GEOMETRIC MODELING

in a Teacher Training Program

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GeoGebra Global Gathering

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THEORETICAL FRAMEWORK

- **Modelling and application of real-life-problem;**

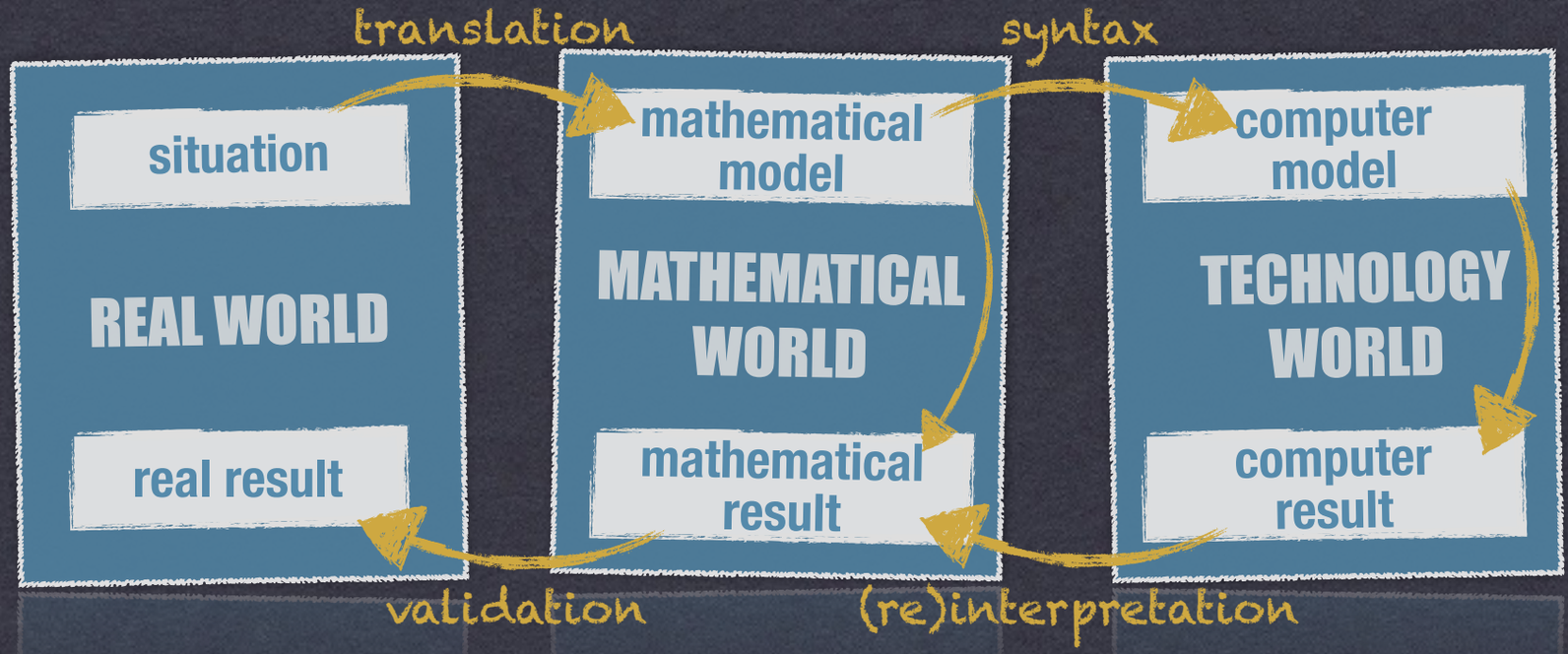


Figure 1: adapted from Siller & Greefrath (2009)

- **Multiple representations;**
- **Multiple solution paths;**
- **Semiotic Mediation;**

RESEARCH QUESTIONS

1) HOW CAN PROSPECTIVE TEACHERS USE THE COMBINATION OF PHYSICAL AND DIGITAL GEOMETRIC MODELING OF JOINTS TO PROMOTE COLLABORATION, INTERDISCIPLINARY AND MULTIPLE SOLUTION STRATEGIES FOR MATHEMATICS LEARNING?

1.1) WHAT DO THE PROSPECTIVE TEACHERS USE SLIDER FOR AND HOW DO THEY DEPICT MOVEMENT RELATIONS WITH (OR WITHOUT) THIS FEATURE ON 3D REPRESENTATION IN THEIR CONSTRUCTIONS?

1.2) HOW DO PROSPECTIVE TEACHERS TRANSFER THEIR GEOMETRICAL CONCEPTIONS FROM PLANE TO SPATIAL REPRESENTATION, SPECIALLY REGARDING SYMMETRY?

2) BASED ON THE FIRST QUESTIONS, HOW CAN PHYSICAL AND DIGITAL GEOMETRIC MODELING BE INTEGRATED AND PROMOTED IN PRE- AND IN-SERVICE MATHEMATICS TEACHER TRAINING?

DATA COLLECTING

INTERVIEWS

OBSERVATIONS

- activities
- group interaction
- peer interaction

QUESTIONNAIRES

BRAZILIAN DOCUMENTATION

- curricula
- national exams

METHODOLOGY

qualitative research

- **First Round:** participants have modeled a SEESAW in both ways, physically and digitally;

19 prospective teachers (10 seesaws teams)

different handcrafts and materials for physical models

geogebra and blender for digital models

group and team meetings

- **Second Round:** participants choose a REAL ARTICULATED MECHANISM to model digitally;

3 teams following up their ideas

PRELIMINARY FINDINGS

some registers focus on...

…which sense they are using sliders in their digital modeling;

proportionality
thin controller
functional thinking

…how the participants connect both models
(it means, whether the models are suitable one each other, or not);

…how accurately the participants represent some movements or objects;

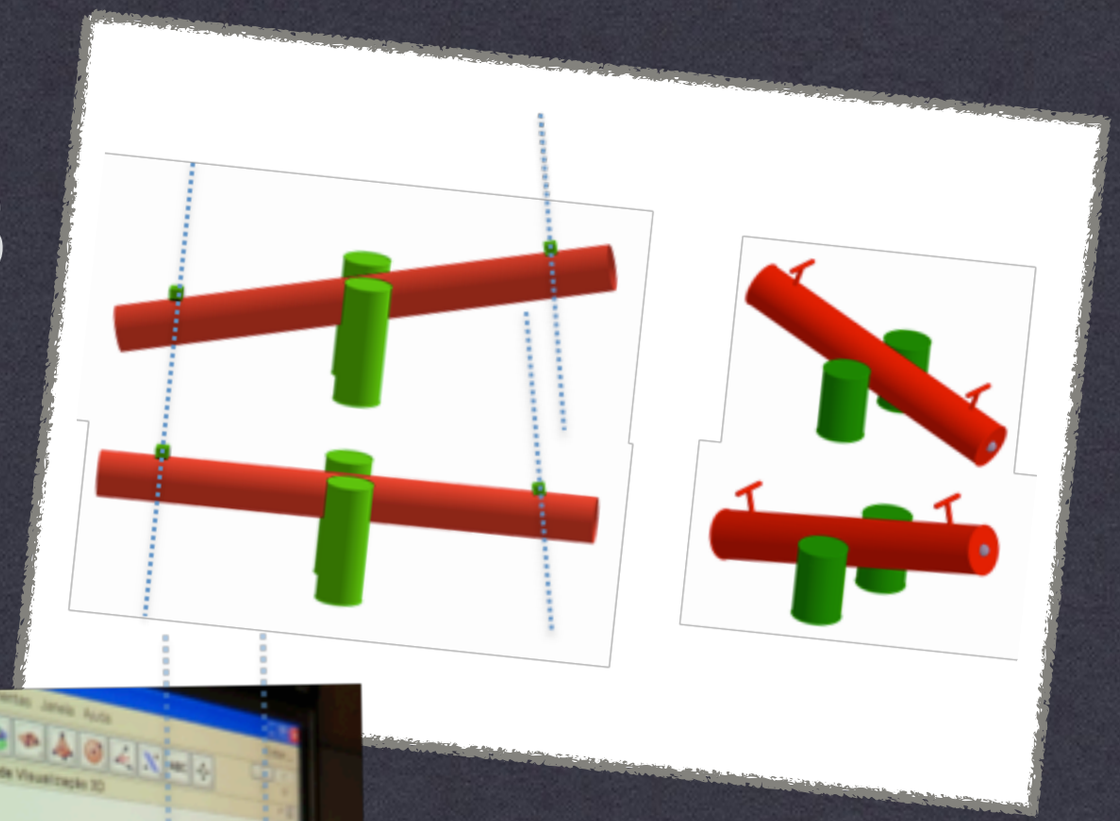
…how the participants transfer planar geometric concepts to spatial geometric concepts and how the software supports them in this sense;

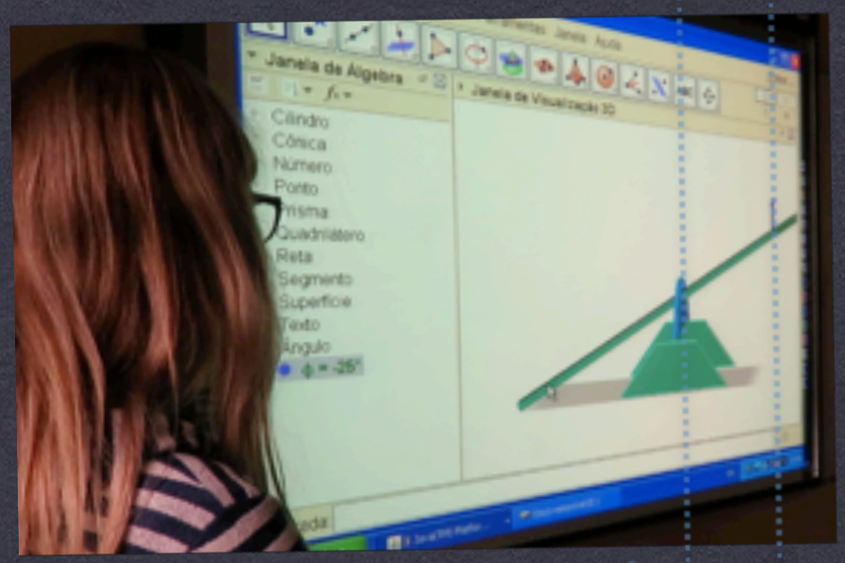
transferring of measures
symmetry
perpendiculars lines

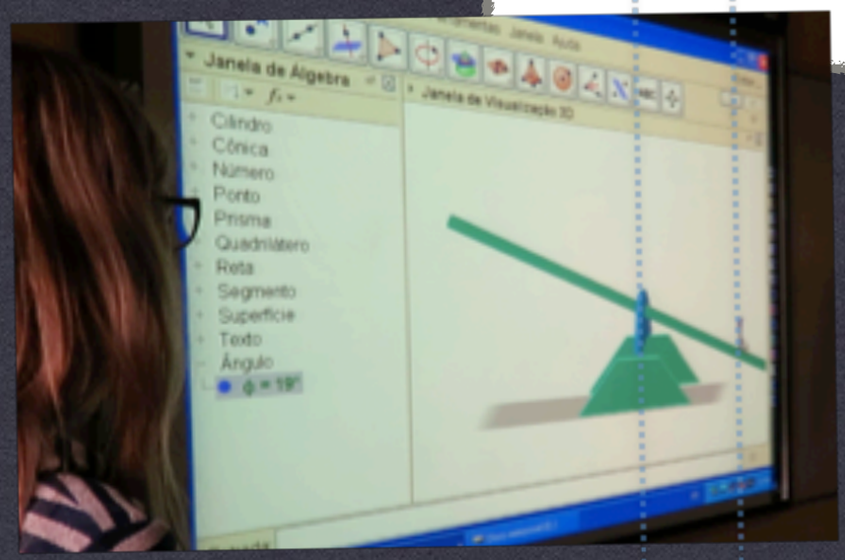
ADVANCING IN CONCEPTS AND CONSTRUCTIONS

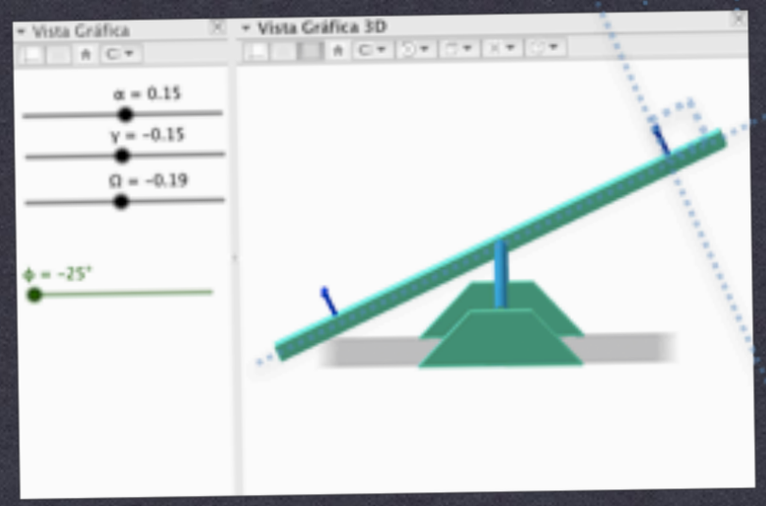
"For each point on a line, there exists an unique perpendicular line through that point"

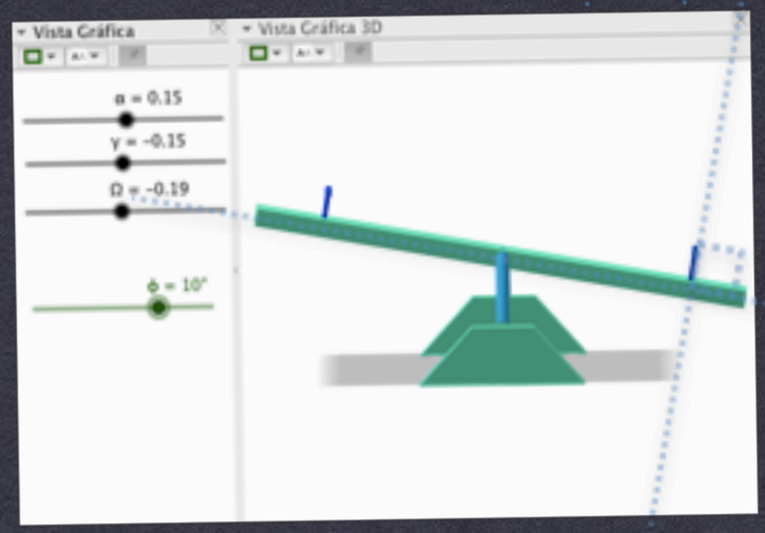
Is that true???

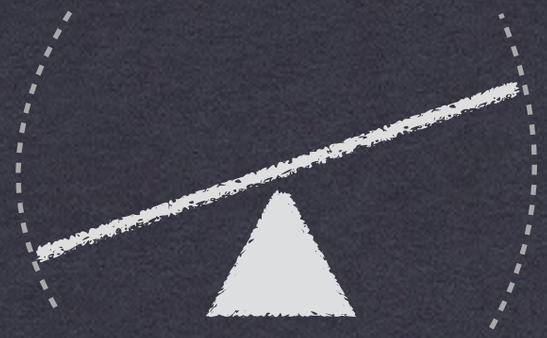













Thank you