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**COMMENTS ON NEIL MERCER PAPER.
SOME CONSEQUENCES OF THE SOCIAL BRAIN IDEAS:
STUDIES ON INDIVIDUAL STUDENT TO THOSE ON
CLASSROOM AS A GROUP**

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INTRODUCTION

Neil Mercer focuses his paper on the relationship between individual and collective thinking processes. He starts from rather recent developments stating that the concept of the 'social brain' emphasizes that human intelligence is intrinsically social. Neil Mercer raises the important problem of "the functional connections between collective and individual thinking activities, and the role of language in those activities." In particular he considers that "one of the most important functions of our social-cognitive capabilities, which is that we are able to engage collectively in purposeful, reflective endeavours." I completely agree with this perspective. Teaching and learning are two joint actions that imply cooperative intellectual activity. I comment this perspective on four sections. The first section consists of some indirect comments on his development of "the educational functions of language." These comments enlarge the educational resources in which genres of language are embedded; for example introducing a material situation can raise development of a genre of discourse, etc. The second section deals with the research development related to the social brain by focusing on the recent shift of the research focus in anthropology and psychology related to education from individual to group. The third section aims at situating the shift when the research focus goes from individuals to groups, that is, when the idea of social brain is developed in the studies of classroom practices. The last section raises the question of the relationship between theoretical frameworks on individual students to collective like a classroom group.

SHORT COMMENTS ON LANGUAGE

Developing the general statement that language is a cultural tool and a psychological tool, Neil Mercer proposes three strands about the prime role of language in cognitive development and learning.

The first strand deals with the collective process of constructing knowledge. Thus varieties or genres of functional language are involved. Such genres represent ways that individual thinking is made accountable to the normative rules of specific communities of thinkers; and fluency in the appropriate genres is a requisite for full admission

to those communities. I would like to emphasize that these genres are rather varied and not always made explicit in the classroom by the teachers. For example, in physics describing the objects and events of an experiment necessitates a specific genre of language which uses most of the everyday vocabulary but not with the same meaning (Rémi-Giraud, 2008). For example in the case of mechanics, even when two objects in contact are motionless, contrary to everyday life where one considers that if there is no change then there is no event, the physics way of describing the situation is to consider that there is an event, each object acts on the other one. If the teacher introduces this way of description, then this genre of talk becomes normative in the classroom but making the difference between physics and everyday genre explicit can facilitate that this language genre becomes functional, this functionality being shared among the classroom group. This passage from normative to functional is not straightforward; it necessitates specific classroom practices.

The second strand is an elaboration of Vygotsky's proposed link between the intramental and the intermental, and Mercer (this issue) emphasizes the reciprocity of this link:

"Thus the genres of various discourse communities provide resources for organizing the process of thinking alone. The strength of Vygotsky's model is that he envisaged this psychological-social relationship as reciprocal: shared social representations shape individual cognition, and individual insights and arguments can, through the use of language and other modes of communication, populate the social world."

The third strand deals with "the process whereby an expert guides a novice is one of the basic, key features of human society; it is a manifestation of the social brain." And the 4th strand "concerns the importance of talk for more symmetrical, collaborative types of learning and problem solving."

These three strands combine the general Vygotski's statement of the reciprocity of social and individual thinking. These statements lead me to emphasize two main interactional situations involved in teaching and learning: the expert's guidance of a novice and the collaborative small groups of students. The reciprocity can be situated in the passage of a large group to small groups. For example, the idea that because the students work in small group,

they develop their own talk, should be nuanced; it is shown how the teacher's and more generally the classroom talk influence the students' ones. For example Webb et al. (2006) showed this influence:

“Through their behavior, then, *teachers modeled the role of ‘teacher’ (help-giver) as active problem solver and provider of largely unlabeled numerical procedures, and the role of ‘student’ (help-seeker) as a fairly passive recipient of the teacher’s instruction. In their small groups, students largely mimicked these roles, with help-givers most often focusing on making sure that their groupmates had correct answers and calculations written on their papers, and help-seekers often passively receiving the procedures to write.*” (p. 109)

This result is extended by Berland (2011) who shows how some teacher's requirements influence students' interactions in constructing argumentation.

More globally, the reciprocity between the influence of the discourse of a community on the process of thinking alone raised the question of the guidance in a classroom. We can note that this guidance is not only directly done by the teacher but involves various ways of which classroom situations are organized and enriched by different resources. The evolution of guidance during time also plays a crucial role. The teacher and students' actions in the classroom depend not only on the present situation but also on what was going on previously and on the perspectives. For example, the wording of an activity, a teacher's requirement, an experimental setting, social classroom organization, etc. may influence students' action and understanding. The social brain strongly depends on the various available resources. Here we do not only include language that is the central resource but it is associated with other modes and material resources.

SHIFT OF THE RESEARCH FOCUS FROM INDIVIDUAL TO GROUP

The development of research in the field of communities of practices started about 20 years ago (Lave & Wenger, 1992). This new perspective of learning consisting of moving from the periphery to the core of the community emphasizes the idea of collective thinking and particularly of collective

and individual identity which is deeply associated to learning as Lave (1991) explains:

“Learning, it seems to me, is neither wholly subjective nor fully encompassed in social interaction, and it is not constituted separately from the social world (with its own structures and meanings) of which it is part. This recommends a decentered view of the locus and meaning of learning, in which learning is recognized as a social phenomenon constituted in the experienced, lived-in world, through legitimate peripheral participation in ongoing social practice; *the process of changing knowledgeable skill is subsumed in processes of changing identity* in and through membership in a community of practitioners; and mastery is an organizational, relational characteristic of communities of practice.” (p. 57, italics by us)

However, the social component of identity is not really developed as noted by Shanahan (2009). This author considers that studies on identity can be situated according to their emphasis on three orientations: personality, social structure, and interaction (Tiberghien, 2016). This analysis shows that until recently, most of the studies were mainly focused on two levels of analysis – personality and interactions – and one of her interpretations was that communities of practice perspective (Lave & Wenger, 1991) emphasizes these two levels and to a far lesser extent the social structure which is considered to be rather stable:

“From this perspective [communities of practice], identity is defined as who one is and who one wants to be and learning is viewed as identity transformation – transformation into who we want to become. This focus on transformation places the *communities of practice framework squarely in the transitions between personality and interaction*. Through interaction, individuals learn about the community of practice and what is expected of its members. These expectations are internalised and the individual can make choices to act in a way that will gain them membership in the community.” (Shanahan, 2009, p. 57)

Thus the current of ‘communities of practice’ clearly is mainly oriented toward the individual in interaction to the extent that the evolutionary aspect of the social group is not studied.

Similarly Carlone (2012) in her study of normative scientific identity pointed out:

“Those trained in psychological traditions, *trained to pay attention to individual outcomes*, may at first be *challenged by a focus on group-level meanings*. It may help to consider this *a matter of lens-shifting*. Rather than ask, “What are individual students learning or who are they becoming?” shift the lens to ask, “Who are students obligated to be?” Rather than ask, “Who’s struggling?” shift the lens to ask, “What does it mean to struggle? What is the struggle about? How is ‘struggling’ defined?” Rather than ask, “Who’s successful?” ask, “What does it mean to be successful? What opportunities does the setting provide for individuals to become successful?” (p. 12).

She discusses the individual and social approaches. For her, the dialectic between agency and social structure should be respected:

“... the structure/agency dialectic, as Shanahan (2009) argued, “poses methodological problems” (p. 46) and, in sociocultural studies, often veers too far over on the ‘agency’ side to over-emphasize the freedom individuals have to shape their own destiny, to make their own meanings [...]

Though we gain solid insight from examining and theorizing moments of agency, creativity, and improvisation, science education needs more accounts of the ways group-level meanings – heavily influenced by larger social structures, history, and politics – emerge and enable and constrain individuals’ subject positions.” (Carlone, 2012, p. 11)

For me, this lens-shifting from individual to group level meanings is essential. This implies that each approach *has specific conceptual framework and that the two frameworks should allow going from one perspective to the other*. For these researchers the concepts of identity, and normative identity are key ways of establishing the links between perspectives. The question “Who are students obligated to be?” supposed to establish the normative identity can be extended by: “in the light of what the student is obligated to be, what does the student do?” Thus the student’s actions are analysed in reference to the normative rules and behaviours of the group. This requires first to develop a study on the normative identity of the group. This perspective is discussed in the next section.

CHARACTERIZING CLASSROOM AS A GROUP, RELATIONSHIP WITH INDIVIDUAL PERSPECTIVE

We first present a theoretical framework which aims at viewing classroom as a group where, following Edward and Mercer (1987), knowledge is shaped in a classroom:

“Knowledge is presented, received, shared, controlled, negotiated, understood and misunderstood by teachers and children in the classroom” (Introduction).

This implies that the “life of knowledge’ is specific to the group in which it lives” (Tiberghien, 2016). In this perspective, the classroom group functions as a collective brain for which teacher and students play different roles. To study the relationship between collective and individual thinking, it is important to be able to characterize the collective work. The French researchers develop didactic theories since the years 1960s with the theory of didactic situations (Brousseau, 1982, 1997; Chevallard, 1991). More recently, Sensevy has developed the theory of joint actions in didactics (JATD) where teaching and learning are the joint actions. In this theory with which I work on currently, the two main concepts are the didactic contract and the milieu. To be short, as I have already presented in Tiberghien (2016), I use these concepts with a meaning based on the idea of game proposed by Sensevy (2011).

“In JATD, following Bourdieu on one hand (for example, 1987) and Wittgenstein (1997) on the other hand (language game), the game is considered as a relevant model to bring out certain aspects of the social world of human activity; it reflects the logic of the practice (Sensevy, 2007). A game is defined by what is at stake and the rules to carry it out. [...] The *contract* is defined as the strategic systems used by the teacher and the students to play the game.” (Tiberghien, 2016, p. 13)

The *potential milieu* consists of all available resources, that is the elements of the material and communicational situation that allow the players to construct or modify a new strategic system. The actual milieu consists of the resources used to play the game.

Figure 1a is a tentative presentation of the collective view with the JATD. This collective view

(Figure 1a) is based on the joint actions of teaching and learning with the game as an operational model to study these actions. The game that implies all the players, with its goal, rules, players' strategies allow taking a holistic view of the classroom. In the JATD this holistic view is based on the didactic triangle with the three poles of knowledge, teacher, and student. In this approach, the game is the object of study, and by nature the game is a collective activity. Characterizing the rules of the game and their origin is a way to study the social structure of the classroom and its evolution with the time according to the different classrooms situation. Studying how the different players, teacher, and students are engaged in the game, which contributions they give,

how they do it, which resources they use is a way to understand to what extent a shared meaning of knowledge is constructed and how.

We also present in Figure 1b a tentative representation of a possible individual approach. The aim of these figures is to contribute to the discussion on the differences between the individual and collective views and of their relationships.

For the individual case (Figure 1b), I chose a view that does not imply modelling a student as a player of a game; this leaves open the theoretical framework to study evolution of personality or interactions. Nevertheless I propose to use the concepts of didactic contract and milieu to establish relationships with the view of classroom as a group.

Figure 1. Tentative representations of theoretical views focus on a classroom as a group and on a student as an individual

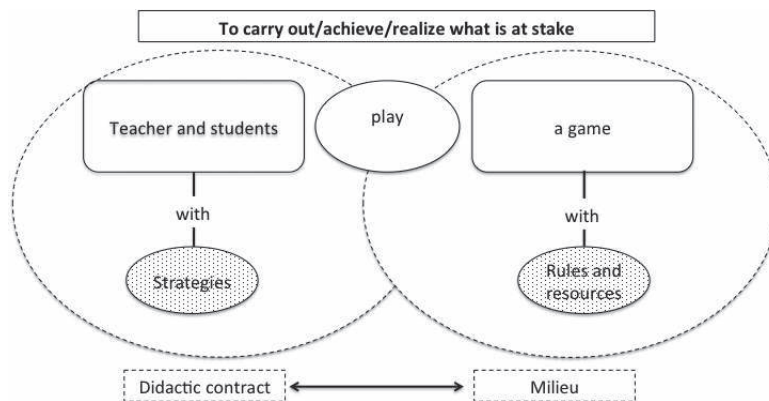


Figure 1a. Collective approach: A tentative representation of a view of a classroom as a group with JATD theory.

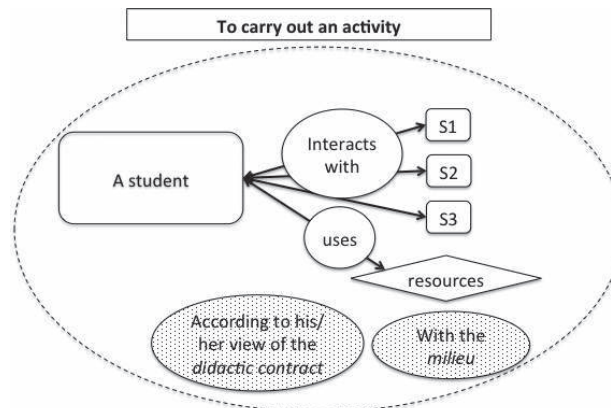


Figure 1b. Individual approach: A tentative representation of a view of an individual student' actions with possible links with a collective approach with the use of the concepts of contract and milieu.

If the didactic contract is used to relate the collective and individual views, its characterization necessitates adopting a collective view first and then to specify what aspects of the contract a student adopts or even creates. The collective view of the contract serves as a reference to study an individual student. Nevertheless the reference will be enriched by the study on individuals, the construction of the didactic contracts, collective and individual, should be dialectic.

SOME CONSEQUENCES OF TWO VIEWS: COLLECTIVE AND INDIVIDUAL

Carlone (2012) proposed a lens-shift between the collective and individual perspectives. Accepting this lens-shift has deep consequences on studies focused on students' learning in a classroom. The theoretical frameworks should explicitly lead to two types of questions on the collective and the individual aspects and to how linking them. The methodology should also be adapted. In fact, a common core of data can be relevant for these views; in particular classroom videos if the focus of the camera and recorded sounds are adapted, specific data for each view can be collected like interviews, questionnaires.

At this step, we think that studying classrooms at several scales of time could help. According to the scales of time, micro, meso, or macro, the analyses can be more or less different. If at micro scale (about seconds), the analyses are done in terms of acts, very likely the analyses with the collective and individual views can be similar, in particular if the micro-analyses have several dimensions: pragmatic, interactional, and representational (Charaudeau, 2004; Tiberghien & Venturini, 2015). However at meso scale, the meaning of the acts and their association can differ according to the view. For example like mentioned above, the research question of the influence of the type of teacher's talk at whole classroom level on the type of students' talk in small group needs to characterize the type of talk like for example the use of arguments at a meso scale (about 10 minutes). With this research question, the interpretation at meso-scale of the acts at micro-scale analysis will be different from an interpretation with another question like how responsibility of knowledge is shared in a classroom group for example. Nevertheless these different interpretations

should be compatible, and relationships should be established. Two possible links are at micro-scale because the role of language and more broadly the role of multimodal productions are common to the two views, and at meso-scale because the role of the social structure seems also common.

CONCLUSION

Neil Mercer raises a crucial question to researchers who studied teaching and learning in classrooms on how to take into account and relate the collective and individual thinking processes. In particular he emphasizes the important aspect of the social brain which goes beyond social interactions since it consists of constructing a collective thinking. My comments are of different types. I associated some ideas or examples with Neil Mercer's emphasis on the educational functions of language. In particular the important influence of the genres of languages used by the teacher and by the whole classroom group on the students' talk in small groups. Then I react on the proposition of working on how to study the whole classroom as a group. I took up the idea of a necessary shift when the research focus goes from individual students to collective like a classroom group which in a sense is a consequence of the idea of studying collective thinking in a classroom.

REFERENCES

- Berland, L. K. (2011). Explaining Variation in How Classroom Communities Adapt the Practice of Scientific Argumentation. *Journal of the Learning Sciences*, 20(4), 625–664. Retrieved from [http://www.tandfonline.com/doi/abs/10.1080/10508406.2011.591718]
- Brousseau, G. (1982). Les « effets » du contrat didactique ». In 2^e école d'été de didactique des mathématiques (Olivet). Retrieved from [http://guy-brousseau.com/wp-content/uploads/2012/02/82-83-effet-de-contrat.pdf]
- Brousseau, G. (1997). *Theory of Didactical Situations in Mathematics*. Dordrecht: Kluwer Academic Publishers.
- Carlone, H. B. (2012). Methodological Considerations for Studying Identities in School Science: An Anthropological Approach. In M. Varelas (Ed.), *Identity Construction and Science Education Research. Learning, Teaching, and Being in Multiple Contexts* (pp. 9–25). Rotterdam: Sense Publisher.
- Charaudeau, P. (2004). Comment le langage se noue à l'action dans un modèle socio-communicationnel du discours. De l'action au pouvoir. *Cahiers de Linguistique Française n°26, Les Modèles du discours face au concept d'action*. Actes du 9^e colloque de Pragmatique de Genève et colloque Charles Bally. Genève: Université de Genève. Retrieved from [http://www.patrick-charaudeau.com/Comment-le-langage-se-noue-a-1,90.html]
- Chevallard, Y. (1991). *La transposition didactique* (2^e éd.). Grenoble: La Pensée Sauvage.
- Chevallard, Y., & Sensevy, G. (2014). Anthropological Approaches in Mathematics Education, French perspectives. In S. Lerman (Ed.), *Encyclopedia of Mathematics Education*. Dordrecht: Springer.
- Lave, J. (1991). Chapter 4: Situating learning in communities of practice. In L. B. Resnick, J. M. Levine & S. D. Teasley (Eds.), *Perspectives on Socially Shared Cognition* (pp. 63–82). American Psychological Association.
- Rémi-Giraud, S. (2008). Mots courants et connaissances scientifiques. In J. Lautrey, S. Rémi-Giraud, E. Sander, & A. Tiberghien (Eds.), *Les connaissances naïves* (p. 154–192). Paris: Armand-Colin.
- Sensevy, G. (2007). Des catégories pour décrire et comprendre l'action didactique. In G. Sensevy & A. Mercier (Eds.), *Agir ensemble : Éléments de théorisation de l'action conjointe du professeur et des élèves* (p. 13–49). Rennes: Presses universitaires de Rennes.
- Sensevy, G. (2011). *Le sens du savoir. Éléments pour une théorie de l'action conjointe en didactique*. Bruxelles: de Boeck.
- Webb, N. M., Nemer, K. M., & Ing, M. (2006). Small-Group Reflections: Parallels Between Teacher Discourse and Student Behavior in Peer-Directed Groups. *Journal of the Learning Sciences*, 15(1), 63–119. Retrieved from [http://doi.org/10.1207/s15327809jls1501_8]
- Tiberghien, A., & Venturini, P. (2015). Articulation des niveaux microscopiques et mésoscopiques dans les analyses de pratiques de classe à partir de vidéos. *Recherches en Didactiques des Sciences et des Technologies*, (11), 53–78 Retrieved from [http://doi.org/10.4000/rdst.986]
- Tiberghien, A. (2016). How does knowledge live in a classroom? In N. Papadouris, A. Hadjigeorgiou & C. P. Constantinou (Eds.), *Insights from Research in Science Teaching and Learning* (pp. 11–27). Dordrecht: Springer.
- Shanahan, M. (2009). Identity in science learning: exploring the attention given to agency and structure in studies of identity. *Studies in Science Education*, 45(1), 43–64. Retrieved from [http://doi.org/10.1080/03057260802681847]