



Faculdade de Ciências Universidade do Porto

Conceptual Questions and Physlets

A case study in a Portuguese Undergraduate School

Edite Briosa

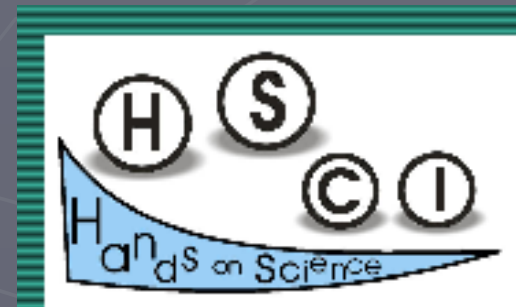
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“Algebra is a wonderful invention. It enables fools to do physics, without understanding.”

Lewis Carroll Epstein

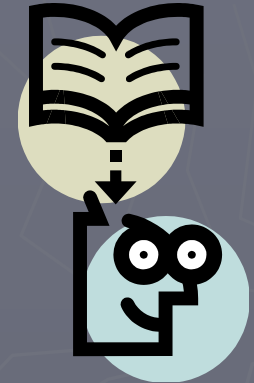
► The “Problem”

- Results
- Attitude
- *Bologna*



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► We need a paradigm shift!



From “teaching our students”
to

“helping our students to learn Physics”

► The Goal



To develop a pedagogic interactive methodology capable of promoting:

- Students effective learning
- Essential skills – responsibility, autonomy, communication, critical thinking
- An improvement in the attitude towards physics

► The Ideas

- “Peer Instruction” (Eric Mazur)
- Physlets[®] (Mario Belloni & Wolfgang Christian)
- “Ranking task exercises in Physics” (O’kuma, Maloney & Hieggelke)
- Lecture Notes and Exercise Sheets



▶ The Intervention

- Applied Physics, Radiology, ISAVE
- Newtonian Mechanics
- Lectures
 - ▶ Reading Quiz
 - ▶ Conceptual Questions / Ranking Task Exercises
 - ▶ Physlets



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- Practical Classes
 - ▶ Exercise / Problem sheets
 - ▶ Conceptual Questions / Ranking Task Exercises
 - ▶ Physlets
 - ▶ Evaluation - Physlets – [Web page](#)



► Evaluation

- Force Concept Inventory (FCI)
- Mechanics Baseline Test (MBT)
- Questionnaire



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► Results

- FCI – Pre-test and Post-test 

- Gain 

- MBT 

- FCI vs. MBT 

- Questionnaire 

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► Conclusions

- Quantitative
- Qualitative

► What next?

- Expand
- Extend



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**“Start by doing what’s necessary,
then what’s possible, and suddenly
you will be doing the impossible.”**

St. Francis of Assisi

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