Relationship of knowledge to learn in programming methodology and evaluation of computational thinking

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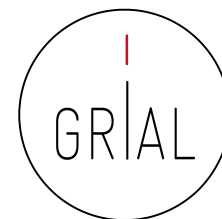
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INTRODUCTION

- Computational Thinking – CT
- Disciplines
  - Science, Technology, Engineering and Mathematics
- CT in not a synonym for programming
- In Puebla – Mexico
  - Desertion
  - High and variable rate of failure
  - Lack of academic performance
- Propose other ways

CONTEXT

- Redesing Programming methodology course

- Each tematic unit is written based on a cognitive category Bloom´s taxonomy.

- CT
  - solving problems
  - Relationship with the Computer Science

CONTEXT

- The relationship between the CT, teach programming and Bloom´s taxonomy

| Bloom's taxonomy	Skill	Thematic unit
Analysis	Abstraction and decomposition	Basics
Application	generalization	expressions
Synthesis	algorithmic design	algorithms and flowcharts
Evaluation	evaluation	algorithms and flowcharts

- UK Bebras
- Computer Olympiad Talent Search

DESCRIPTION

- Mobile – decomposition
- Kangaroo – abstraction
- Spies – generalization
- Beavers on the run – algorithmic design
- Puddle jumping – evaluation
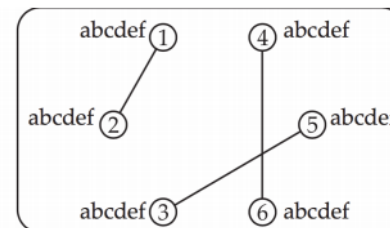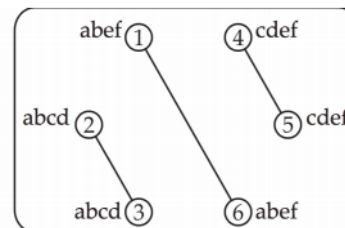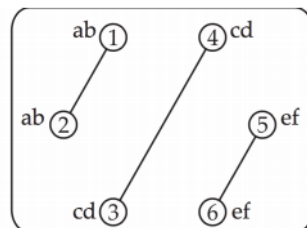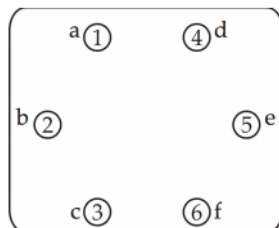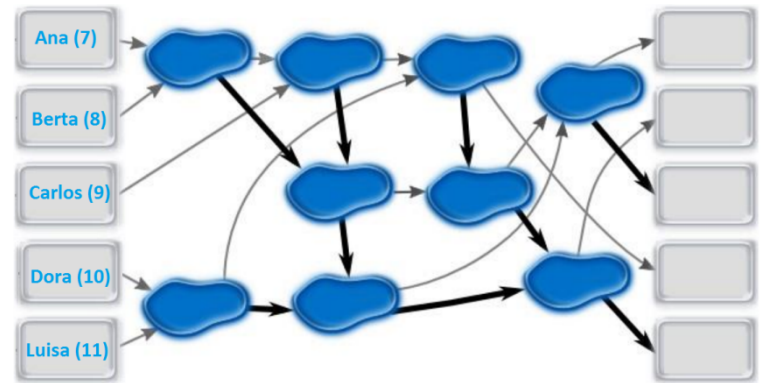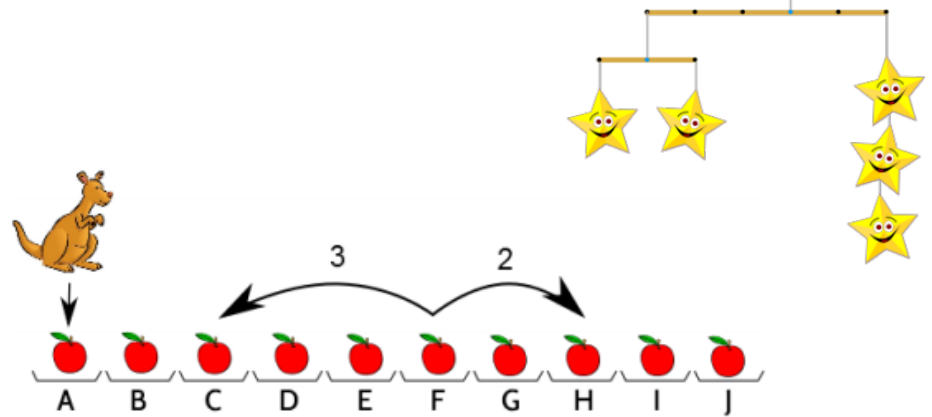
RESULTS

SCENARIO	MODEL	EVALUATION	RIGHT / WRONG	TIME
1	Online	Full course online	5 right	15 days
2	Online	Full course online	W- beavers on the run	1 month
3	Semi distance	Counseling Laboratory	W-puddle jumping	1 month
4	Online	Online counseling	W-beavers and puddle	1 month
5	Online	Online	W-Spies	1 month
6	Semi distance	Academy	W-beavers, puddle and spies	Academy
7	Semi distance	Departmental Laboratory	R-Kangaroo or Mobile	Academy
8	Classroom	Academy	5 wrong	Academy

RESULTS - EXPERIMENT

- 18 volunteer students
- Knowledge already familiar from his first course
- Later perfomed the evaluation of CT
- Verify correspondence
- Results determination 6 cases

RESULTS

Unit	Knowledge	A	B	C	D	E	F
1	Type of data Variable identifiers	6	2	2	4	4	0
2	Arithmetic operators Logical operatos Relatinal operators Hierarchy of operatos Solve expressions	4	8	0			6
3	Using counter and accumulator variable Selection structure (conditional) Structure repetition (cycle) Flowchart Design of algorithms	3	0	13	2	0	0

A: Claim to know all the knowledge and correct answers

B: say know all the knowledge, but incorrect responses

C: say know some of the knowledge and correct answers

D: knowledge unfamiliar and wrong reactive for two skills

E: familiar with all knowledge and wrong reactive for two skills

F: not yet sure and erroneous reagents

CONCLUTIONS

- Justified proposal
- Evaluation computational thinking – how to study
- Based on teaching experience options of learning environment are determined
- Two experimental groups
- Accredited students, desertions and academic level
- Learning environment in Moodle platform

ACKNOWLEDGEMENTS

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