

## Influence of “Relation with Learning” on a Situation of Communication Teaching-learning for Different Scholar Pupils<sup>1</sup>

**Di Scala-Fouchereau Emmanuella<sup>1</sup>, Ricaud Philippe<sup>2</sup>, Pinsard Nathalie<sup>3</sup>, Andres Robert<sup>4</sup>, Rouzet Samuel<sup>5</sup>**

<sup>1,2,3</sup> CIMEOS EA 4177 laboratory University of Burgundy, <sup>4,5,6</sup> ESPE Burgundy (France)

[emmanuella.fouchereau@u-bourgogne.fr](mailto:emmanuella.fouchereau@u-bourgogne.fr), [philippe.ricaud@u-bourgogne.fr](mailto:philippe.ricaud@u-bourgogne.fr),

[nathalie.pinsard@bourgogne.fr](mailto:nathalie.pinsard@bourgogne.fr), [robert.andres@ac-dijon.fr](mailto:robert.andres@ac-dijon.fr), [samuel.rouzet@u-bourgogne.fr](mailto:samuel.rouzet@u-bourgogne.fr)

### Abstract

*Communication can be understood as the set of relations between two people interacting. Between learners and teachers, the relationship is induced by a situation of communication teaching-learning. In this constructivism theory, Chevallard and Charlot [1,2] make the hypothesis that learning requires a factor commonly underestimated: the “relation with learning”. This study surveys the impact of the “relation with learning” of pupils under a situation of communication teaching-learning. The evolution of conceptions among learners had been studied in parallel of pedagogical method proposed by teacher. The necessity to change the conceptions in scientific learning is claimed by Giordan’s allosteric model and KVP model of Clement [3,4].*

*We surveyed and compared qualitatively a population of primary school pupils (n = 24), high school pupils (n= 25), and university students (n= 20) about a usual topic (blood circulation). One questionnaire enabled to determine a set of relations with learning profiles. Besides, another questionnaire for identifying the conceptions was distributed one month before the learning sequence (phase 1), and again one month after the learning sequence (phase 2) and once again six months after the learning sequence (phase 3). In parallel, the pedagogical method for each teaching sequence were defined using Bell criteria [5].*

*Our first results show that two factors are correlated, like shown in our quantitative last research on gymnasium pupils [6]: utilitarian profile (U) and pleasure profile (P) both improve in the short run the evolution of the scientific conceptions in phase 2. Moreover, these data show same results for phase 3 for primary school pupils, university students and partly for high school pupils. Nevertheless, few conceptions decline between phase 2 and phase 3, specially for high school and primary school pupils. Analysis of different pedagogical methods used in this study shows that inquiry methods proposed for primary school and high school pupils and transmissive/explicit method proposed for university students are not correlated with a better elaboration of conceptions. Moreover, university students have more elaborated their conceptions in phase 3 than other scholar pupils.*

*We can propose that independantly of pedagogical methods, “resonance” of learner with learning defined in partly by his “relation with learning” would be an important factor to create good conditions of communication under a situation teaching-learning.*

### 1. Introduction

Two models who match together explain changing of conceptions: Clement’s KVP model [4] and Giordan’s allosteric model [3]. In the KVP model, conceptions (C) result from the interaction between scientific knowledge (K), values (V) and social practices (P). In Giordan’s allosteric model, changing of conceptions comes from an efficient didactical environment [7]. In this model, knowledge, skills and meta-knowledge are important to create this efficient environment.

Pedagogical methods and especially inquiry methods are often proposed in training sequence, because of expected efficiently in scientific learning. Nevertheless, Bell and his collaborators [5] describe different levels of inquiry methods: confirmation inquiry, structured inquiry, guided inquiry and open inquiry. These levels depend of implication of learner in inquiry method as an actor of his knowledge increase.

Beside this, Charlot [4,8], Caillot [9,10], Chevallard [1] have investigated the “relation with learning” of learners. From a theoretical point of view, this concept allows a new vision on didactical situations. It means that one cannot enter in the learning without mobilizing at the same time the relation he has with learning. Our last researches have shown a relationship between learning relation and scientific conceptions on pupils in gymnasium school [6].

Our research surveys the impact of the “relation with learning” of pupils under a situation of

---

<sup>1</sup> Research carried out by BQR ESPE Dijon project with the financial help of University of Burgundy.

communication teaching-learning. The evolution of conceptions among learners had been studied in parallel of pedagogical method proposed by teachers. Does the “relation with learning” change or modify scientific conceptions according to pedagogical method proposed?

## 2. Methodology

### 2.1 Surveved sample:

Our study focuses on three different classrooms: 24 primary school pupils (10 years old), 25 high school pupils (15 years old) and 20 students at university (21 years old). Data were gathered according to diagnostic assessments by collecting initial conceptions two months before the learning training (T1). The same kind of data was then collected one month after the learning training (T2) and four months after learning sequence (T3). The learning training concerns blood circulation: It corresponds to guided inquiry methods for primary school, structured inquiry methods for high school pupils and transmissive method for students at university.

Initial, second and third conceptions were collected from schemas and opened questions such as “Draw where the blood in your body is and explain what it is used for” and “Draw the interior of the heart and explain what is it used for”. Relation with learning was collected before the initial conceptions. The relation of learning was collected from specific questions as proposed by Charlot [8], Montandon and Osiek [11].

Pedagogical methods were defined according to Bell’s criteria for inquiry methods [5]: confirmation inquiry (no implication of learner), structured inquiry (few implication of learner), guided inquiry (more implication of learner) and open inquiry (total implication of learner)

### 2.2 Data processing:

Results are gathered in double-entry tables indicating the correlation between level of elaboration of conceptions (decline, sustain or elaboration) and their relation with learning (R, I, T, U or P) between T1 (before the learning training) -T2 (after learning training) and between T1 (before the learning training) -T3 (few months after learning training). In parallel, graphics show profiles learning of pupils in decline, sustain or elaboration (in number of pupils) according to learning relation. Pupils were classified according to their relation with learning as described by Montandon and Osiek [11], leading to the following profiles:

- R (educational system is rejected);
- T (Tourist: pupils go to school only for fun);
- I (Intermediate: school is viewed as useful and pleasant);
- U (utilitarian: school is viewed as useful for their future);
- P (pleasure: learning is a pleasure independently of its usefulness).

## 3. Results

### 3.1 Impact of “relation with learning” under a situation of communication teaching-learning for primary school pupils

First of all, the results (Fig.1.T1-T2) show that more than half pupils change their conceptions towards an elaboration. Less of half pupils keep their initial mis-conceptions (sustain) and no pupils are in decline profile. Moreover, pupils in elaboration have got especially a P profile. Fig.1.T1-T3 show that conversely more than half pupils keep their mis-conceptions (sustain), two pupils are in decline but several pupils stay in elaboration. P profile is privilege again in phase T1-T3 to stay in elaboration profile.

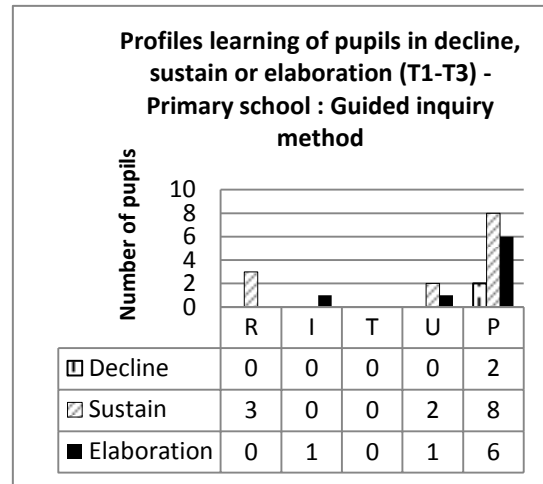
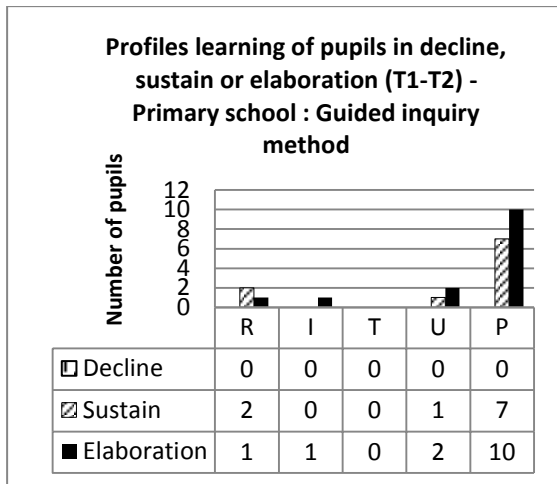


Figure 1: Number of primary school pupils with evolution of conceptions in decline, sustain or elaboration for T1-T2 or T1-T3 in function of their profiles with learning relation.

### 3.2 Impact of “relation with learning” under a situation of communication teaching-learning for high school pupils

First of all, the results (Fig.2.T1-T2) show that more than half pupils change their conceptions towards an elaboration. Less of half pupils keep their initial mis-conceptions (sustain) and no pupils are in decline profile. Moreover, pupils in elaboration have got specially a I or U profiles. Fig.2.T1-T3 show that conversely more than half pupils keep their mis-conceptions (sustain), no pupils are in decline but few pupils stay in elaboration. Only U profile is privilege in phase T1-T3 to stay in elaboration profile.

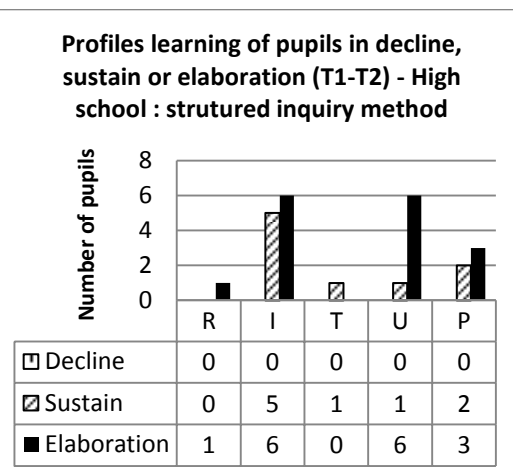
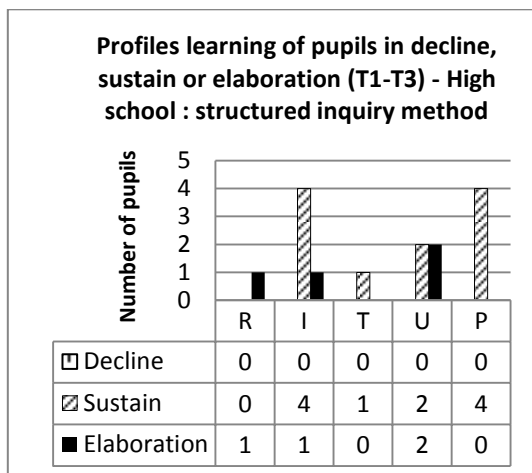


Figure 2: Number of high school pupils with evolution of conceptions in decline, sustain or elaboration for T1-T2 or T1-T3 in function of their profiles with learning relation.

### 3.3 Impact of “relation with learning” under a situation of communication teaching-learning for College students

First of all, the results (Fig.3.T1-T2) show that more than half students change their conceptions towards an elaboration. Less of half students keep their initial mis-conceptions (sustain) and no students are in decline profile. Moreover, students in elaboration have got especially a P profile. Fig.3.T1-T3 show that more than half students stay still in elaboration. No students are in decline and few students keep their mis-conceptions with sustain profile. P profile is privileged in phase T1-T3 to stay in elaboration profile.

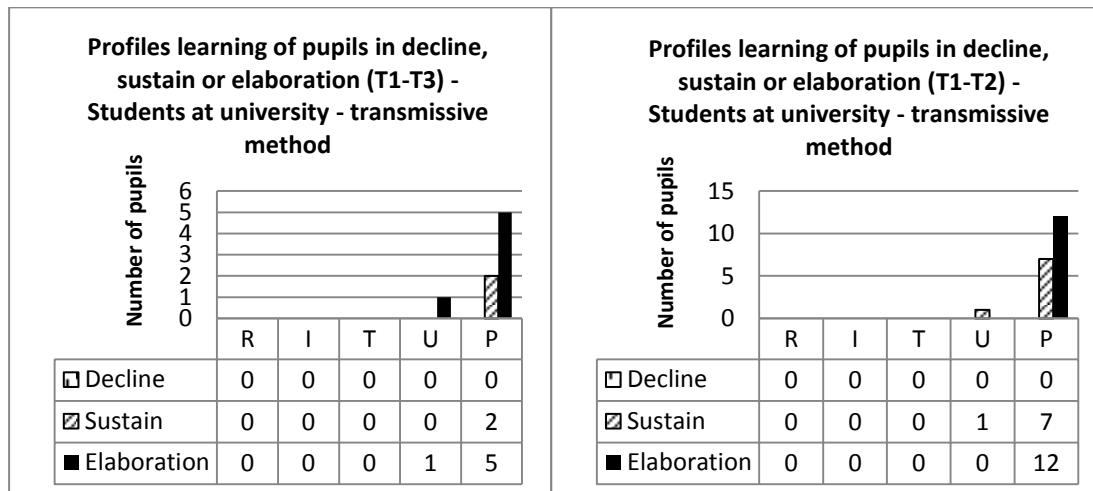


Figure 3: Number of students with evolution of conceptions in decline, sustain or elaboration for T1-T2 or T1-T3 in function of their profiles with learning relation

### 4. Discussion-Conclusion

Our last study [6,12], showed with significant data on gymnasium pupils a correlation between the relation with learning profiles and the level of elaboration of conceptions: U/P profiles have a better elaboration of conceptions during training sequence and Utilitarian (U) and Pleasure (P) profiles are the best profiles to enter in an elaboration of conceptions hence in learning.

This new study shows, that number of pupils with elaboration of conceptions at primary and high school, decrease in T3 in comparison with T2 phase. We could explain this result by regression in learning probably because the students have forgotten. Maybe pedagogical methods (guided inquiry methods and structured inquiry method) were not sufficient to really change sustainable *all* pupils' conceptions between T2 and T3. Nevertheless, we observe an important number of pupils remaining in elaboration profile in T3 phase, especially for U/P profiles. We have yet shown that U/P profiles are privileged to elaborate scientific conceptions in T2 for gymnasium pupils; so these results confirm our last analysis also for primary and high school pupils and show the same result in T3 phase. But, a more significant study should really confirm these first data. For high school pupils, the decrease of elaboration for P profile in T3, could be explain by a pedagogical method not in resonance for these pupils or values are not significant. Actually, in this classroom half of pupils have got I profile and half U/P profiles, against other levels studied (with P profiles) and against our last research who showed that U profile is dominant.

The analysis of students' learning profiles shows a difference with primary and high school pupils' learning profiles. Indeed, elaboration profiles of students do not decrease in T3. We even observe an increase but weak population studied is no significant to show a real increase. Nevertheless, these data show that pedagogical method (transmissive method) could sufficient to change conceptions of students in the long run. Moreover, all students (except one) have P profiles. Maybe this relation with learning influences the sustainable changing of scientific conceptions on condition that learners would be in resonance with learning.

Finally, independently of pedagogical method, we observe that “resonance” of learner with learning partly defined by his “relation with learning” would be an important factor to create good conditions of communication under a situation teaching-learning. Maybe the “resonance”, more than pedagogical method, is the key to enter in communication in a situation of teaching-learning and so to enter in scientific learning.

## References

- [1] Chevallard, Y. (1992). Concepts fondamentaux de la didactique : perspectives apportées par une approche anthropologique. *Recherches en Didactique des Mathématiques*, 12,1, 73-112.
- [2] Charlot, B. (1997). *Du rapport au savoir. Eléments pour une théorie*. Paris Anthropos.
- [3] Pellaud, F., et Eastes R.E. (2003). "Mettre en scène" le savoir pour apprendre : le rôle de l'environnement didactique dans le modèle d'apprentissage allostérique, Hawaii international conference on social sciences, Hawaii, Juin.
- [4] Giordan, A., (Ed) (1999), *Une didactique pour les sciences expérimentales*, Paris : Belin.
- [5] Clement P., (2006). *Didactic transposition and the KVP model: conceptions as interactions between scientific knowledge, values and social practices*. Proceedings Summer School ESERA, IEC, Univ. Minho, Portugal, 9-18.
- [6] Bell, L., Smetana, L. and Binns, I. (2005). Simplifying inquiry instruction : assessing the inquiry level of classroom activities. *Science Teacher*. 72(7) : 30-33.
- [7] Di Scala-Fouchereau, E., Ricaud, P., Pinsard, N., and Andres, R., (2014) « *Impact of relation with learning on scientific conceptions and knowledge among gymnasium pupils*», New Perspectives in Sciences Education, Florence, 395-400.
- [8] Charlot, B. (2000). *La problématique du rapport au savoir in Rapports aux savoirs et apprentissage des sciences*. Actes du 5<sup>ème</sup> colloque international de didactique et d'épistémologie des sciences, Sfax, 7-9 avril, 13-25.
- [9] Caillot, M. (2000). *Rapport au savoir et didactique des sciences in Rapports aux savoirs et apprentissage des sciences*. Actes du 5<sup>ème</sup> colloque international de didactique et d'épistémologie des sciences, Sfax, 7-9 avril, 25-37.
- [10] Chartrain, J.-L, et Caillot, M. (1999). *Apprentissages scientifiques et rapport au savoir : le cas du volcanisme au CM<sub>2</sub>*. Actes des premières rencontres scientifiques de l'ARDIST, ARDIST et ENS Cachan, 131-136.
- [11] Montandon, C., et Osiek, F. (1997). La socialisation à l'école du point de vue des enfants. *Revue Française de Pédagogie*, 118, 43-51.
- [12] Di Scala-Fouchereau, E., Ricaud, P., Pinsard, N., and Andres, R., (2014) « *Evolution of scientific conceptions and knowledge among gymnasium pupils*», INTED,Valence, 1137-1142.