Review of Cognitive Energy Flow Model Concept for Virtual Student

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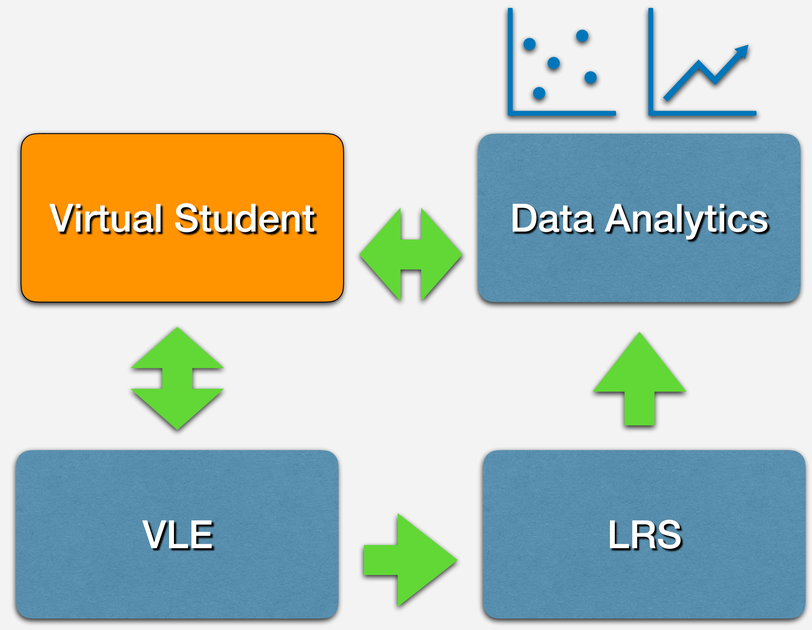
INTRODUCTION

- The **Learning Agent Model** or **Virtual Student (VS) model** as a concept to automate and simplify real learners' behavior classification problems.
- The **challenge** is to evaluate, and improve **the quality** of e-learning courses before the large-scale implementation.
- **Virtual Student** model has following properties:
  - varying **Emotional states & Motivational sequences**,
  - ability to forget the learned facts,
  - and need for rest property

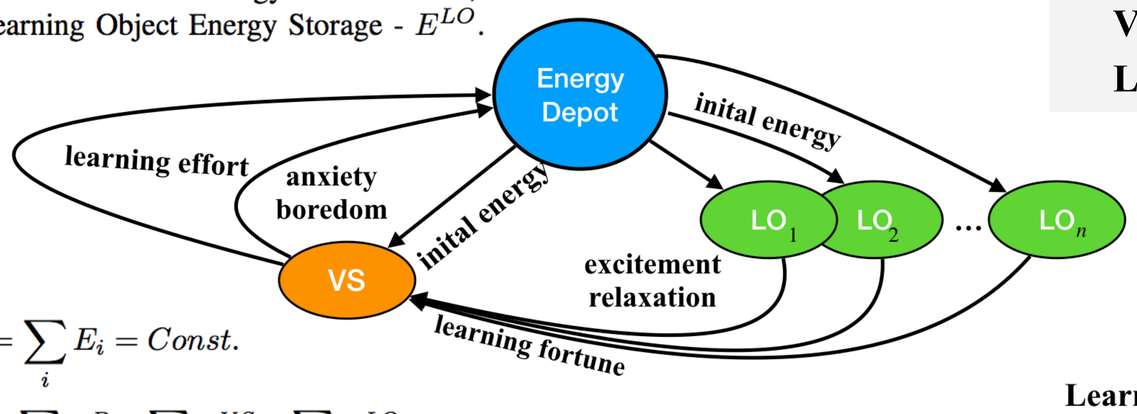
  based on **Agent's Energy Flow concept**.



Virtual Student interactions within e-Learning System
VLE - Virtual Learning Environment
LRS - Learning Record Store
VS - Virtual Student
LO - Learning Object

VIRTUAL STUDENT ECOSYSTEM

- System Energy Depot - E^D,
- Virtual Student's Energy Buffer - E^{VS},
- Learning Object Energy Storage - E^{LO}.

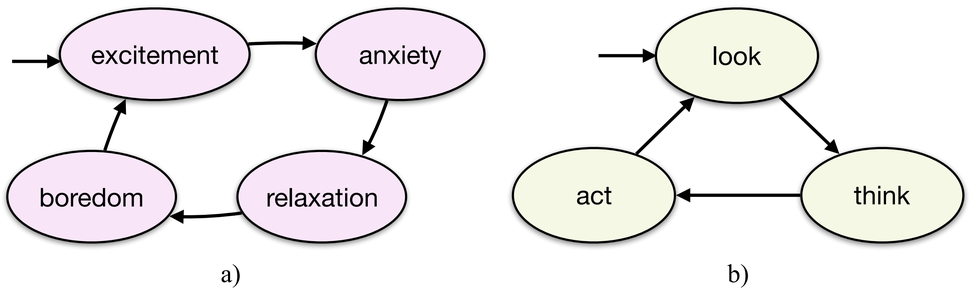


$$U = \sum_i E_i = Const.$$

$$U = \sum_i E_i^D + \sum_j E_j^{VS} + \sum_k E_k^{LO}$$

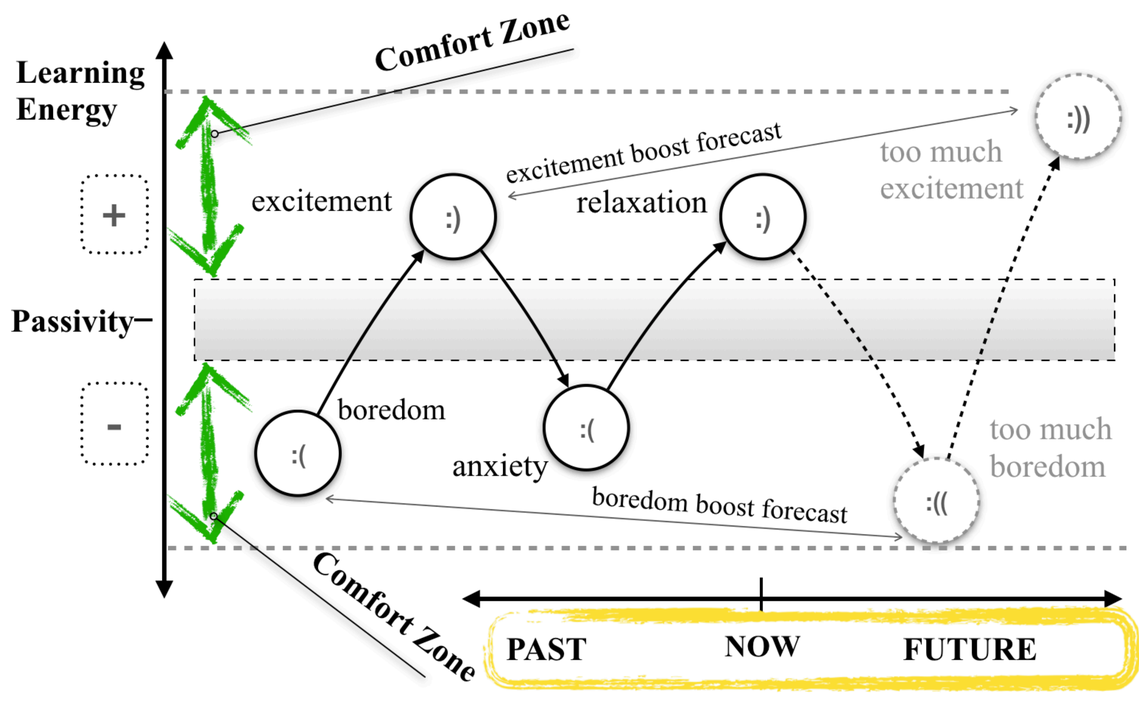
EMOTIONAL STATES & MOTIVATIONAL SEQUENCES

Adapted from
Apter's reversal model - a) and
Stringer's Action Spiral model - b)

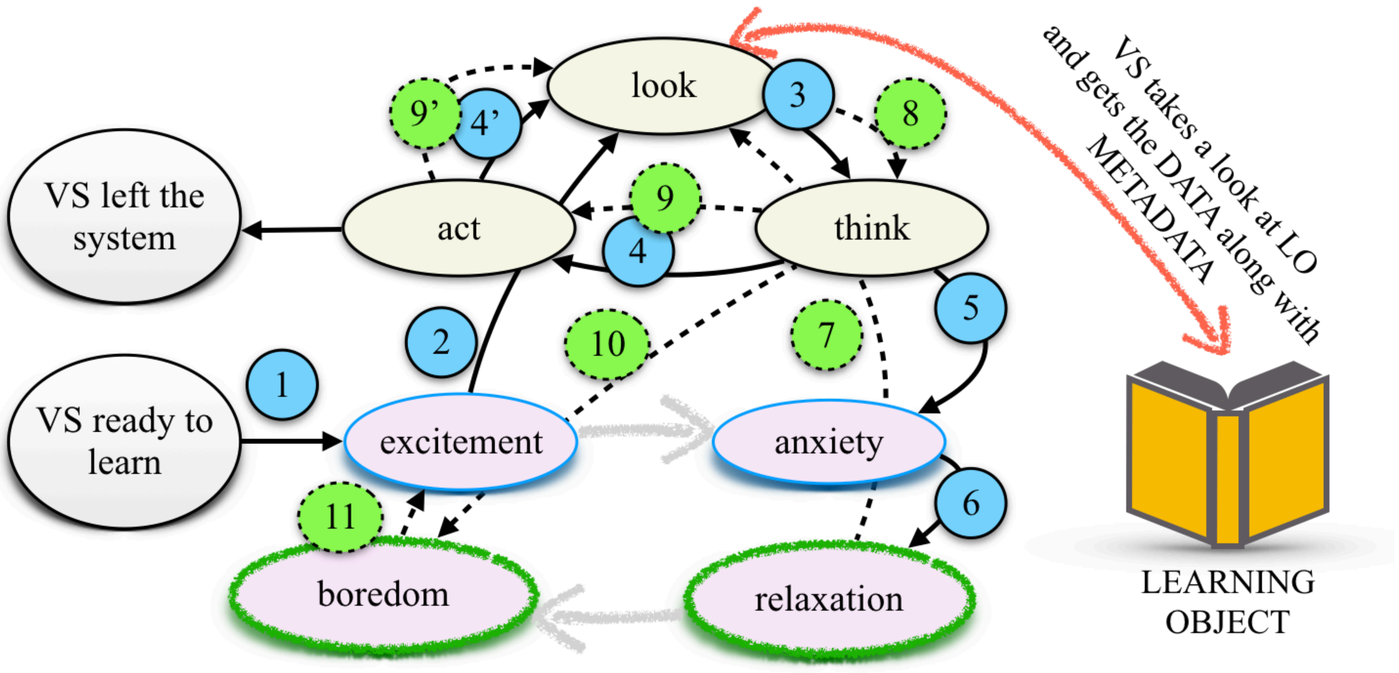


a) b)

TOWARDS EMOTIONAL STATES FORCASTING based on LEARNING ENERGY FLOW MODEL



VIRTUAL STUDENT LEARNING MODEL



CONCLUSIONS

- In the model, Learning Energy Flow redistribution among the System objects can be controlled by the local Ecosystem Algorithm based on Learning Objects' Metadata.
- Energy Quantity in Learning Energy Ecosystem is constant for every simulation run allowing optimize Ecosystem Components empirically.
- Proposed **Virtual Student** will produce more **synthetic data** ready for validation of correlation with real user behavior data.

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