#HV&A4L

3CA model:
Concept map, Critical thinking, Collaboration and Assessment

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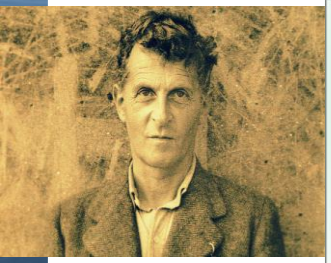
Theoretical Framework: A Theory of the Language Thinking (LGCT)

Aristotle's approach

The critical thinking questions: what, when, where, why, how and who are taken from Aristotle's, Nicomachean Ethics. This is the first study of the critical thinking questions.

Chomsky's

key revelation is that a language must have a grammar and a syntax that provides the dynamic process to the language of thinking.



The late Wittgenstein theory

of the language game integrates the different components of the language of thinking. His view is that language of ordinary people is perfectly in order, and the language games of thinking consists of a series of activities called a language game.

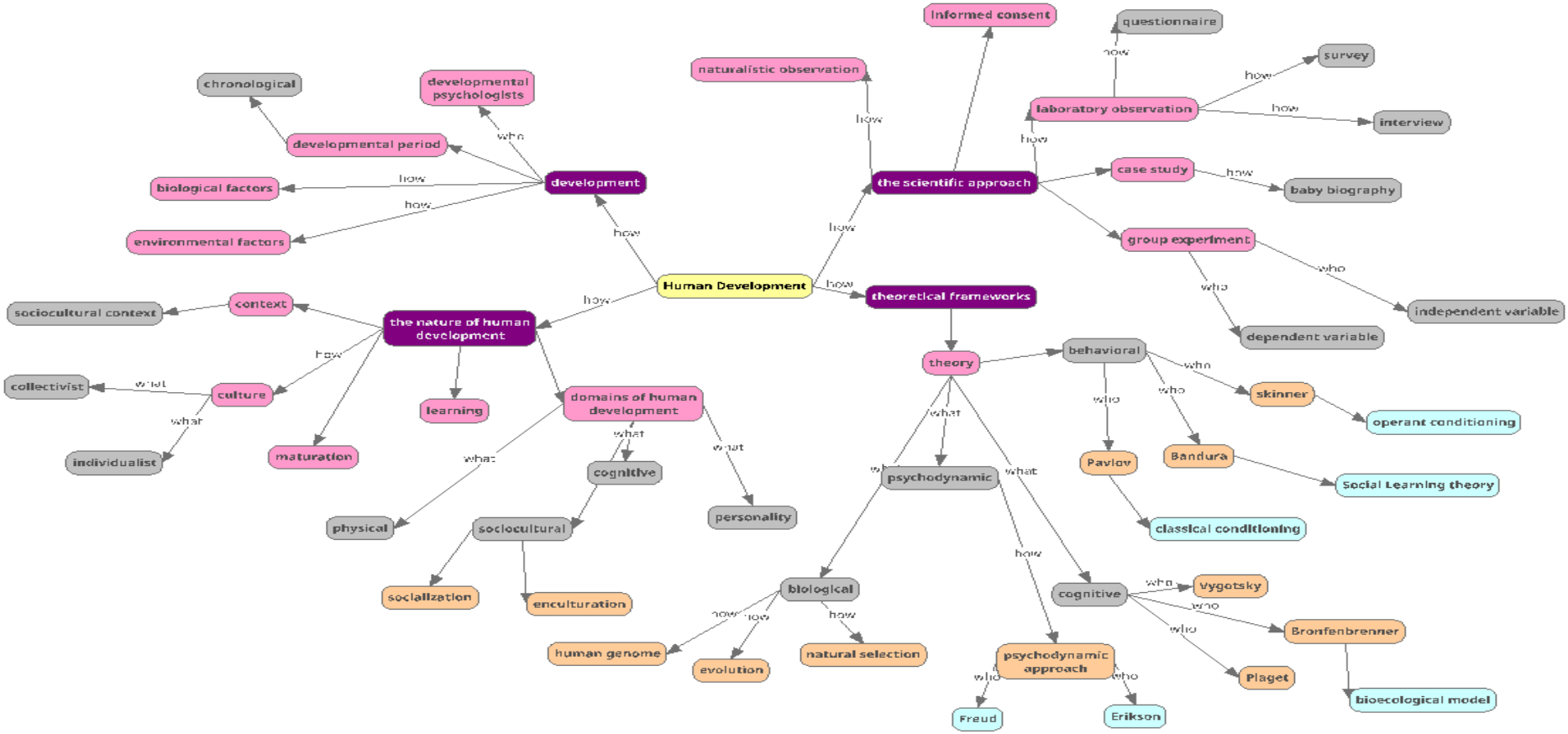
Gordon (2018) insight

that in the past education has directed the science of evaluation but in the future, the science of assessment will give direction to education, triggered a reimagining of the purposes and tools of assessment.

Components of the 3CA model

- Concept Map
- Critical Thinking
- Collaboration
- Assessment

Concept maps are a node-link diagram in which each node shows a concept and a link that represents the relationship between the two concepts (Schroeder, Nesbit, Anguiano & Adesope, 2017).



Critical Thinking

A important educational life skill, and there is widespread agreement about the need for critical thinking to improve achievement and deepen understanding across the disciplines.

Teaching critical thinking is necessary in fields, such as science education (Fettahlıoğlu & Kaleci, 2018), high school chemistry (Suardana, Redhana, Sudiatmika, & Selamat, 2018, business ethics, undergraduate engineering (Adair & Jaeger, 2016; Ralston & Bays, 2015), nursing/medical education (Papp et al., 2014) and music education (Kokkidou, 2013).

Despite the widespread interest and research into the teaching of critical thinking, students do not have practical guidelines to apply critical thinking in different contexts.

Critical Thinking in 3CA model
Aristotle's approach

Application of WH questions:

(what , when , where, how, why, who,) to different concept, key terms,…

Widely respected in philosophy, used in the law, practiced in journalism, the corner stones of inquiry in the sciences, and used in everyday conversation to gather information.

The 3CA approach provides effective tools, such as the WH questions first described by Aristotle in the Nicomachean Ethics (Sloan, 2010).

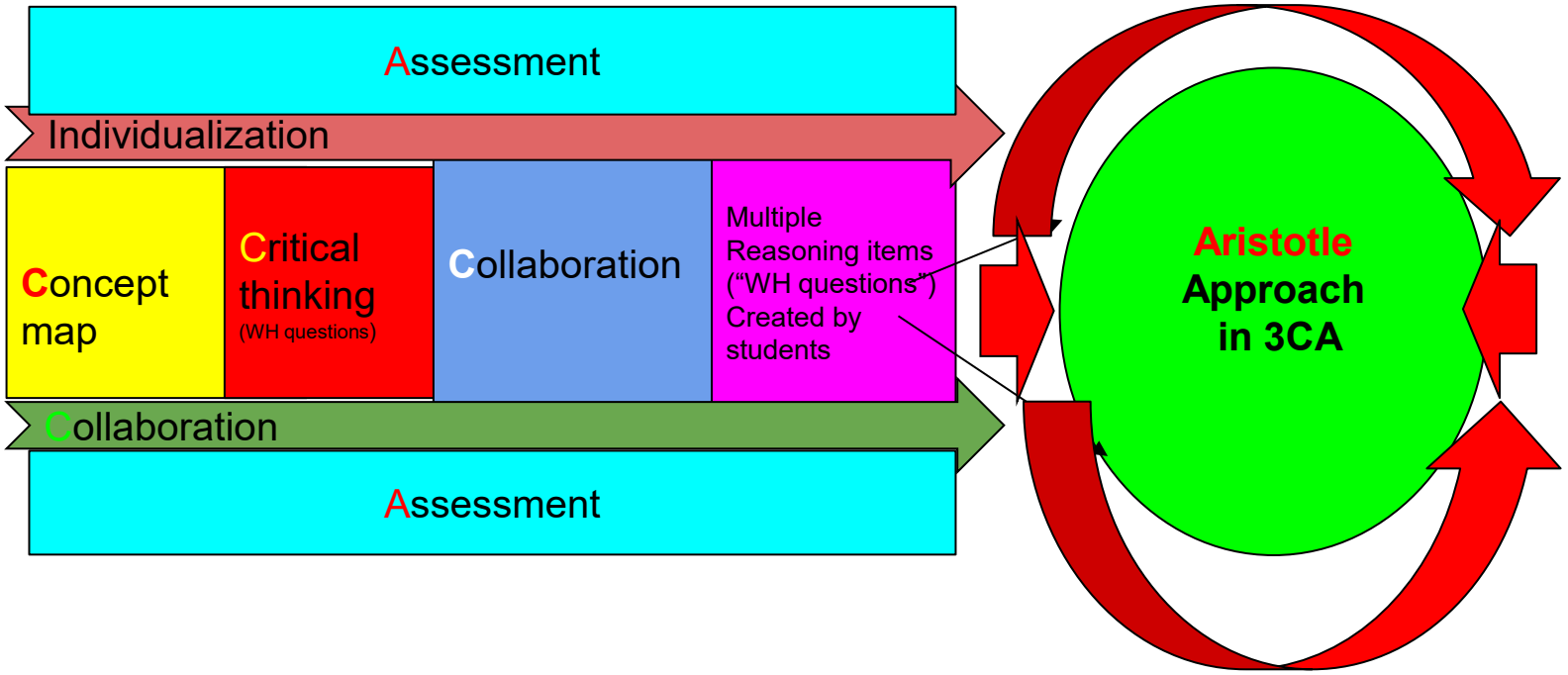
Collaboration

- Collaboration is derived from the Latin “collaborare” and means to work together.
- In their review of the psychological and cognitive science literature, Andrews and Rapp (2015) make clear that collaboration has its own unique benefits, costs, and challenges

Assessment reconsidered:

- New approach to assessment
- Students create the items for their own assessments and grades
- A change in the hierarchical power in assessment
- the reduction of student stress, and the construction of items/questions as tools for equity in the assessment process.

General picture of the model



Training (2 weeks)

- Concept map (Mind mup)
- Critical Thinking
- Assessment

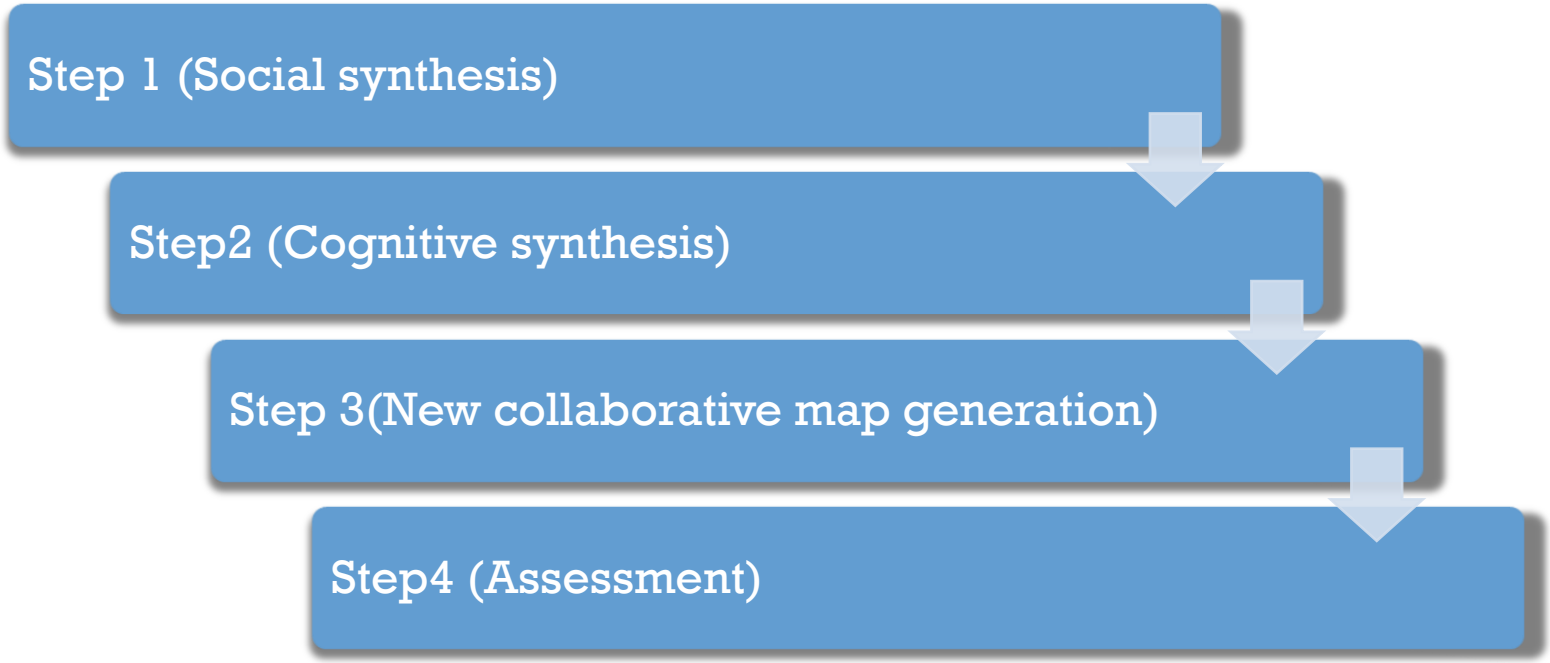
Individual Phase

Step 1 (Concept Map)

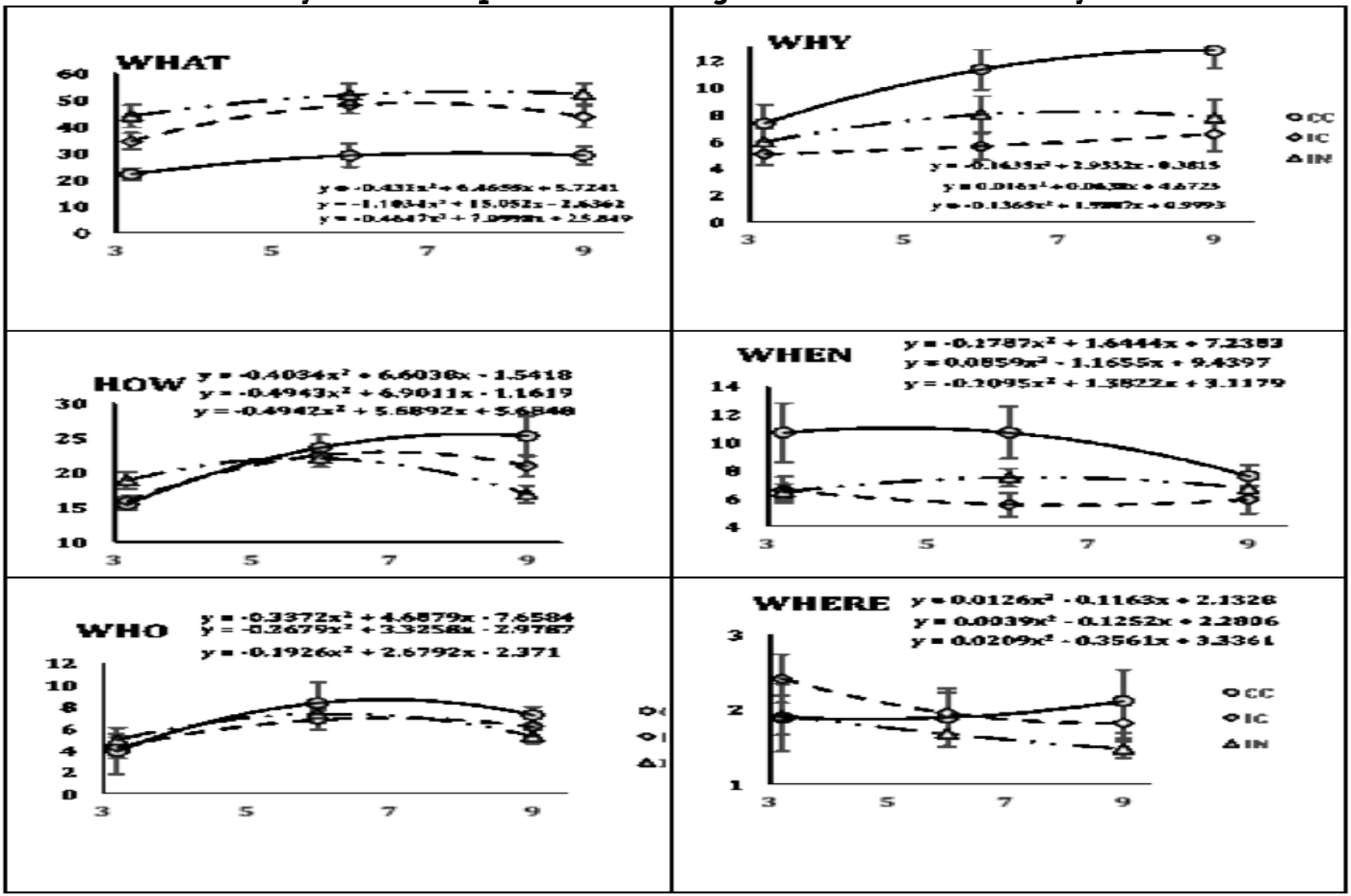
Step2 (Critical Thinking)

Step4 (Assessment)

Collaborative phase



Result: Trend analysis of "WH questions" among conditions as affected by time intervals



Discussion

- Concept map: It reorganizes knowledge using visual learning
- Critical thinking questions: A set of analytic tools that can be used at any context
- Collaboration: It engages agency and communication
- Assessment: Empowering students

Student's rating of different components of 3CAM

Link to the published article
https://eric.ed.gov/?id=EJ1191203

Concept map

- Students were enthusiastic about the concept maps. **Four major themes** emerged from the student's comments on concept maps. Most of the students made supportive comments while 6 students were not satisfied with concept maps.
- The themes were visualization, organization, simplification of learning.
- "They help visualize concepts for people who are visual learners like myself"
- "They allow students to visualize their own learning as well as their peer's learning and make it easier to learn"
- "Organization of thoughts into categories more clearly"

Critical Thinking

- They said it took them a while to be comfortable with the process but once, they became comfortable with the process they found the language games of critical thinking to help them organize their thinking about the content of the chapters in the text. The critical thinking questions helped them think beyond the book and rationalize their thinking. One student commented, it helped them to think backwards and forward. Another said that it helped apply the material to the real world.

Collaboration

- It was the best of the whole class
- I have learned a lot through collaboration
- Love it
- We shared our maps that was interesting how we think differently

Assessment

- When students were asked to assess the creation of reasoning questions, they were particularly enthusiastic. The commented that creating questions put them in the place of the instructor and having to make decisions about what are the important concepts. Another said, it eased tensions, it helped me to connect point A with point B. It gave me a chance to expand my critical thinking by taking on the professor's role a bit. It was a fun way to review the concepts. It helped me to understand the concept of the chapters. It makes me more actively engaged and think outside of the box. "I am forced to think".

Future research

- Applying the model to
- SLL and FLL using the critical thinking concept map
- both cognitive & affective aspects of learning
- To the development of abilities

How to scaffold negative emotions

Thanks for your attention