DEVELOPING A COLLABORATIVE USE OF THE INTERACTIVE WHITEBOARD BY K-2 STUDENTS: AN ACTION RESEARCH

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Research Context

Massive arrival of interactive whiteboards

1996
Equip Quebec schools with computers and peripherals (318 millions $ over 5 years)

2011
Provide each classroom with an IWB (40 000 IWB, 240 millions $, over 5 years)

2014
The number of IWB is growing in the elementary schools of Quebec

Using the IWB in the classroom

- Teachers have a tendency to :

  - Integrate the IWB into their existing practices (Cogill, 2002);

  - Use the IWB when teaching as a whole class (Winzenried, Dalgarno and Tinkler, 2010);

  - Keep control of the IWB (Winzenried, Dalgarno and Tinkler, 2010);

  - Call the students one by one to punctually have them interact with the IWB

(Bennett and Lockyer, 2008)

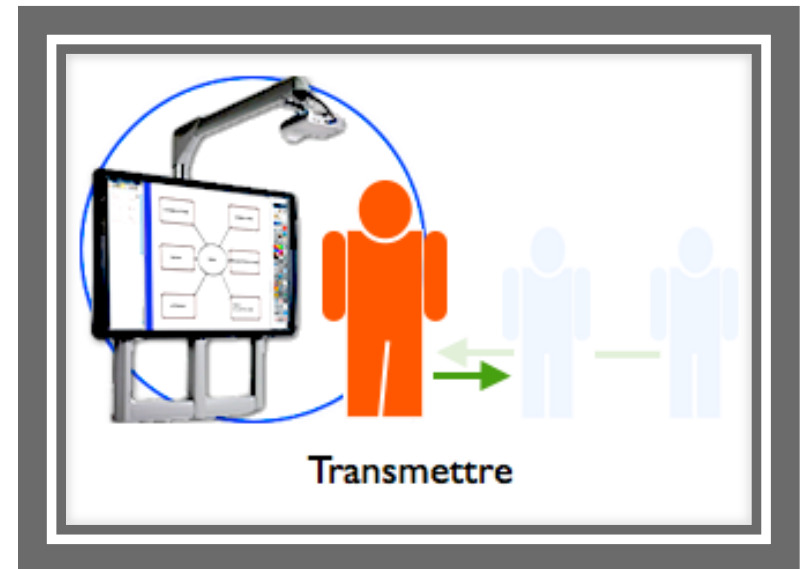# "Traditional" use of the IWB

- Especially when teachers :
  - start using it;
  - never had training.

(Hodge and Anderson, 2007; quoted in Winzenried, Dalgarno and Tinkler, 2010)

Caution

□ The IWB, when placed in front of the class, could even reinforce a traditional teaching style.

(image: André Roux)

(Hall and Higgins, 2005; quoted in Gillen, Staarman, Littleton, Mercer and Twiner, 2007)

What are the advantages of using the IWB when teaching?

- Create and present attractive resources (Ball, 2003; Kennewell, 2004);

- Can accelerate the rhythm (Glover and Miller, 2001b; Ball, 2003; Miller, 2003) and facilitate the synthesis of the lessons (Glover and Miller, 2002; Walker, 2002);

- Facilitate the incorporation of diverse multimedia resources (Ekhami, 2002; Johnson, 2002; Levy, 2002)
  - Texts, photos, videos, sounds, diagrams, websites, etc.

Quoted in Higgins, Beauchamp and Miller (2007) and Duroisin and al. (2011)

Consensus

The learning benefits of the IWB are largely dependent of the way it is used in the classroom.

(Winzenried, Dalgarno and Tinkler, 2010)

Teachers need training and support to use the IWB to its full potential and to facilitate students' learning.

Objectives

Objectives of the project

1) To develop and put in place a continuous training model based on a **professional learning community** (PLC) composed of kindergarten and first cycle teachers, educational consultants, and researchers, in an **action research process**;

2) Experiment, document and analyse techno-educational practices that foster the **collaborative use of the IWB** by the students, for their learning in languages and other domains;

3) Study the impact of the collaborative use of the IWB by the students on **their engagement and their learning in languages**

Frame of reference

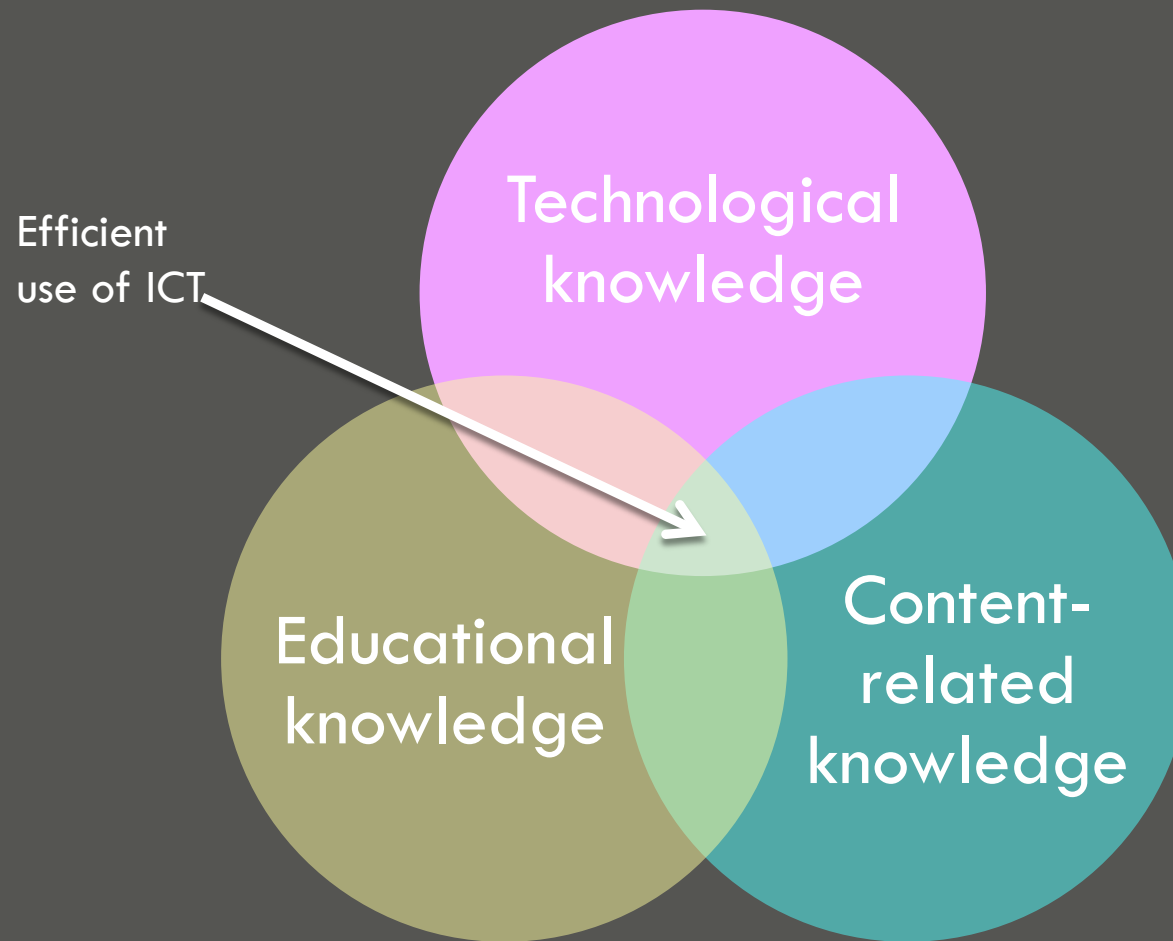# Impacts of the collaborative use of the IWB in the classroom

- **Generate and maintain a dialogic space** (Warwick, Kershner and Staarman, 2010)

- **Allow the confrontation and the co-construction of ideas** (Mercer, 2000; quoted in Mercer, Warwick, Kershner and Staarman, 2010)

- **Make visible the reflexion process** (Kershner and al., 2010) **and strategies used by peers** (Haldane, 2007)

Conditions needed to "think and build together" with the IWB

- Enough time;

- Complex task;

- Scaffolding strategies from teachers and peers;

- Availability of resources and tools;

- Social abilities to work together/"talk-rules" (turn taking on the IWB & in discussion, not to interrupt, etc.).

(Mercer, Warwick, Kershner, Staarman, 2010)

TECHNOLOGICAL, PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK)

Technological knowledge

Efficient use of ICT

Educational knowledge

Content-related knowledge

www. tpack.org (Mishra, P. & Koehler, M. J., 2006)

TRANSITION FRAMEWORK OF TEACHERS USE OF THE IWB

Expert

Beginner

- The teacher and the students use the IWB to its full potential and in an equal manner to co-construct knowledge and learning

Synergistic user

- The teacher uses hyperlinks, different types of files (pictures, sounds, videos) and peripherals
- The students frequently and confidently use the IWB, often in a spontaneous manner

Advanced user

- The teacher uses many functions and programs at the same time
- The students use different tools available in the IWB software

Initiated user

- The teacher uses activities that he/she prepared in basic subjects and in a linear manner
- The students write, encircle, highlight and 'drag' content

Apprentice user

- The teacher uses the IWB to write and draw as if it was a black board

Black board substitute

(Beauchamp, 2004)

Methodology

Action Research

☐ « A methodological practice centered on the resolution of a concrete problem experienced in a real educational situation with the goal to make beneficial changes, to contribute to the professional development of those who took part in it and to improve the knowledge on this situation. »

(Guay and Prud'homme, 2011, p.188)
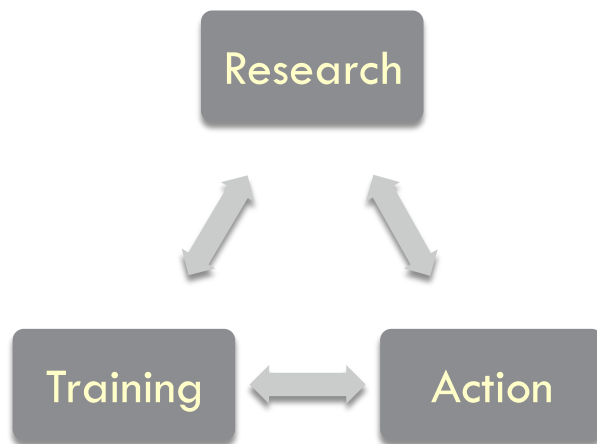
The three goals of the action research (Dolbec and Clément, 2004)

Professional Learning Community on the IWB
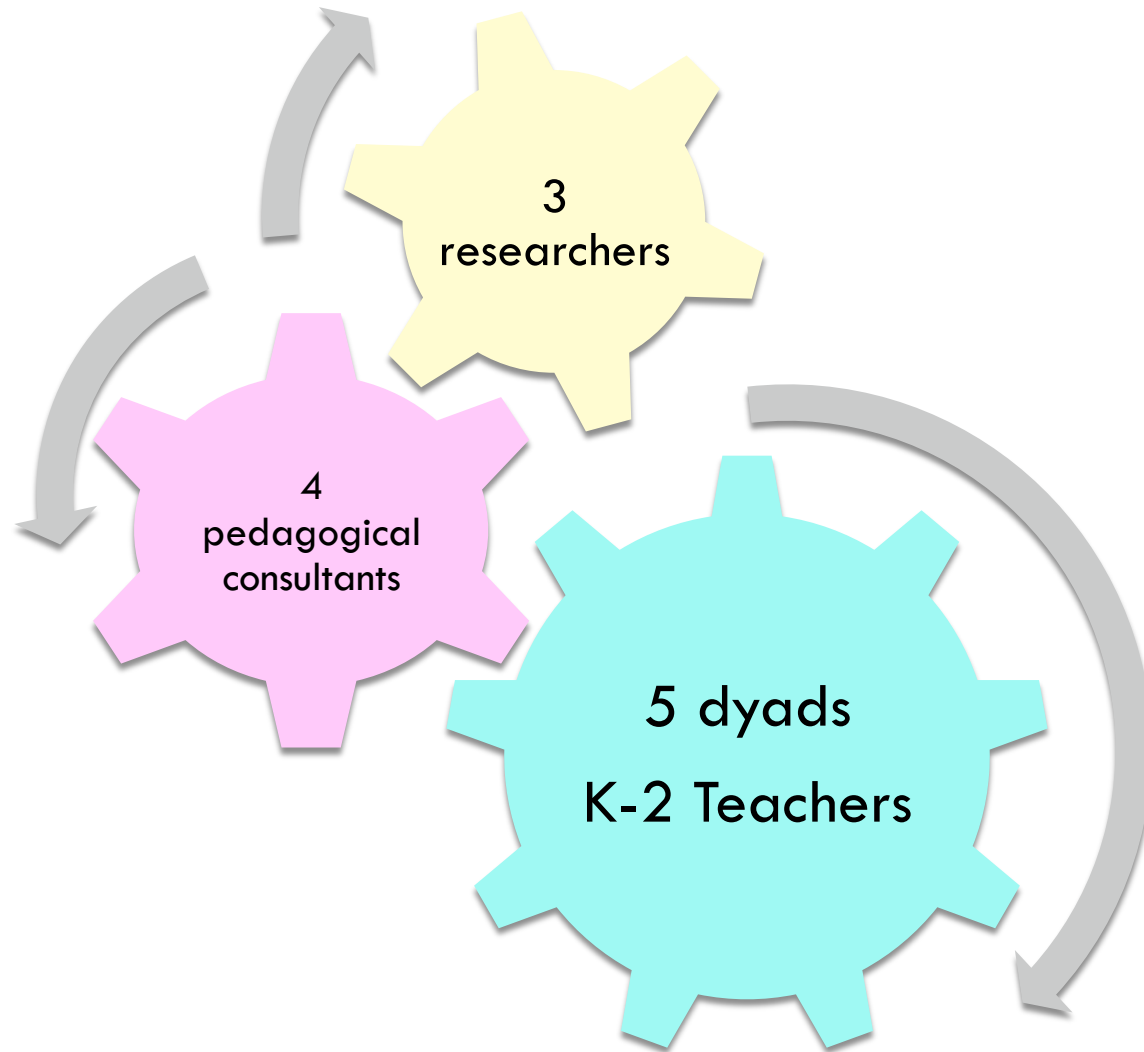
Methodology / Data collecting

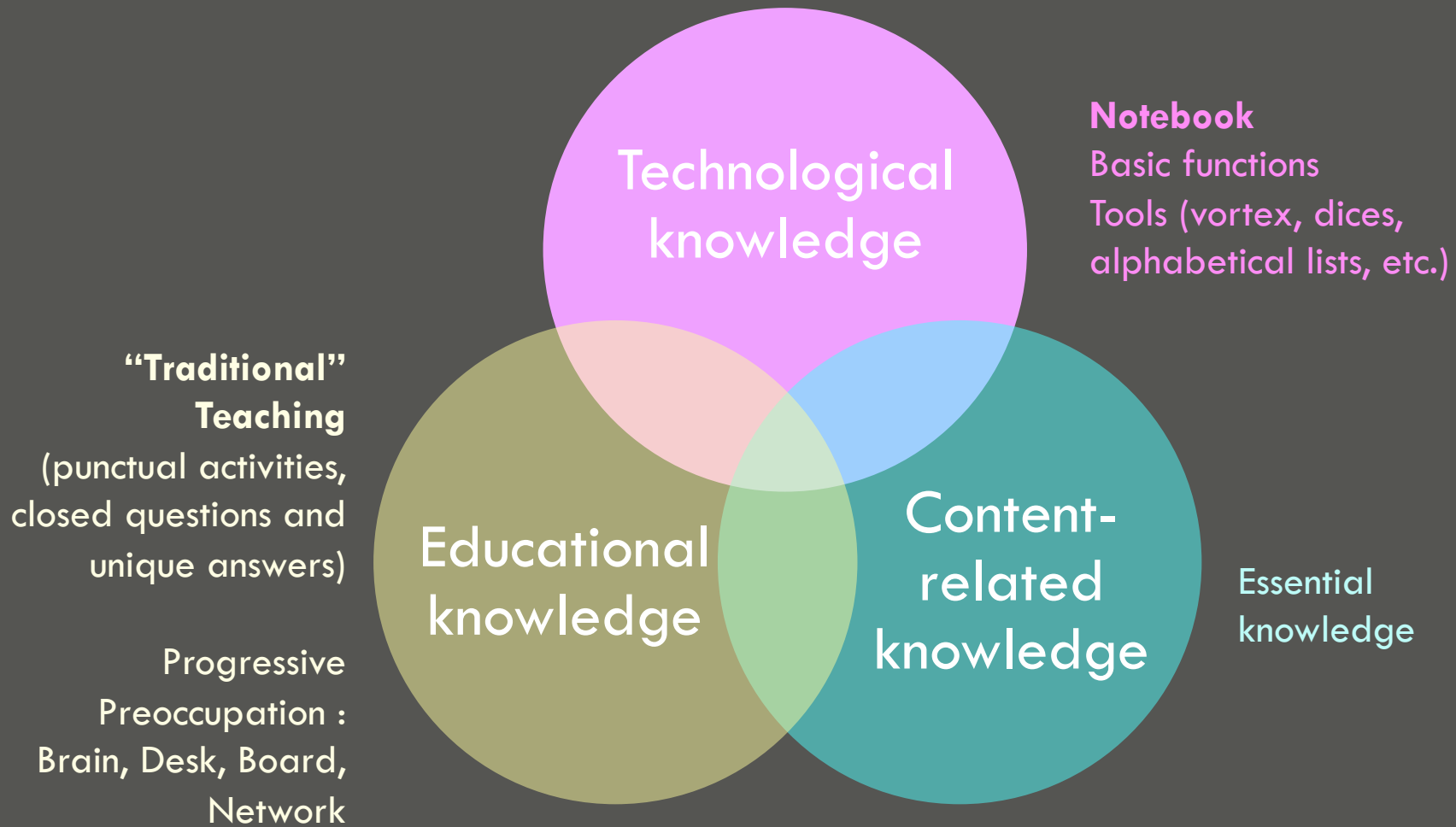| Tools	Year 1			Year 2			Year 3		
	Beginning	Mid-project	End	Beginning	Mid-project	End	Beginning	Mid-project	End
Questionnaires	x		x			x			x
Interviews	x		x			x			x
Logs		x			x			x	
Practice sharing		x			x			x	
Video	x October		x May	x October		x May	x October		x May

Results

Year 1 and year 2 preliminary results

- How do teachers' educational practices develop regarding the student's collaborative use of the IWB?

YEAR 1

Technological knowledge

Educational knowledge

Content-related knowledge

Notebook
Basic functions
Tools (vortex, dices, alphabetical lists, etc.)

"Traditional" Teaching
(punctual activities, closed questions and unique answers)

Progressive Preoccupation : Brain, Desk, Board, Network

Essential knowledge

(Mishra, P. & Koehler, M. J., 2006)

YEAR 2

Technological knowledge

Educational knowledge

Content-related knowledge

Open canvas and more software and tools

Cooperative learning
Center approach

(More complex tasks requiring many stages of completion)

"Traditional" Teaching

Disciplinary competencies

(Mishra, P. & Koehler, M. J., 2006)

ON THE WAY TO YEAR 3

Technological knowledge

Maximal use of the IWB and **all of its functions:** pictures, sounds, hyperkinks, etc. Use of **peripherals.**

Project approach
Center approach
Cooperative learning
Explicit teaching

Educational knowledge

Content-relative knowledge

Disciplinary and **cross-curricular** competencies
Essential knowledge
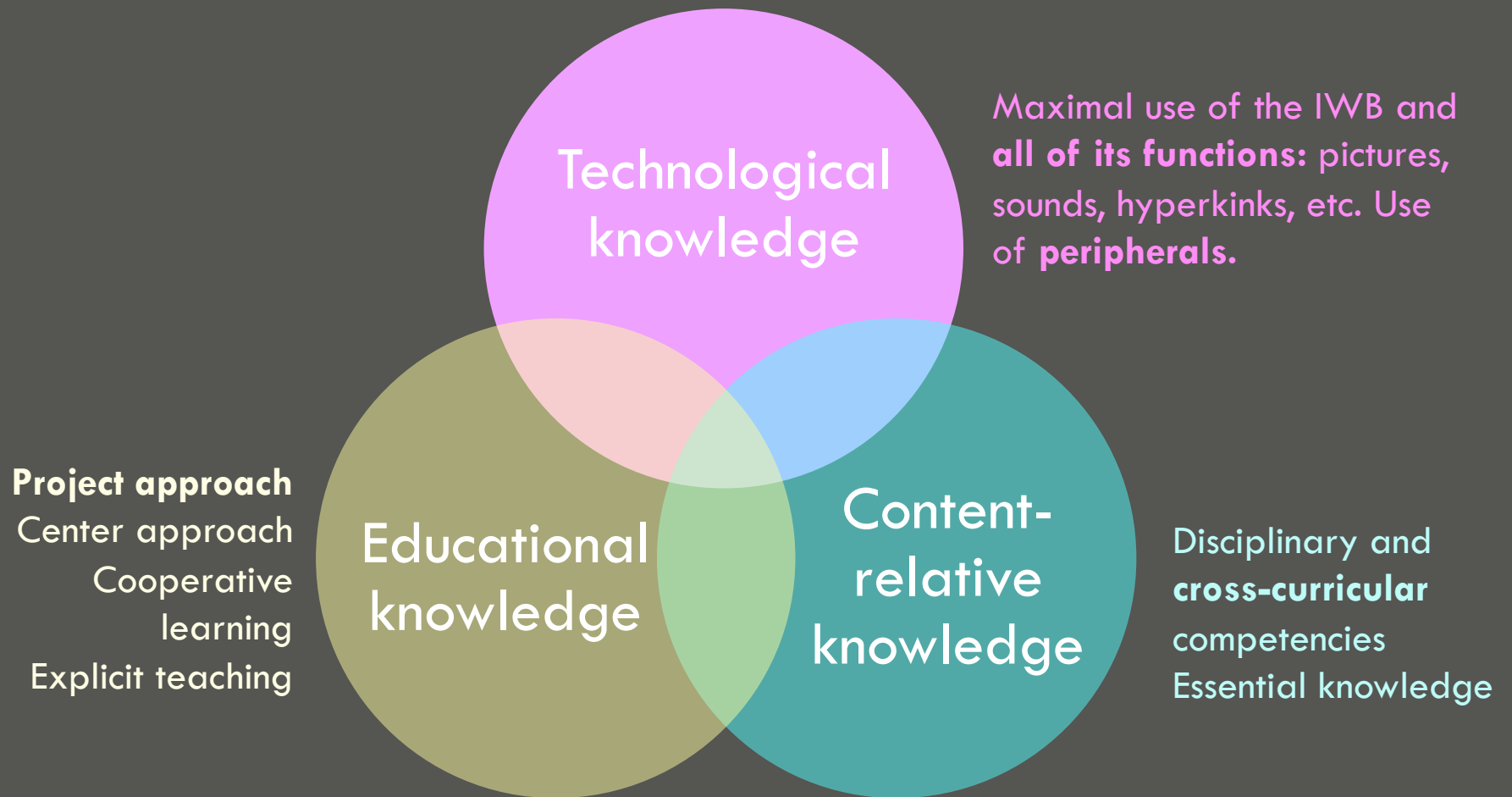
(Mishra, P. & Koehler, M. J., 2006)

Progression of interactions with the IWB

Teacher → students
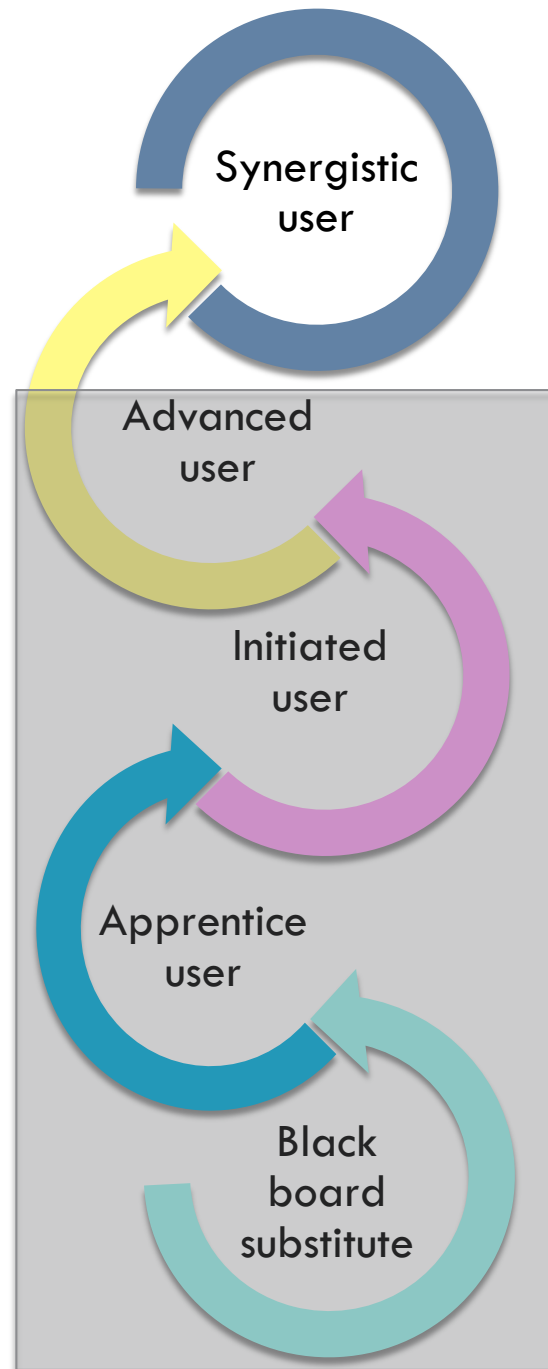
Teacher ↔ students

Student
Student ↔ Student
← Teacher
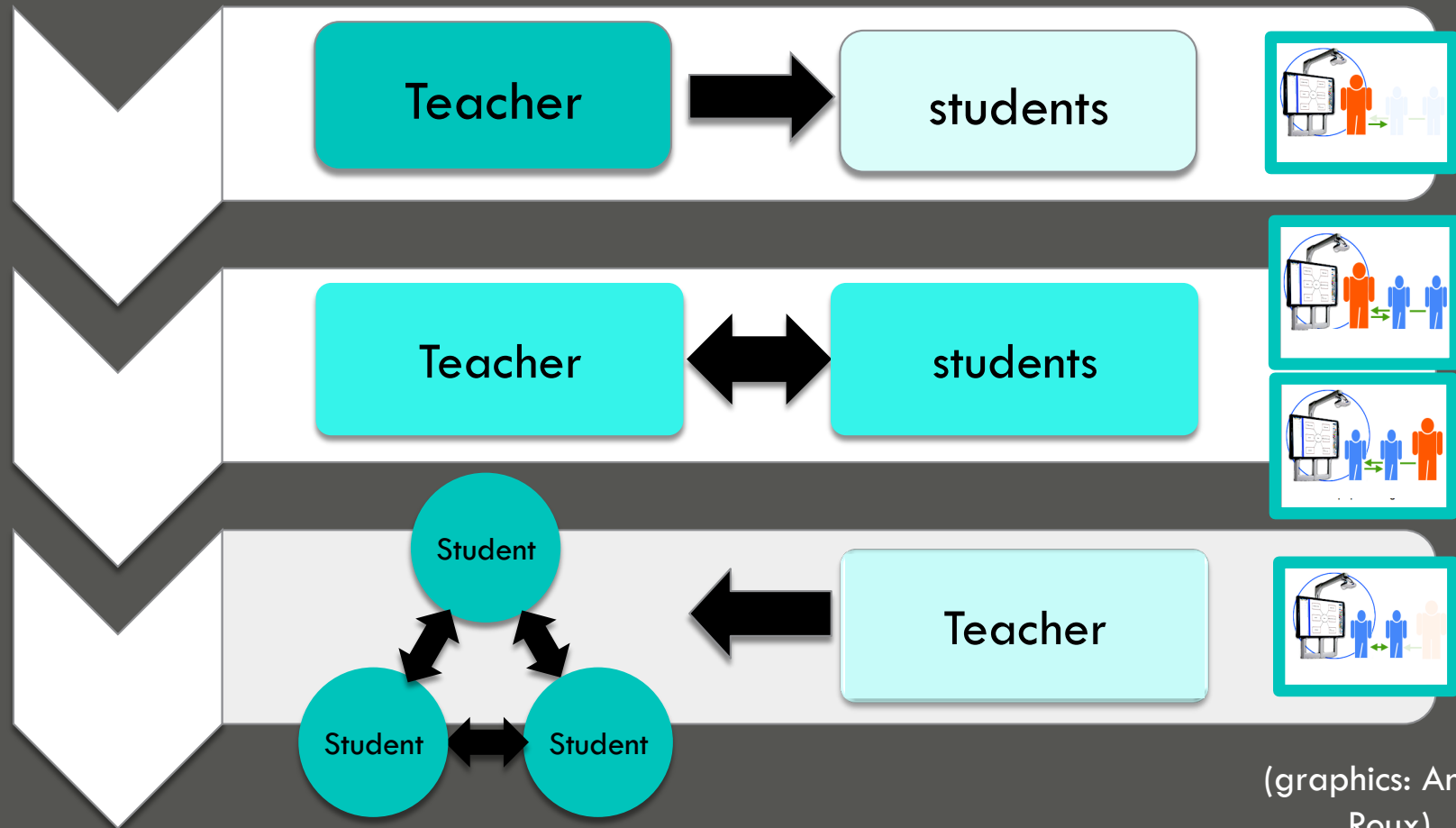
(graphics: André Roux)

(Birmingham and *al.*, 2002; quoted in Higgins, Beauchamp and Miller, 2007)

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Synergistic user

Advanced user

Initiated user

Apprentice user

Black board substitute

(Beauchamp, 2004)

Year 1 and year 2 preliminary results

☐ What is the impact of the use of the IWB on the students' learning?

▫ *What were the students' learning when using the IWB, as noted by the teachers and reported by the students themselves?*

Students' learning

- Disciplinary competencies
  - Learning of vocabulary
    - "I think that for anagrams, it helps the children to memorize vocabulary words. I saw, even in spelling quizzes, improvements since we started to play that game in class. It is an activity that we do on a regular basis during the week… " [Grade 1 teacher]

Students' learning

- Disciplinary competencies
  - Reading
    - " (…) I noted a great improvement in reading in the majority of my students, even in those that were in difficulty" [Grade 1 teacher]
  - Reading strategies [reported by students themselves]
    - Using of the first letter of the word
    - Decoding
    - Global recognition of the word

Students' learning

- Disciplinary competencies
  - Writing
    - Handwriting
    - Writing words and sentences
    - Spatial organization
    - Story structure
      - "Inventing stories made my students work on structure and ideas to build stories" [Kindergarten teacher]

Students' learning

- ## In summary,
  - "They [students] discuss, exchange, have to make compromises, give ideas, find solutions, ask for help… (oral)
  - There are activities [with the IWB] to develop reading : word finding, word/picture associations, message of the day, wordplays, (…) phonological awareness,
  - and also in writing (invented spelling, handwriting).
  - There is also when I [teacher] type at the keyboard (…), my students see the words that I say written in front of them.

    It is a very interesting tool for language development."

    [Kindergarten teacher]

Students' learning

- "Cross-curricular" Competencies
  - ICT Competency (8/10)
    - Notebook Tools
      - "The students have more autonomy using certain tools like pencils, highlighters, colors…" [Grade 1 teacher]
  - Autonomy (8/10)
    - "During a complex task with constraints and working in teams, I see that students try things, functions, discuss with each other and find solutions to smaller challenges and ask for help for greater ones." [Kindergarten teacher]
  - Fine Motor & Gross Motor Learning (5/10)

Conclusion

❑ Even though studies show advantages to the use of the IWB in class, its impact on the students' learning remain to be clearly demonstrated.

Conclusion

❑ **Teachers need:**

  ❑ training and
  ❑ long-term support (TPACK)

So that the IWB really becomes a tool for:

  ❑ the co-construction of knowledge and competency
  development of the students

Contact

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References

- Beauchamp, G. (2004). Teacher Use of the Interactive Whiteboard in Primary Schools: Towards an Effective Transition Framework. *Technology, Pedagogy and Education, 13*(3), 327-348.

- Bennett, S. et Lockyer, L. (2008). A study of teachers' integration of interactive whiteboards into four Australian primary school classrooms. *Learning, Media and Technology, 33*(4), 289-300.

- Cogill, J. (2002). *How is the interactive whiteboard being used in the primary school and how does this affect teachers and teaching?* URL: www.canterbury.ac.uk/education/protected/ppss/docs/julie-coghill.pdf

- Duroisin, N., Tempermen, G. et De Lièvre, B. (2011). Effets de deux modalités d'usage du tableau blanc interactif sur la dynamique d'apprentissage et la progression des apprenants. *Environnements informatiques pour l'Apprentissage humain. Conférence EIAH* (Mons, Belgique). 257-269.

- Dolbec, A. et Clément, J. (2004). La recherche-action. Dans T. Karsenti et L. Savoie-Zajc (dir.), *La recherche en éducation : ses étapes et ses approches* (3e éd.). Sherbrooke : Éditions du CRP.

References

- Gillen, J., Staarman, J.K., Littleton, K., Mercer, N. et Twiner, A. (2007). A 'learning revolution'? Investigating pedagogic practice around interactive whiteboards in British primary classrooms. *Learning, Media and Technology, 32*(3), 243-256.

- Guay, M.-H, et Prud'homme,L. (2011). La recherche-action. In T. Karsenti et L. Savoie-Zajc (dir.). *La recherche en éducation: étapes et approches*, 3e édition, (p. 183-211). Saint-Laurent: ERPI.

- Higgins, S., Beauchamp, G. et Miller, D. (2007). Reviewing the Literature on Interactive Whiteboards. *Learning, Media and Technology, 32*(3), 213-225.

- Haldane, M. (2007). Interactivity and the Digital Whiteboard: Weaving the Fabric of Learning. *Learning, Media and Technology, 32*(3), 257-270.

- Kershner, R., Mercer, N., Warwick, P. et Staarman, J.K. (2010). Can the interactive whiteboard support young children's collaborative communication and thinking in classroom science activities? *International Journal of Computer-Supported Collaborative Learning, 5*(4), 359-383.

References

- Mercer, N., Warwick, P., Kershner, R. et Staarman, J.K. (2010). Can the interactive whiteboard help to provide 'dialogic space' for children's collaborative activity? *Language and Education, 24*(5), 367-384.

- Warwick, P., Mercer, N. et Kershner, R. (2010). In the mind and in the technology: The vicarious presence of the teacher in pupil's learning of science in collaborative group activity at the interactive whiteboard, *Computers & Education, 55*(1), 350-362.

- Winzenried, A., Dalgarno, B. et Tinkler, J. (2010). The interactive whiteboard : A transitional technology supporting diverse teaching practices. *Australasian Journal of Educational Technology, 26*(4), 534-552.