

# HOW CAN CONCEPT MAPPING PROMOTE DEEP AND MEANINGFUL LEARNING IN OSTEOPATHY?

Barcelone,  
OsEAN 2014

Andrée Aubin, DO  
Louise Collette,  
DO



CENTRE OSTÉOPATHIQUE  
DU QUÉBEC

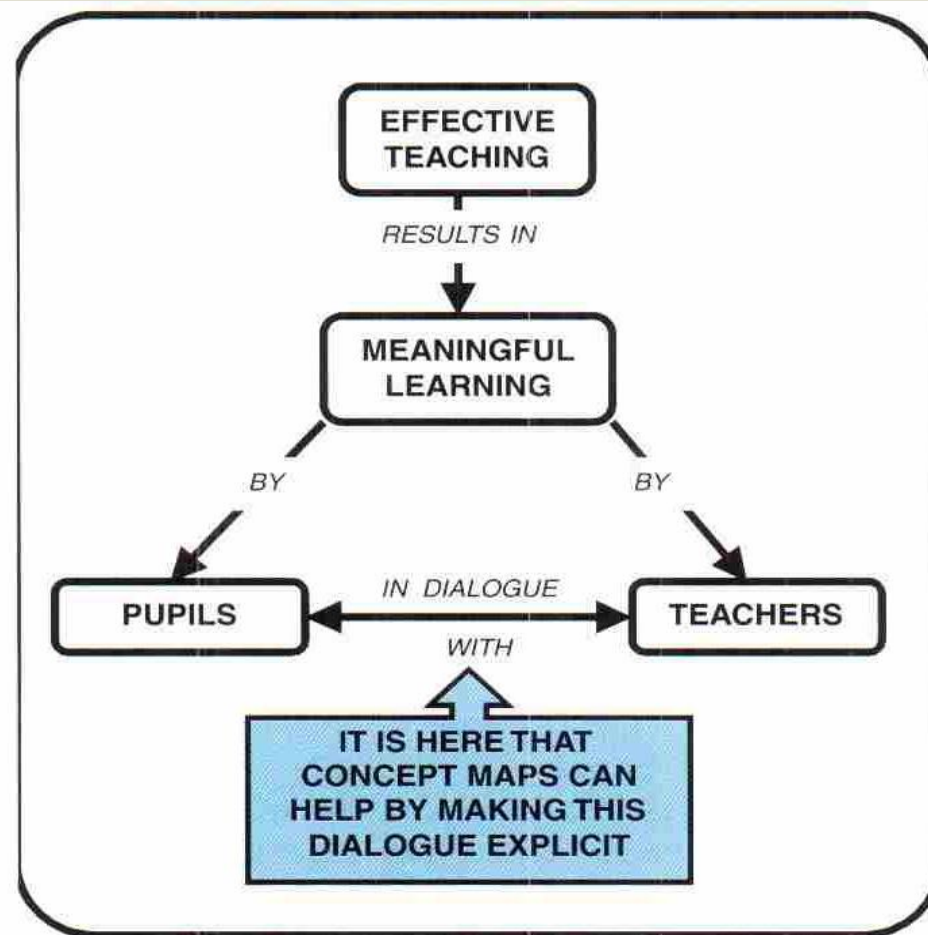
# DEEP AND MEANINGFUL LEARNING

- Osteopathic studies are demanding and students must cope with multiple and complex learning processes
- Osteopathic teaching method must promote deeper and meaningful learning (instead of rote learning) to achieve students' efficient use of clinical reasoning process and expertise growth
  - For osteopathic concepts
  - For clinical reasoning
  - For palpation skills
- BUT HOW?

# WHAT IS CONCEPT MAPPING?

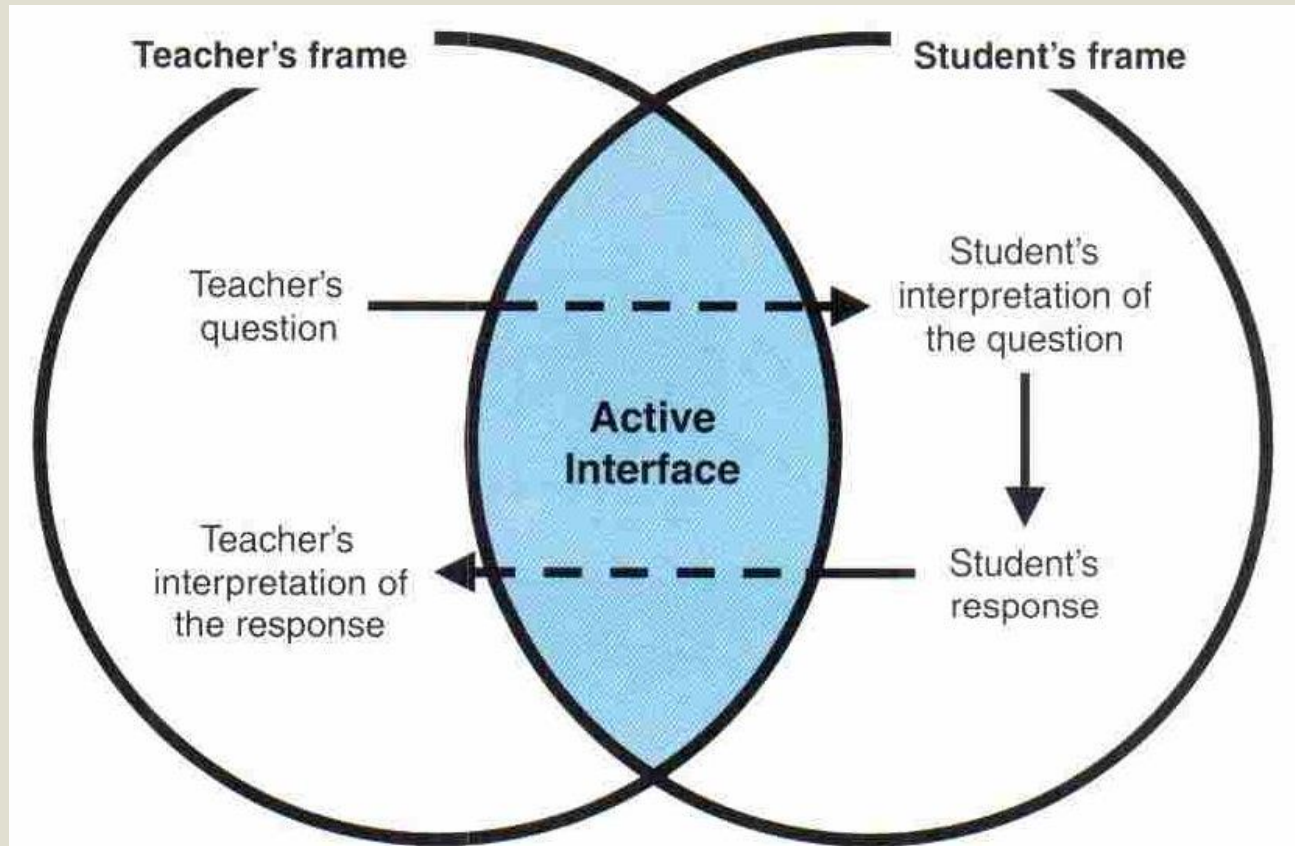
- Concept mapping (Cmap) is a simple, flexible, low-cost and a productive learning tool
  - Constructive activity based on Asubel' work (1970)
  - Develop by Novak (Cornel University)
  - A wide field of research in the last decade (geography, finances, biology, education, **medical education**, etc.)
- Can be considered as a « **window in the mind** »
- Promote deep learning that involves the **formation of complex and well-linked conceptual networks** by student, who can be helped (or not) by a teacher

# EFFECTIVE TEACHER/STUDENT DIALOG



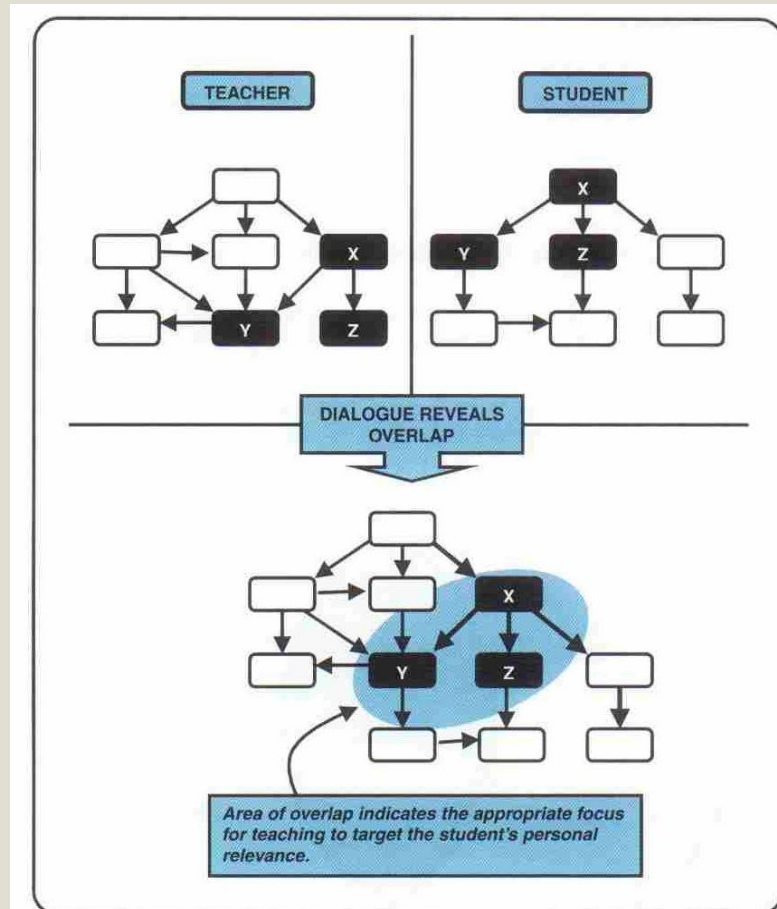
*Figure 1* A view of effective teaching that emphasises the central importance of dialogue between teachers and students (modified from Kinchin, 2001a).

# EFFECTIVE TEACHER/STUDENT DIALOGUE



*Figure 2 The translation interface (modified and redrawn from Johnson and Gott, 1996).*

# EFFECTIVE TEACHER/STUDENT DIALOGUE



*Figure 3* Conceptual frameworks held by experts (teachers) and novices (students) usually exhibit overlap. The structure of this overlap can be illustrated by concept mapping to reveal the most appropriate point to target initial teaching of a topic.

# DEEP LEARNING: HOW TO MAKE IT VISIBLE?

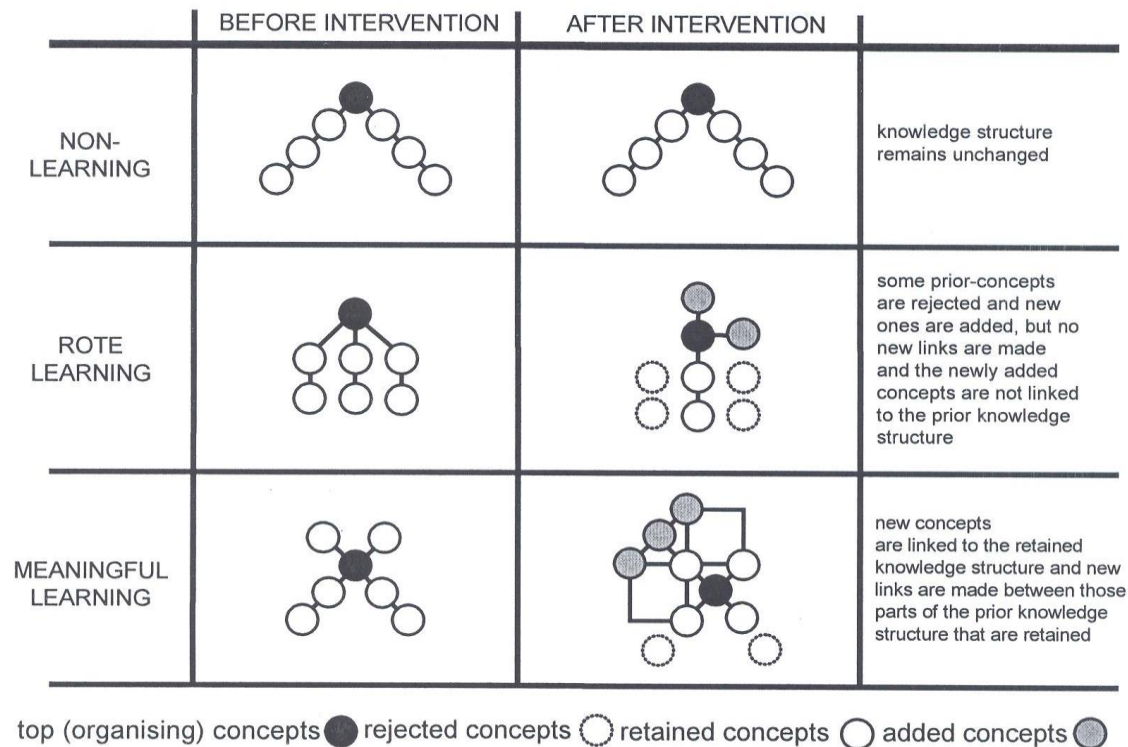


Figure 4. Measures of learning quality.

Hay (2007) used the concept mapping method to compare students' knowledge structures *before* and *after* teaching. In this summary of the data, concepts are shown as circles and the links between them are drawn as lines.

# WHY USING CONCEPT MAPPING?

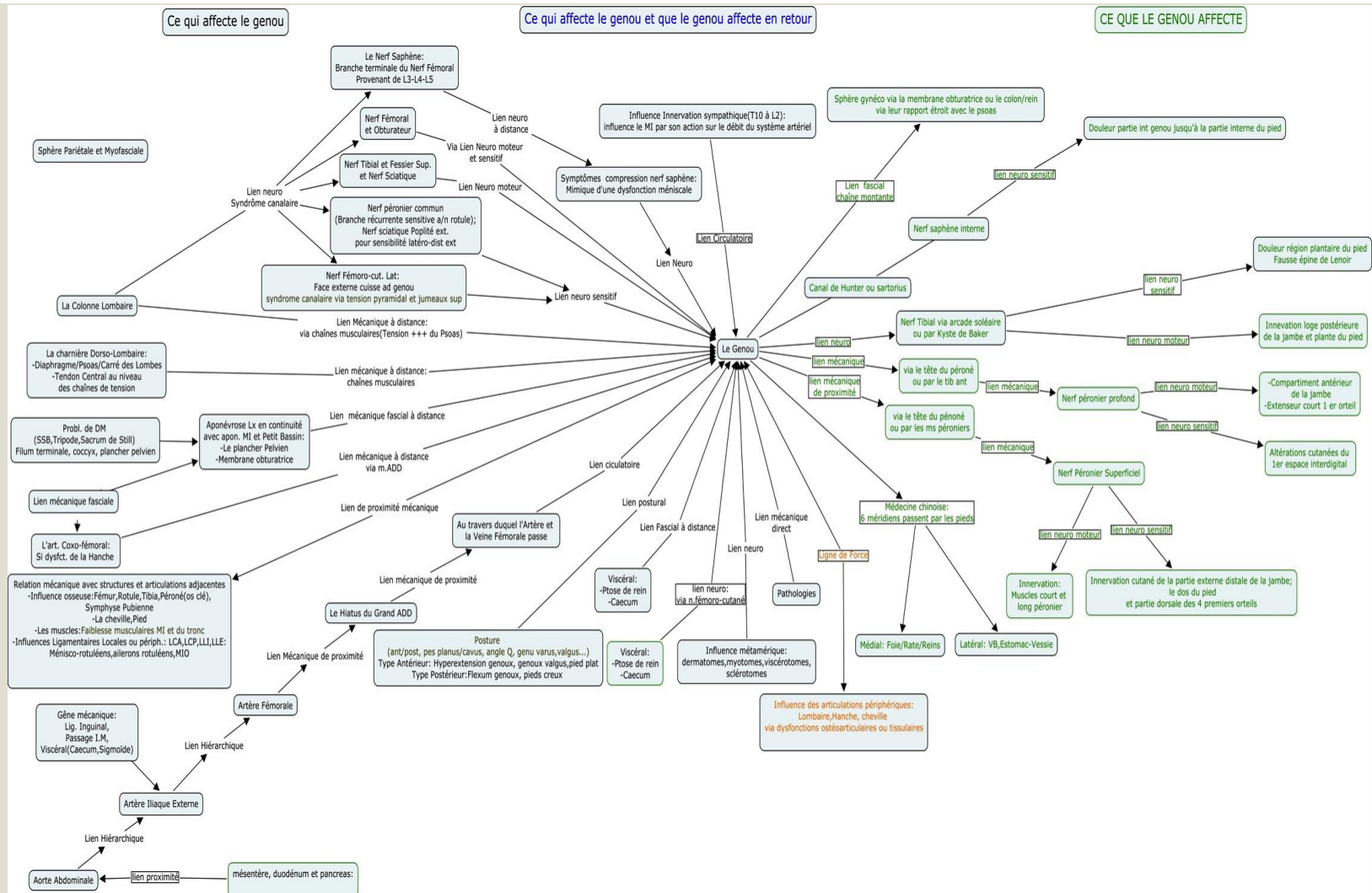
- **Arouse students' motivation and interest**
  - Daley, B., & Torre, D., 2010; Nesbitt, J.C., & Adescope, O.O., 2006
- **As a learning method or a learning strategy**
  - Rochette, A. & al., 2010; Torre, D.M. & al, 2007
- **Promotion of reflective thinking**
  - Wheeler, L.A. & Collins, S.K.R., 2003; Torre, D.M. & al, 2007
- **Assessment of learning processes**
  - Buldu & Buldu, 2010; Chastragnat, P., & Marchand, C., 2012; Kinchin, 2008
- **Assessment of results**
  - Reese, D.D., 2004
- **Making explicit clinical reasoning processes**
  - Demeester, A., Vanpee, D., Marchand, C., & Eymard, C., 2010; Pottier, P. & al., 2011
- **Promotion of deep learning**
  - **Organization of knowledge, retention and transfer...**
    - Canas & Novak, 2008; Daley, B., & Torre, D., 2010; Nesbitt, J.C., & Adescope, O.O., 2006
  - **...and retrieval**
    - D'Antoni & al, 2010



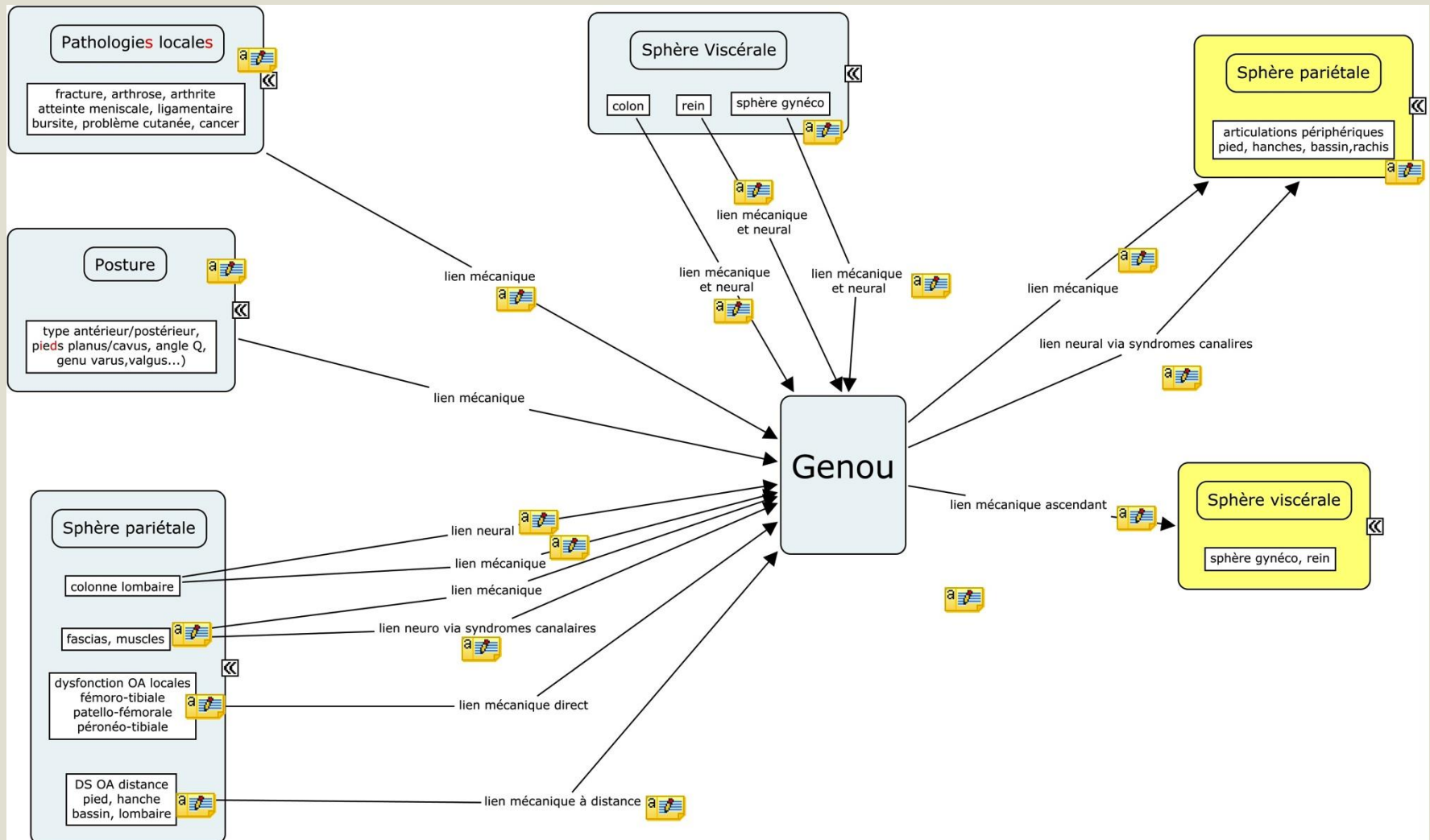
# PEDAGOGICAL ACTIVITY

- Third and fourth-year students (was also done with fifth-year students in 2011 and 2012)
- Work in progress process: 3 versions (rarely 4) of each Cmaps until students get at least 8/10 to promote deep learning:
  - Improving knowledge
  - Promotes organization
- Tutor's formative correction:
  - Aspect of the Cmaps
  - Aims to reach
  - Modification, additions or deletions

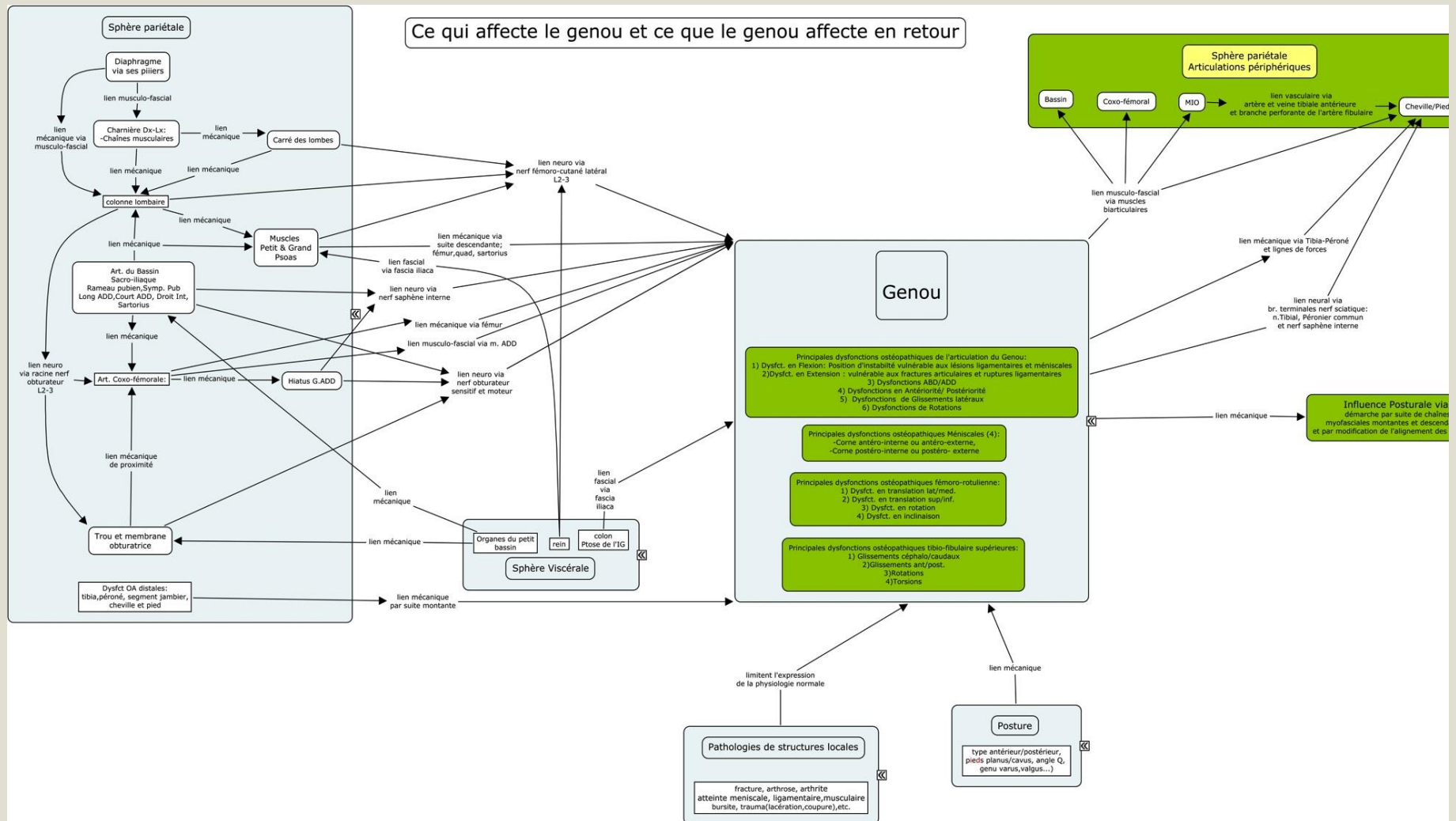
# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 1<sup>st</sup> TRIAL



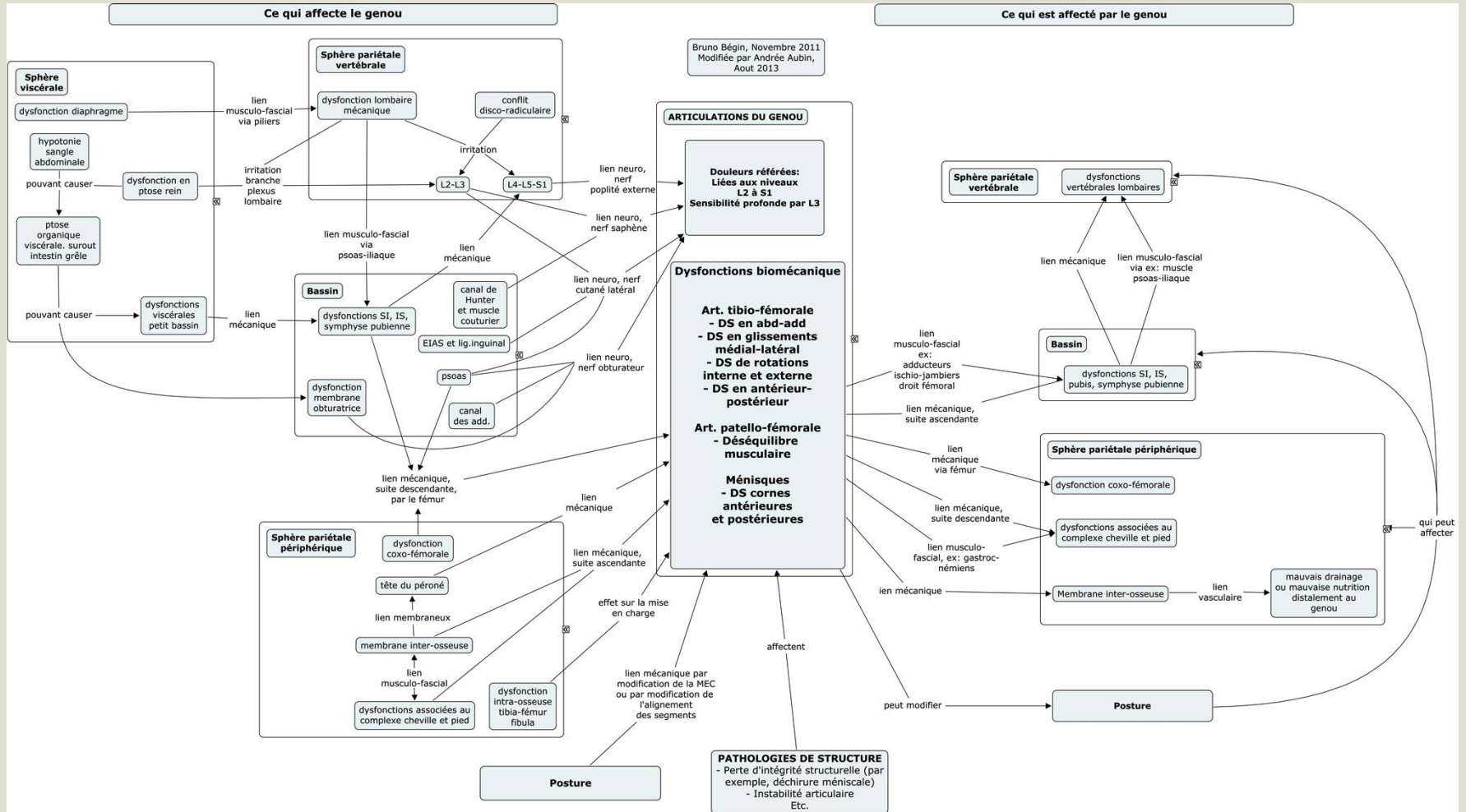
# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 2<sup>nd</sup> TRIAL



# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 3<sup>rd</sup> TRIAL

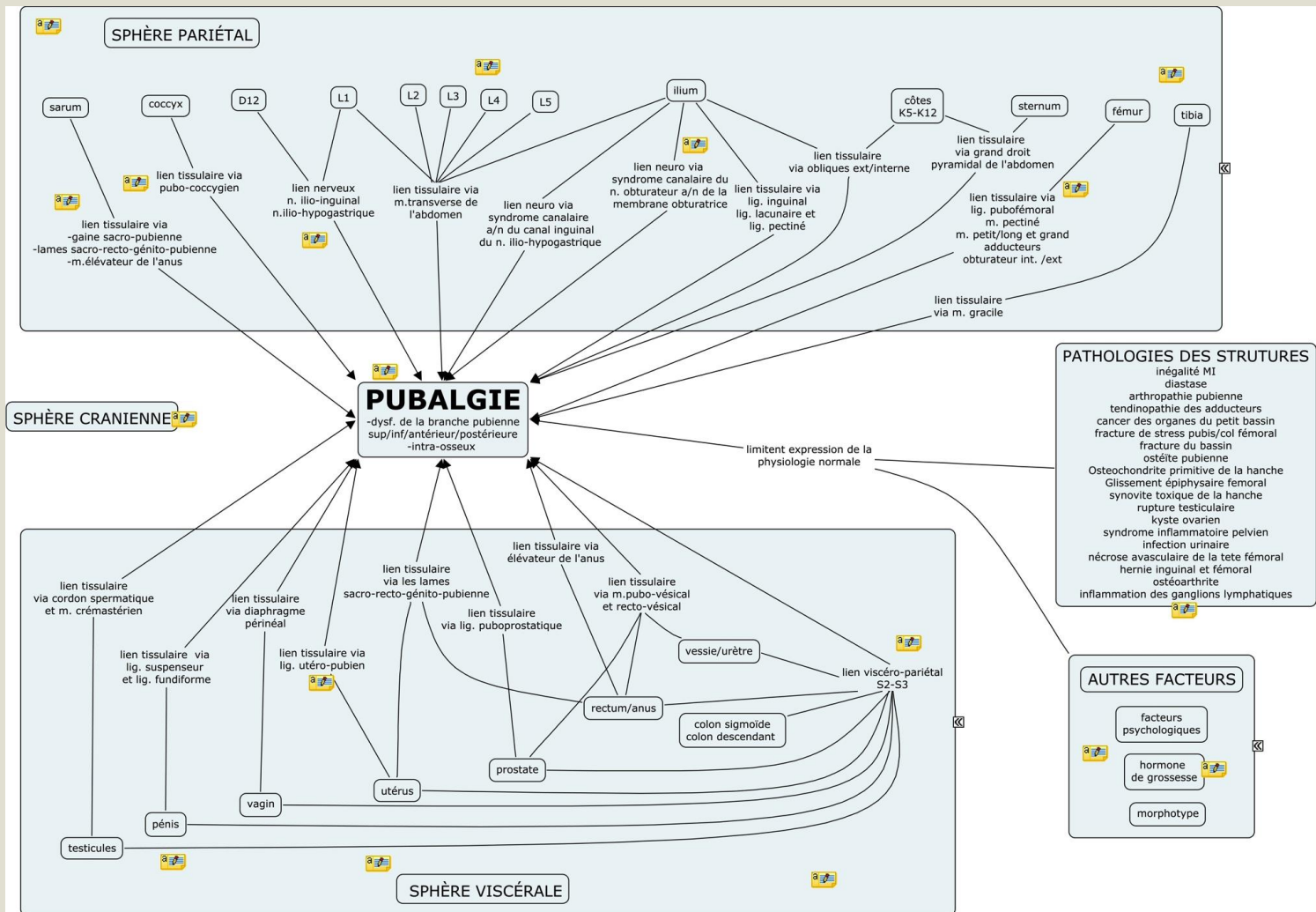


# A WINDOW INTO THE MIND : FROM TEACHERS TO STUDENTS

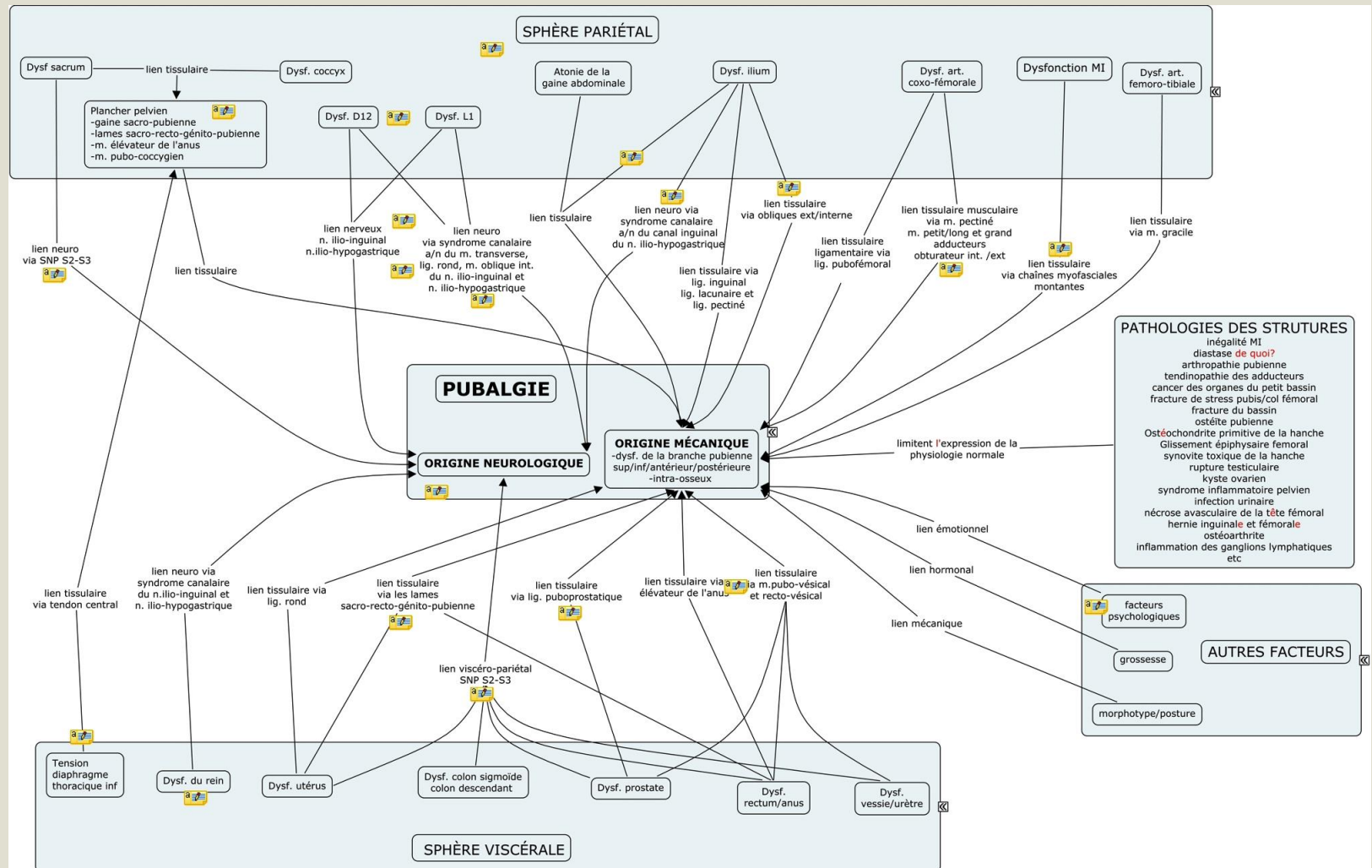




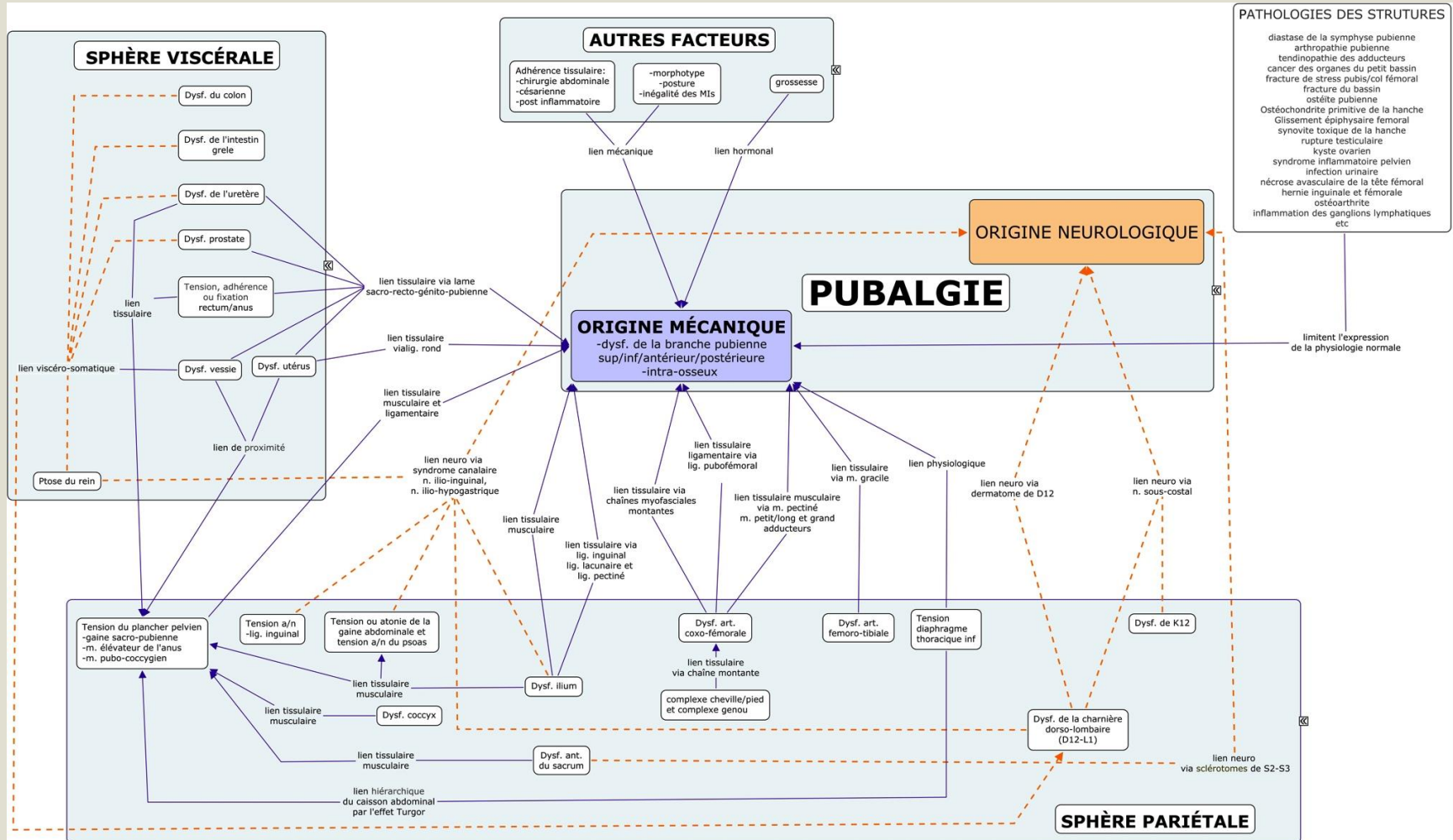
# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 1<sup>st</sup> TRIAL



# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 2<sup>nd</sup> TRIAL

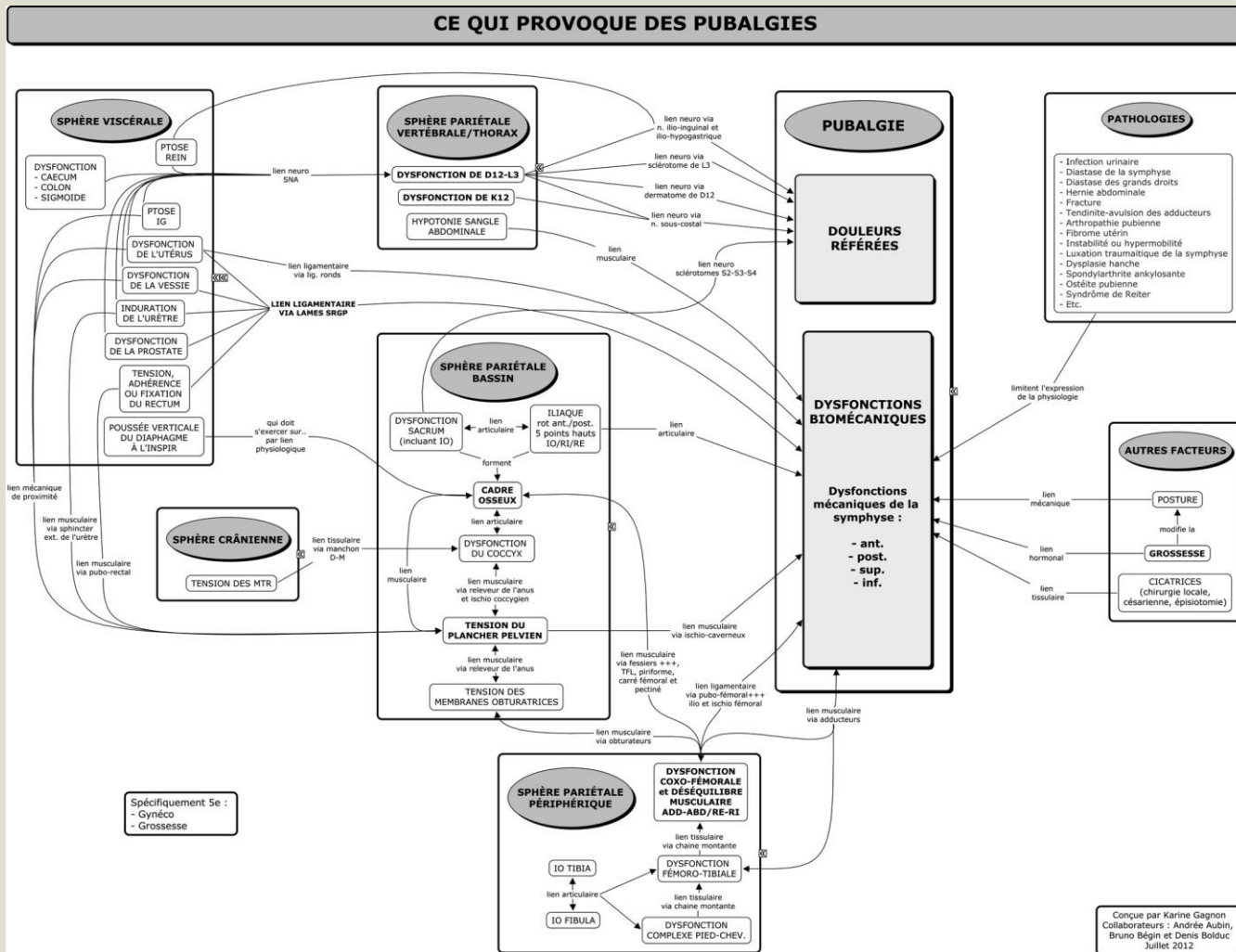


# A WINDOW INTO THE MIND : FROM STUDENTS TO TEACHERS – 3<sup>rd</sup> TRIAL

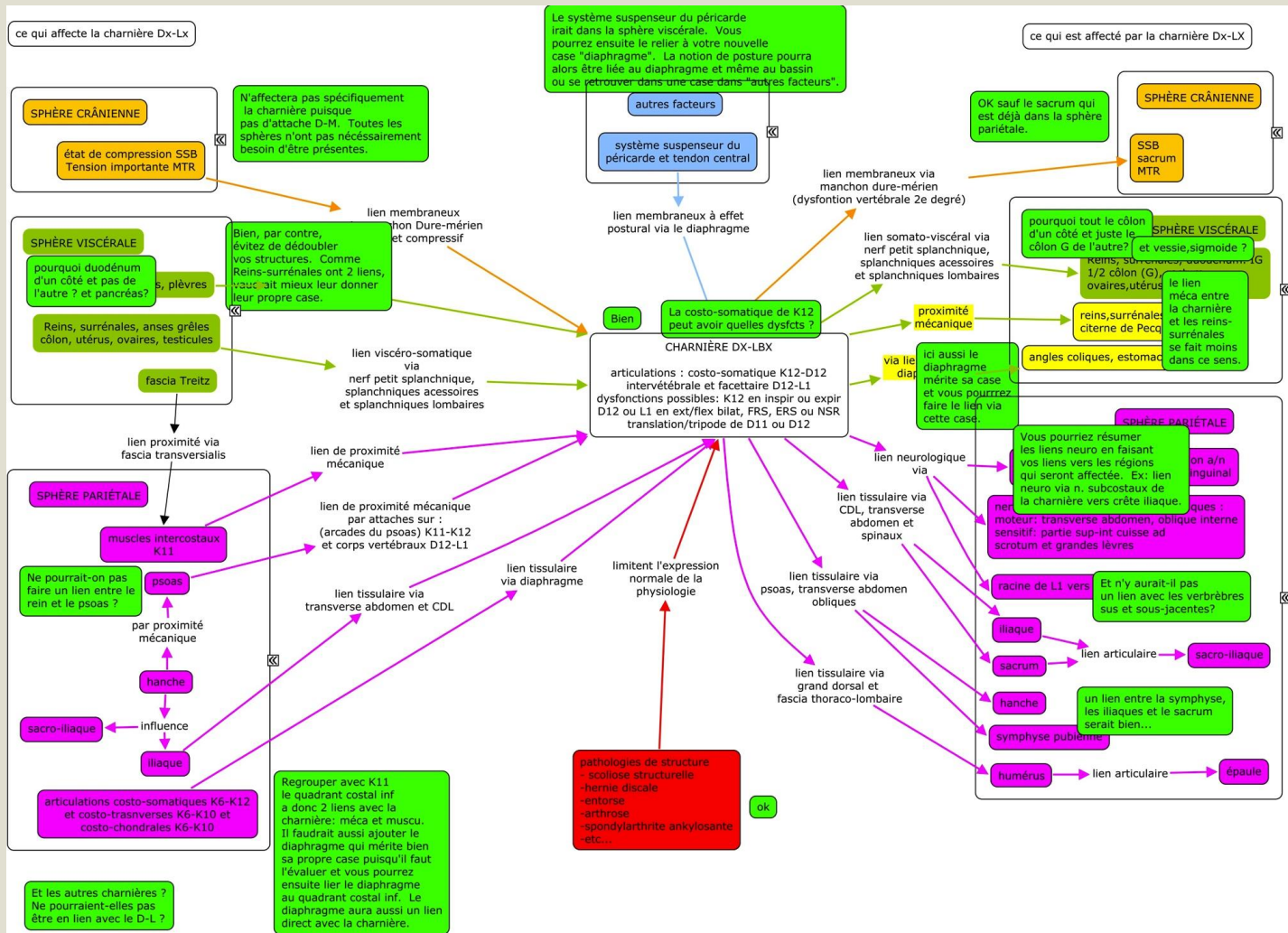




# A WINDOW INTO THE MIND : FROM TEACHERS TO STUDENTS



# A WINDOW INTO THE MIND : FROM TEACHERS TO STUDENTS



# **SURVEY QUESTION STUDENTS**

**Following your new learning experience of production and presentation of concept mapping, we would like to know your opinion and appreciation.**

**If necessary, you can add longer comments overleaf.**

**Inspired from Concept Mapping Questionnaire, in Buldu & Buldu, 2010**

# SURVEY'S RESULTS

## (2013 + 2014 GRADE 3 & 4)

AIMS	NONE OR LITTLE		AVERAGE		PRETTY OR HIGH	
	Grade 3 / grade 4		Grade 3 / grade 4		Grade 3 / grade 4	
DEEP LEARNING	8	3	19	22	29	29
MOTIVATION	17	20	14	16	24	18
FEEDBACK	5	5	15	14	35	35
CONTEXT	18	16	22	19	43	46
EFFICIENT TOOL	17	19	18	12	23	23
ORAL PRESENTATION	6	8	11	7	11	12

# SURVEY'S RESULTS

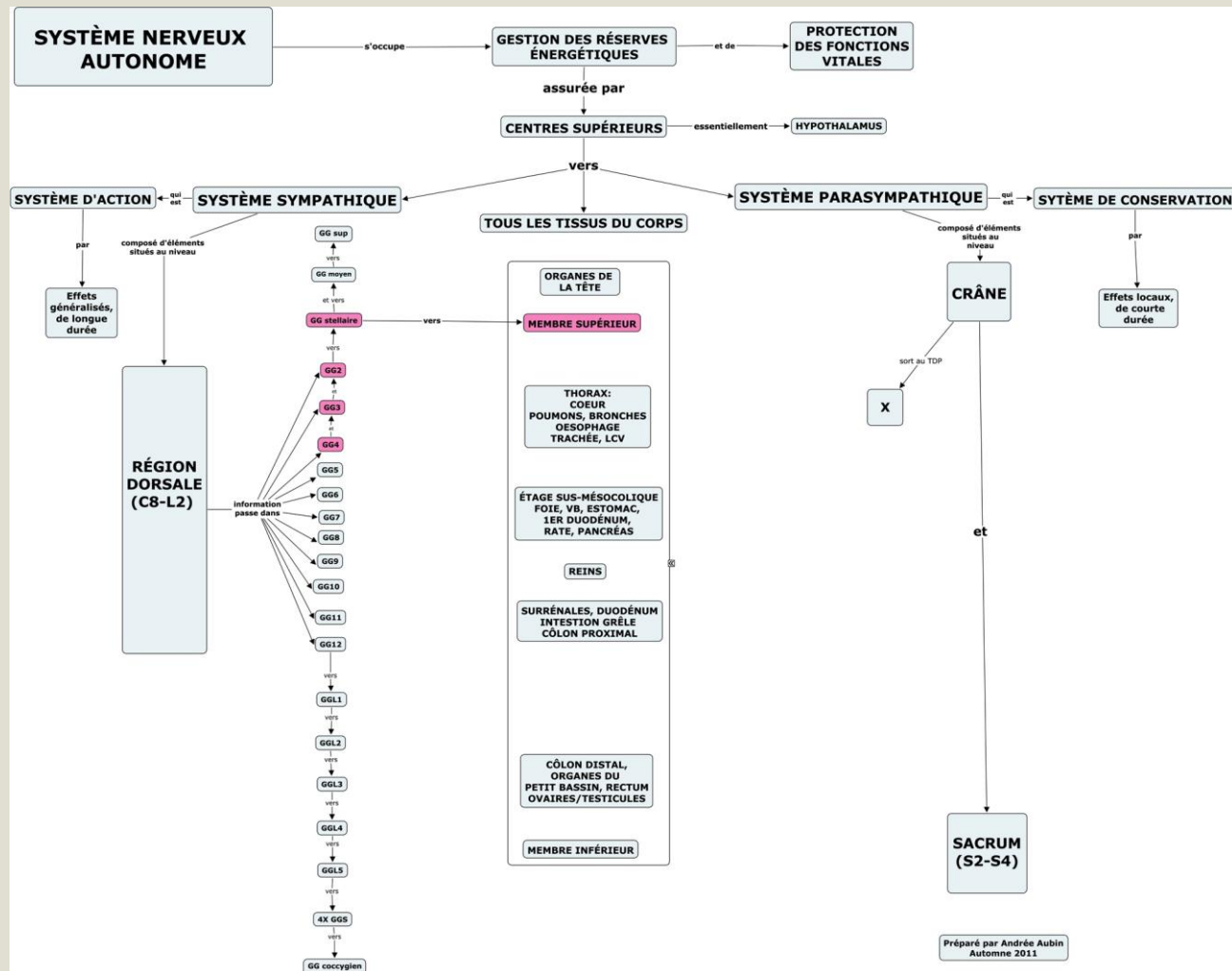
(2013 + 2014 GRADE 3 & 4 AND 2011 + 2012 GRADE 5)

AIMS	NONE OR LITTLE			AVERAGE			PRETTY OR HIGH		
	3 / 4	Grade 5		3 / 4	Grade 5		3 / 4	Grade 5	
DEEP LEARNING	8	3	4	19	22	5	29	29	52
MOTIVATION	17	20	7	14	16	19	24	28	36
FEEDBACK	5	5	6	15	14	10	35	35	43
CONTEXT	18	16	24	22	19	17	43	46	54
EFFICIENT TOOL	17	19	9	18	12	16	23	23	40
ORAL PRESENTATION	6	8	2	11	17	12	11	12	18

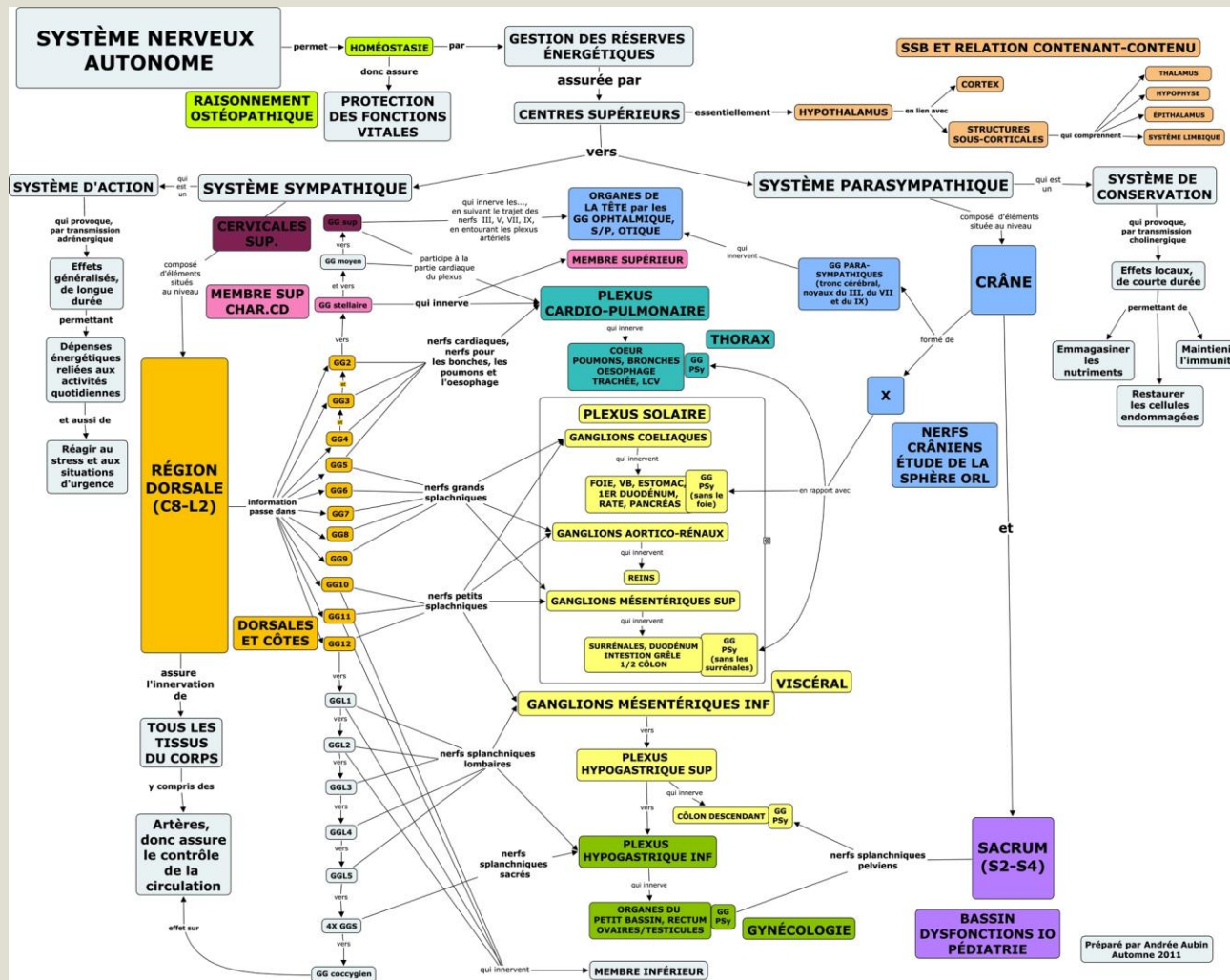
# SURVEY'S RESULTS

- **Deep learning** is mostly rated from average to high for all groups
- **Motivation** is associated with this activity, especially in fifth-year students
- **Teachers feedback** is equally appreciated in each group
- **Context** refers to students' appreciation of teamwork and the schedule for the work in progress process
- **Concept mapping** was a new experience for all students; associated factors such as **software's utilization** are important points that can limit deep learning
- **Students** don't really appreciate **oral presentation** as a deep learning activity, except in fifth-year students

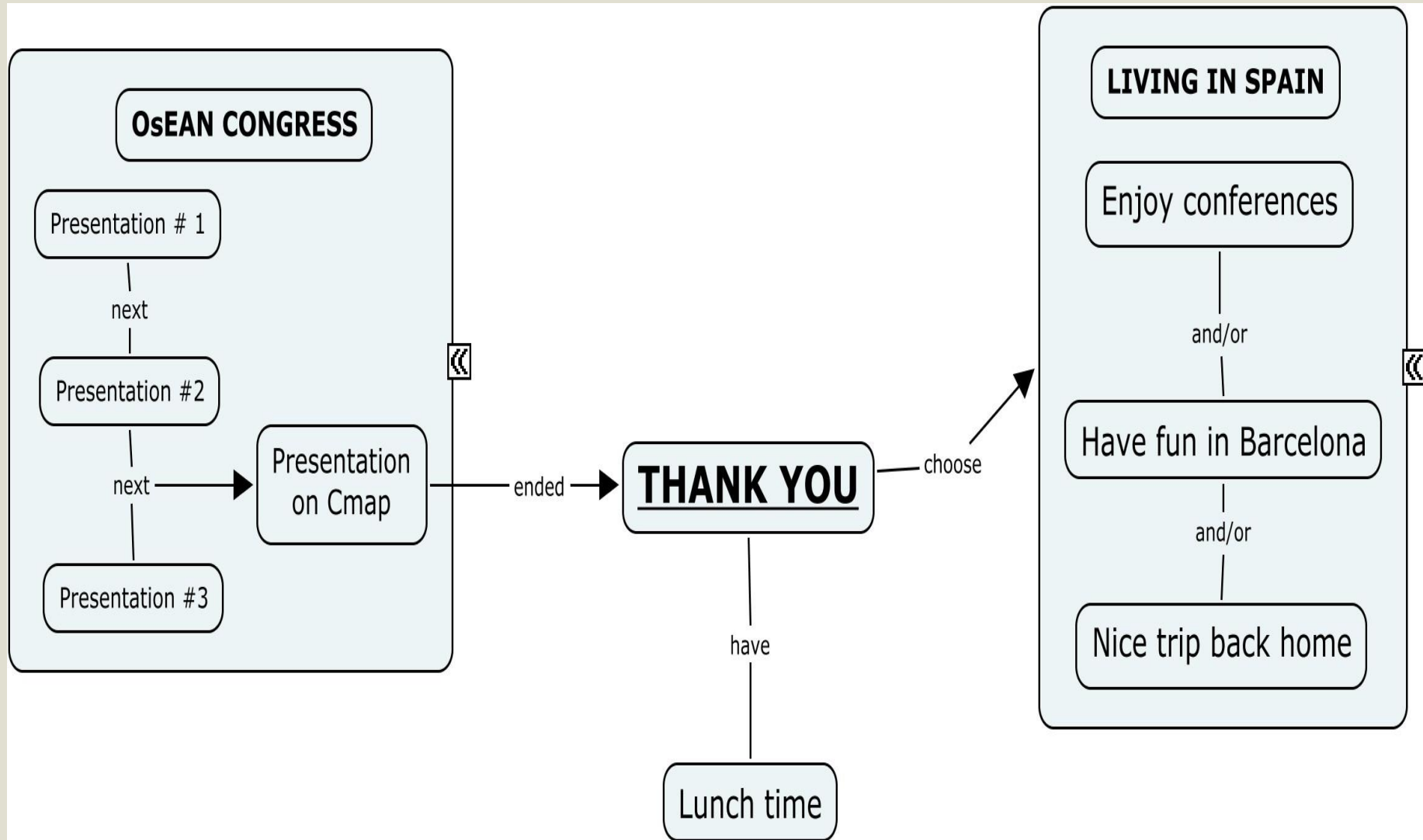
# A WINDOW INTO THE MIND : FROM TEACHERS TO STUDENTS



# COLLABORATIVE TEACHING







# BIBLIOGRAPHY

- Buldu, M., & Buldu, N. (2010). Concept mapping as a formative assessment in college classrooms: Measuring usefulness and student satisfaction. *Procedia Social and Behavioral Sciences*, 2, 2099-2104.
- Canas, A.J. & Novak, J.D. 2. (2008). Concept Mapping Using CmapTools to Enhance Meaningful Learning. In *Knowledge Cartography: Software Tools and Mapping Techniques*, Springer, 25-46.
- Chastragnat, P., & Marchand, C. (2012). Les cartes conceptuelles : un outil au service de l'évaluation des compétences. *Pédagogie Médicale*, 13(4), 257-272.
- Chiou, C.C. (2008). The effect of concept mapping on students' learning achievements and interests. *Innovations in Education and Teaching International*, 45(4), 375-387.
- Daley, B., & Torre, D. (2010). Concept maps in medical education: an analytical literature review. *Medical Education*, 44, 440-448.
- D'Antoni, A.V., Pinto-Zipp, G., Ohlson, V.G., & Cahill, T.F. (2010). Does the mind map learning strategy facilitate information retrieval and critical thinking in medical students? *BMJ Medical Education*, 10, 1-11.
- Demeester, A., Vanpee, D., Marchand, C., & Eymard, C. (2010). Formation au raisonnement clinique : perspectives d'utilisation des cartes conceptuelles. *Pédagogie Médicale*, 11(2), 81-95.

# BIBLIOGRAPHY

- Hay, D. B., Kinchin, I., & Lygo-Baker, S. (2008). Making learning visible: the role of concept mapping in higher education. *Studies in Higher Education*, 33(3), 295-311.
- Kinchin, I.M. (2003). Effective teacher/student dialogue: a model from biological education. *Journal of Biological Education*, 37(3), 110-113.
- Kinchin, I. M., Baysan, A., & Cabot, L. B. (2008). Towards a pedagogy for clinical education: beyond individual learning differences. *Journal of Further and Higher Education*, 32(4), 373-387.
- Marchand, C., & d'Ivernois, J.-F. (2004). Les cartes conceptuelles dans les formations en santé. *Pédagogie Médicale*, 1(5), 230-240.
- Nesbitt, J.C., & Adescope, O.O. (2006). Learning with Concept and Knowledge Maps: a meta-analysis. *Review of educational research*, 76(3), 413-448.
- Novak, J. D. (2003). The promise of new ideas and new technology for improving teaching and learning. *Cell Biology Education*, 2, 122-132.
- Pottier, P., Planchon, B., Hardouin, J.-B, Sebile, V., Rogez, J.-M., & Barrier, J.-H. (2011). Évaluation préliminaire de la validité de construit d'un dispositif cartographique (carte procédurale) pour l'étude du raisonnement clinique. *Pédagogie Médicale*, 12(2), 87-101.

# BIBLIOGRAPHY

- Reese, D.D. (2004). Assessment and Concept Map Structure: The Interaction Between Subscores and Well-Formed Mental Models. Paper presented at the 2004 meeting of the American Educational Research Association. San Diego.
- Rochette, A., Bélisle, M., Laflamme, A., Doucet, M., Chaput, M., & Fillion, B. (2010). Étude descriptive de l'utilisation des cartes conceptuelles comme stratégie pédagogique en sciences de la santé. *Pédagogie Médicale*, 11(2), 97-109.
- Torre, D.M., Daley, B., Stark-Schweitzer, T., Siddartha, S., Petkova, J., & Ziebert, M. (2007). A qualitative evaluation of medical student learning with concept maps. *Medical Teacher*, 29, 949-955.
- Wheeler, L.A. & Collins, S.K.R. (2003). The influence of concept mapping on critical thinking in baccalaureate nursing students. *Journal of Professionnal Nursing*, 19(6), 339-346.