing what the other half does

	Using film to encourage self-observation
Indicating	<ul style="list-style-type: none"> Signaling moments when children have to work autonomously Reminding them that they have to find solutions within the group Tell them to start from what the children understand Drawing the children's attention onto the process rather than the product Using gestures to encourage the children to work in groups Reminding them of the time Suggesting to carry on when no consensus has been reached in the group Suggesting that the children set themselves some reminders Encouraging the children to use a reference tool Creating a physical mean of support to help children
Confirming	Reassuring the children of their own competencies
Imparting	<ul style="list-style-type: none"> Using vague responses purposely Modelling a possible answer but not perfectly so Pooling findings in a plenary session
New Gestures Identified in our Data	
Organising	<ul style="list-style-type: none"> Using a format familiar to children Building differentiation within the activity and letting them choose the level of difficulty they want to work at Having clear objectives on what needs to be completed Choosing between process (creativity) or product (results) Varying tasks to promote the process rather than the product Promoting roles to enable children to assign these for the activity Framing their work practices with flexibility Adapting grouping to particular children's needs Changing grouping regularly to reflect real life situations at work Building in thinking time Building in reflecting time Giving them the right amount of autonomy depending on their skills in the subject being worked on Including a problem/catch/difficulty in the activity Including a self-correction device (answer keys, checklist, etc.) Including a roadmap with clear milestones Including a checklist to evaluate one's contribution and participation Leaving them the choice of medium to be used to complete the activity Encouraging peer interactions through the way activity is set up
Accepting	<ul style="list-style-type: none"> Accepting other possible solutions or choices from the children (even if it may lead to more difficulties later on) Accepting children's limits in terms of motivation or understanding Accepting the dichotomy between individual work and with others within the group (tension between autonomy and collaboration) Allowing for time to develop their competencies
Motivating	<ul style="list-style-type: none"> Choosing the right moment to motivate (at the beginning rather than during the reflection phase) Verbalizing of the task value and how it will be exploited later on Promoting motivation at group level rather than individually Regularly reminding the children of the benefits of the activity Reminding them that groups were set up to enable everyone to contribute Attending to affect (emotional attachment to teacher) Including an element of competition to enhance successful feeling

Looking again at the data, which of these gestures were the most salient ones? *Organising* the activity seemed to be the most salient teacher's action which is to be expected when setting up an autonomous task, as these can only work when well-planned and well organised before and during the activity. *Indicating*, as exemplified in Table 1, came next and that is where most of the scaffolding was happening with a very light touch from the teacher. *Imparting*, i.e., bringing in bits of knowledge and prompts at appropriate times helped with the flow of the activity as without the teacher's intervention, the task could sometimes come to a halt. However, the surprising finding here is that *accepting* children's input and *motivating* them were mentioned by the teachers in the co-analysis. Although we concluded above that self-motivation was the phase least attended by the teacher,

when we looked at the data from the teacher’s gesture perspective, motivating was happening across the sub-phases and not only when the teacher endeavoured to harness that particular sub-phase of the model.

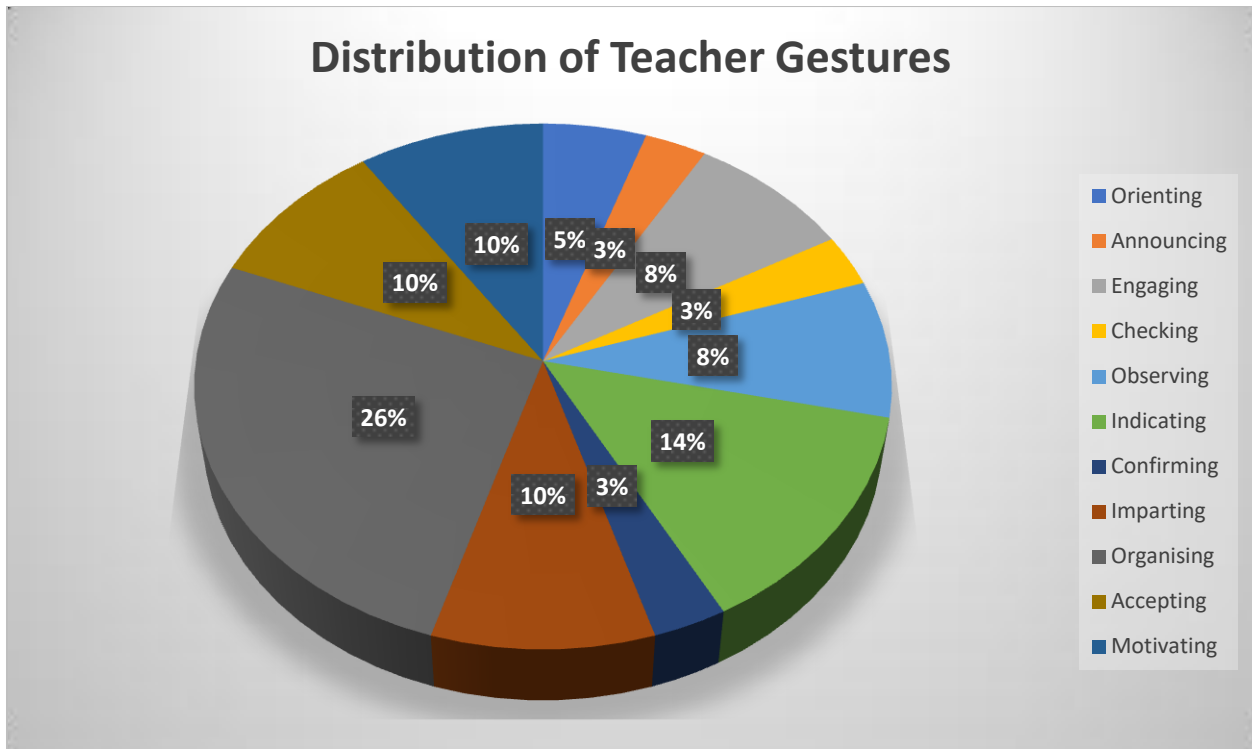


Fig.1: Distribution of Teacher Gestures when Scaffolding Self-regulated Learning (adapted from Giglio, 2016a, p. 149)

As each phase of Zimmermann and Campillo’s model (2003) were used in turn when analysing the film excerpts and the co-analysis sessions, the teacher’s gestures identified in Table 1 were interpreted in the light of the six sub-phases in the model and classified as can be seen in Fig.1, with the three new teacher’s gestures added to the ones identified in Giglio (2016a). There is no statistical significance to the number of times each teacher action was identified in each of the sub-phase. This exercise was done merely to associate more tightly teacher’s gestures to the most appropriate sub-phase of self-regulated learning. A further analysis of teacher’s gestures allowed us therefore to identify the phases of Zimmerman and Campillo’s model best matched to these. The way these occur and develop can be looked at in the context of Zimmerman and Campillo’s model (2013), with the resulting matrix which can be seen in Table 2.

Table 2: Occurrences of Teacher’s gestures in each phase of Zimmerman & Campillo’s Model

	Task Analysis	Self-motivation	Self-control	Self-observation	Self-judgment	Self-reaction	Total
Orienting	3		2				5
Announcing			2	1			3
Engaging	2		1	3	2		8
Checking	1	1	1				3
Observing	3		2	2	1		8
Indicating	7		3	1	2		13
Confirming	3						3
Imparting	4		1		4		9
Organising	4	1	5	8	4	3	25
Accepting	1	1	1	1	4	1	9
Motivating		5	1	1		2	9
Total	28	8	19	17	17	6	95

Indicating to children what they need to do seemed to happen mainly, and quite logically, during the task analysis subphase, along with bits of knowledge being given by the teacher to help kickstart the activity.

Organising as a teacher action was mentioned repeatedly during the excerpts chosen where self-observation was identified. Most of the teachers' comments were about embedding devices in the activity which would enable children to self-observe and monitor the way they were completing the task as well as regular requests for verbalisation about where they were up to during the activity. *Organising* featured also quite often in other sub-phases, namely self-control, self-judgment and self-reaction. It had to do with the regrouping of children to match some of the children's specific needs better and building in some thinking time to enable children to choose the correct strategies and figure out what everyone would do in the group, as well as varying both the activity and the grouping at the set-up stage.

Motivating understandably happened during the self-motivation sub-phase when the teacher would give some clues as to how to get yourself motivated but not exclusively. As previously mentioned, repeated mentions of motivation strategies permeated through most sub-phases except during the task analysis phase.

Accepting was better suited to the self-judgment phase which, again, had to be expected since it was related to the realisation of alternative choices when looking at how well the activity went. *Orienting*, *observing* and *confirming* (as well as *indicating* mentioned earlier) were better performed during the task analysis sub-phase, when children figured out what needed to be done whilst the teacher observed to gauge their intervention, then oriented and indicated when needed and confirmed when the children managed to break down the task requirements themselves.

Announcing was mainly related to the reminding of keeping time during the execution of the task. Moreover, *engaging* was done when asking children to verbalise what had been achieved so far and to be conscious of their own contribution to the activity, and thus happened mainly during the self-observation phase. However, it could happen during other phases too, for instances, when a request to reformulate, the instructions was made during task analysis or during the judgment phase when a justification of the process used to come to the right solution was asked for. *Checking* naturally happened towards the beginning of the model in order to ensure that the activity had been understood and analysed from the start, but also during the execution phase at regular intervals.

CONCLUSION

Further Research Developments for the Scientific Community

The further identification, development and description of professional teacher's gestures enabled us to draft a taxonomy of these to support autonomous classroom learning in the performance of tasks without interrupting the communicative, collaborative and reflective dynamics of the children or keep these to a minimum. These support gestures also encouraged the progressive autonomy for each group of children and helped organize the flexible classroom environment based on a new theoretical framework. It also helped researchers to analyze what happened during the introduction of younger children to self-regulated learning in a group situation and thereafter create appropriate educational scenarios.

The scientific community will also benefit from the development of educational scenarios with flexible learning environments for transversal competencies at school. Indeed, these can be the object of further research as some issues came to light during the trial period of these scenarios such as their tighter matching with children's age and their application to different school subjects.

Pedagogical Scenarios for the Teacher Community

In order to develop a practical application of our findings to be used in the classroom, three pedagogical scenarios were drafted in collaboration with the teachers who took part in the theoretical research project. These three scenarios were to be articulated along subject lines (languages, maths, sciences) matched to transversal competencies more easily developed in their respective subjects. A further requirement was to match these to a subphase of Zimmerman and Campillo's model (2003) to ensure that the three scenarios would cover all phases of the self-regulated learning model, thereby following Zimmerman's advice (2002, p. 66) that the self-regulation of learning 'involves the selective use of specific processes that must be personally adapted to each learning task'. The inclusion of collaboration, communication and reflection skills as defined by the Plan d'études Romand (2010) and the self-regulated learning model (Zimmerman & Campillo, 2003) allowed us to depart quite drastically from earlier pedagogical scenarios by Giglio, Matthey and Melfi (2014). The new scenarios were also developed directly from the present project findings by the researcher, written in collaboration with the teachers who took part in the United Kingdom as subject specialists and trialed and evaluated by the teachers in Switzerland, making the project a truly international partnership between researchers and teachers as researchers and co-constructors of knowledge (Desgagné, 2007). These scenarios will be published separately in a Swiss professional teacher education journal, *l'Éducateur*, in order to make them available to a wider audience.

Acknowledgments

This article is dedicated to Prof. Marcelo Giglio who, most unfortunately, passed away in July 2020. I carried on and completed the project that we started together. We would also like to express our gratitude to the Swiss and British teachers and children who participated in the project

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