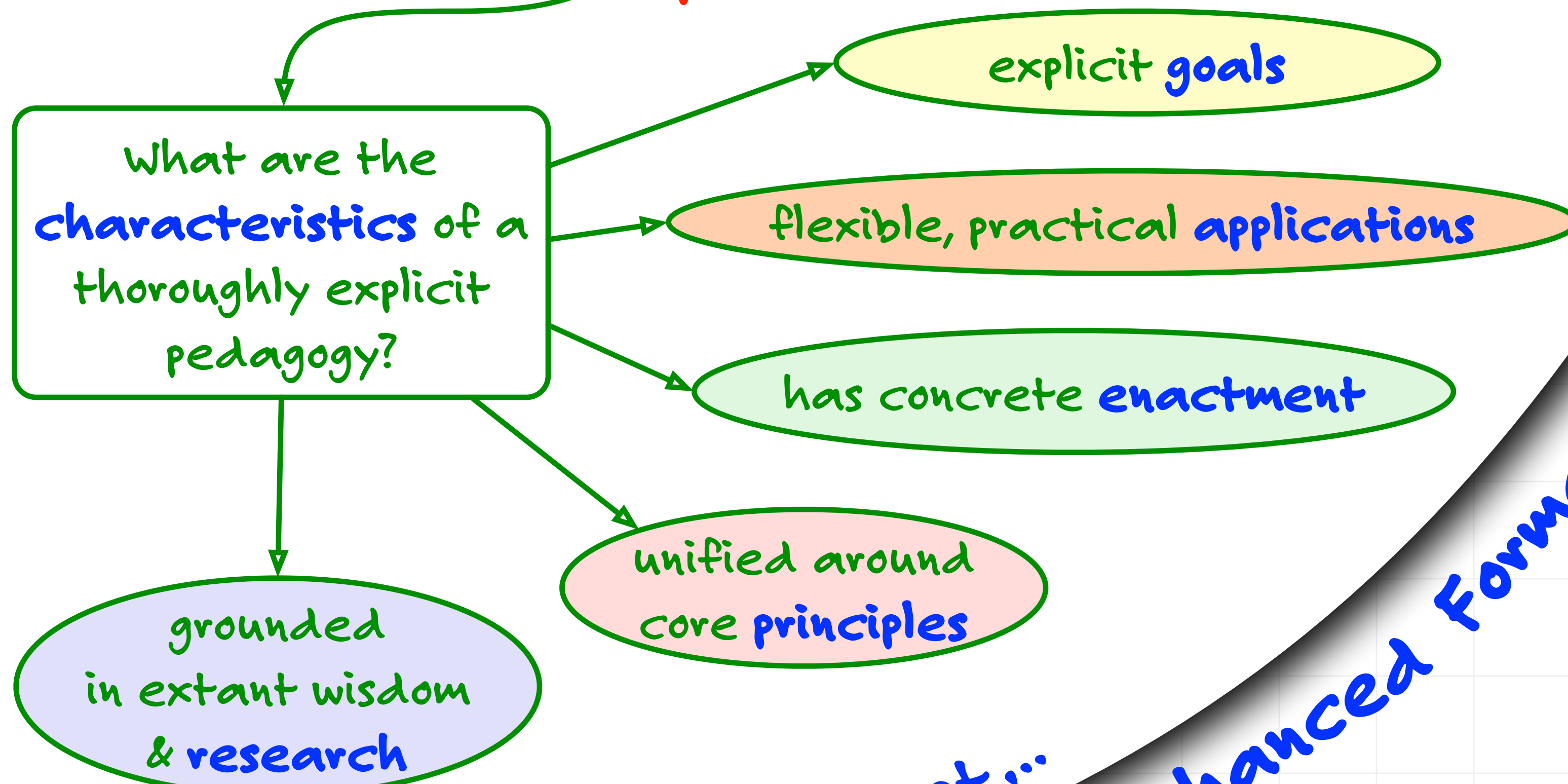


# CLICKERS NEED THEORY, TOO!

IAN D. BEATTY

University of North Carolina at Greensboro Physics Education Research Group  
(formerly at the University of Massachusetts Amherst)

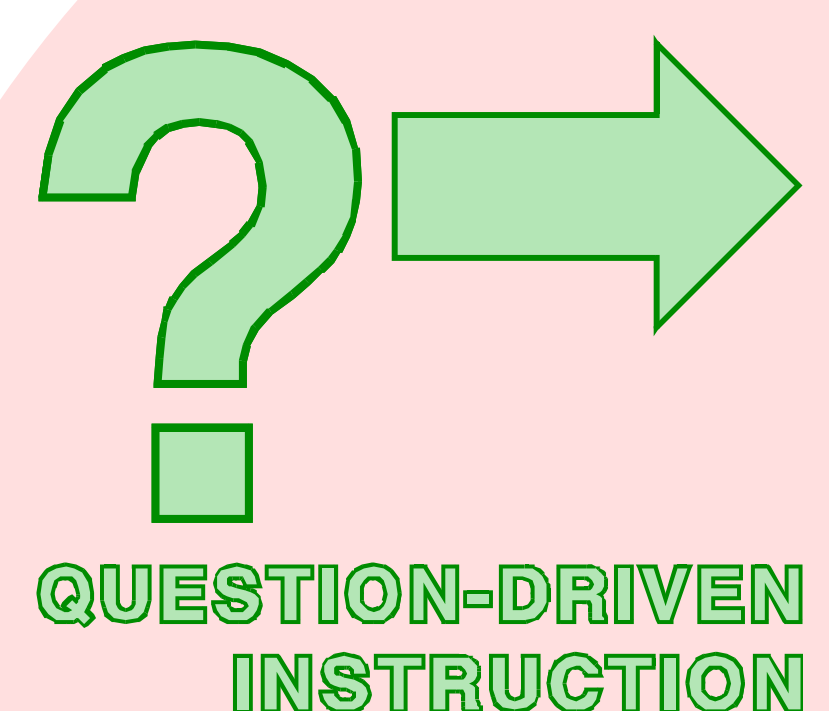
idbeatty@uncg.edu



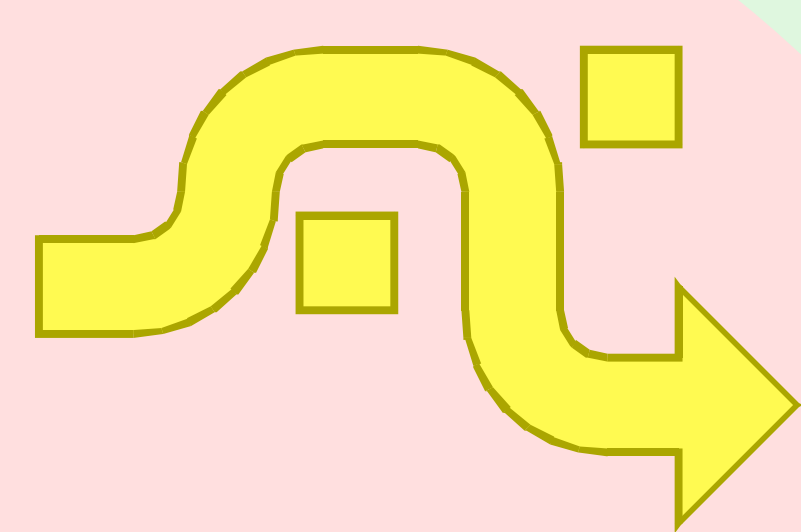
Here's our attempt ...

"Technology-Enhanced Formative Assessment" (TEFA)

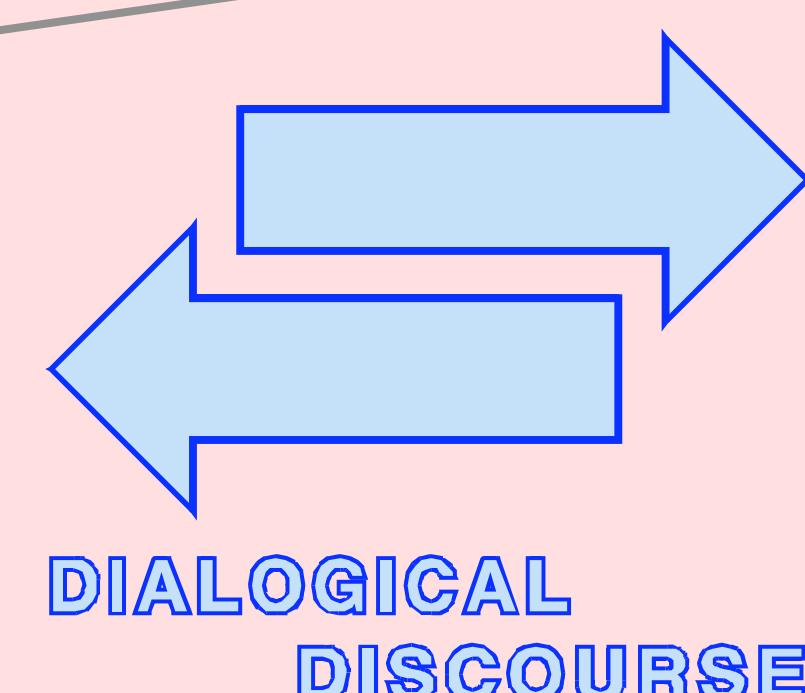
## 4 PRINCIPLES:



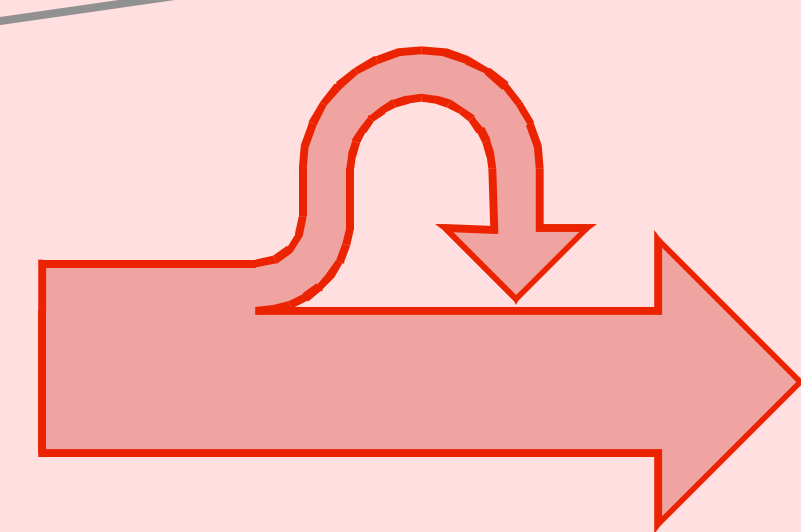
QUESTION-DRIVEN INSTRUCTION



FORMATIVE ASSESSMENT



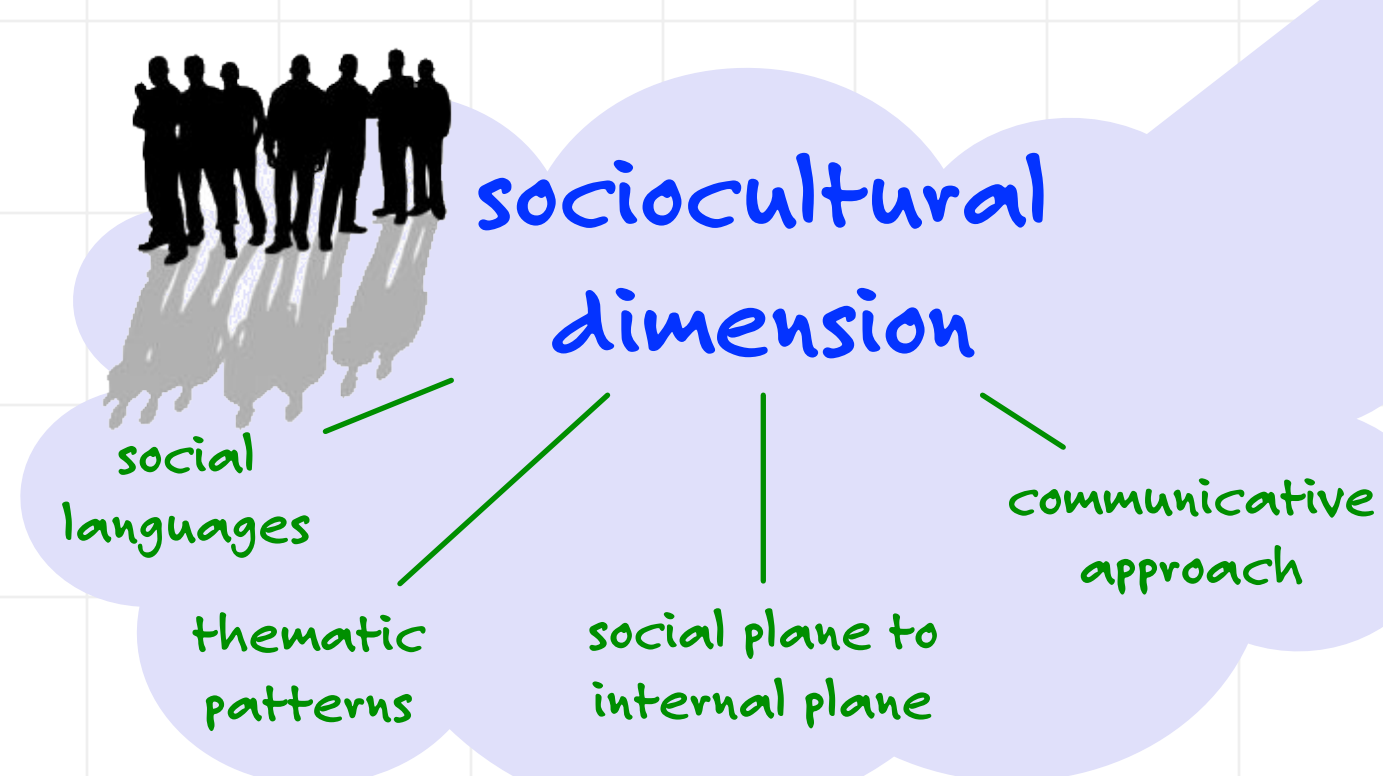
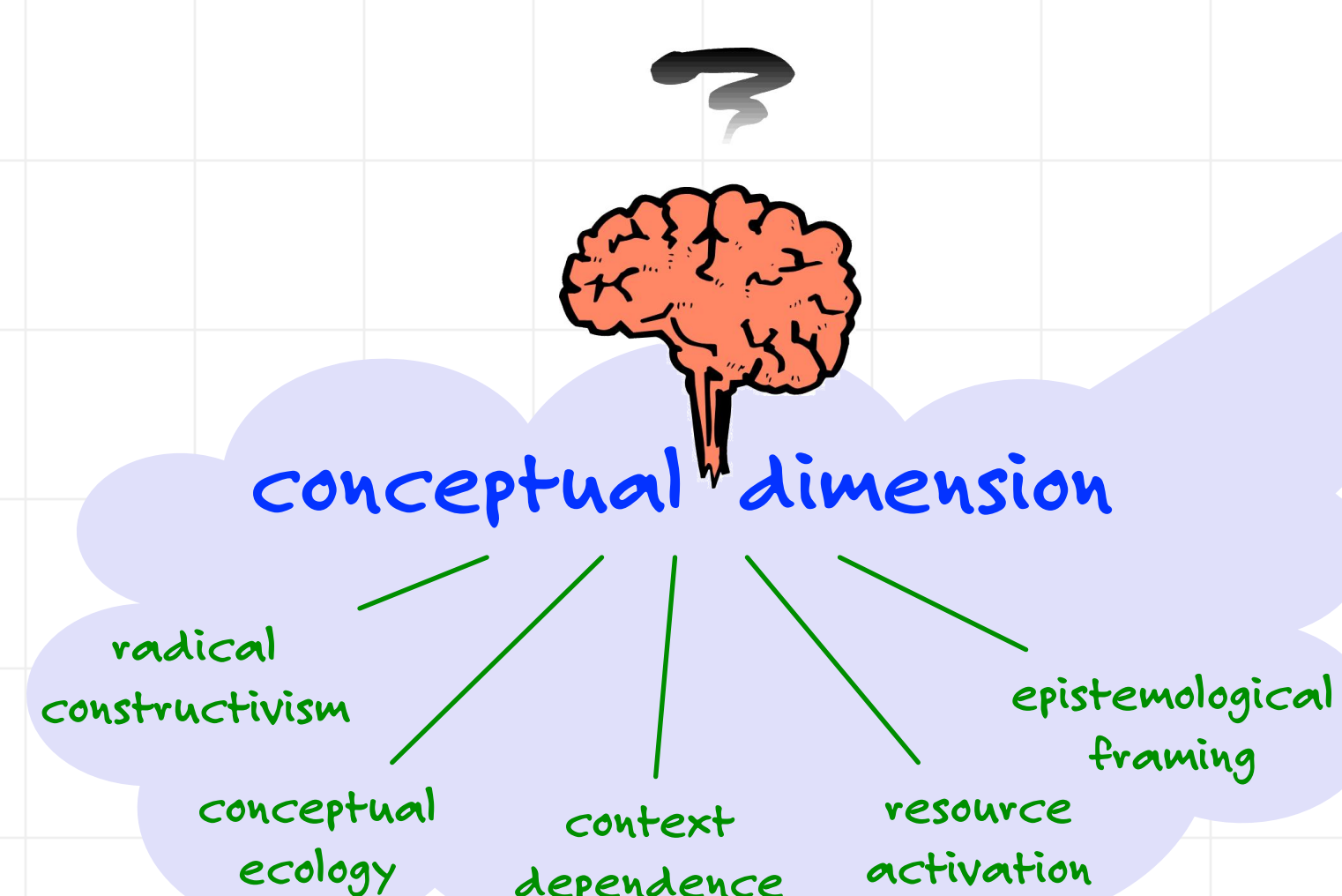
DIALOGICAL DISCOURSE



META-LEVEL COMMUNICATION

## RESEARCH BASE:

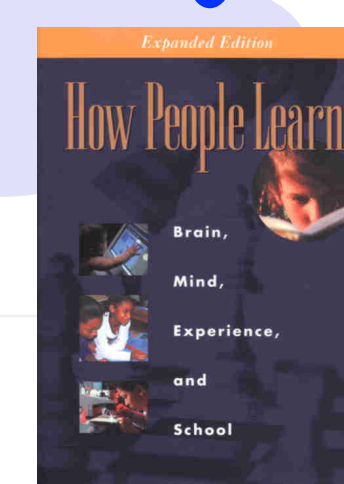
theoretical frame & empirical support



formative assessment literature

CRS literature

effective learning environments



Want the details?  
**Read** the paper!

Beatty, I. D. & Gerace, W. J. (2009). Technology-enhanced formative assessment: A research-based pedagogy for teaching science with classroom response technology. *Journal of Science Education & Technology*, 18(2) 146.

This looks hard to do! How do teachers learn it? What challenges do they encounter? How can professional development help?

see <http://srri.umass.edu/tlt> and stuff listed there!



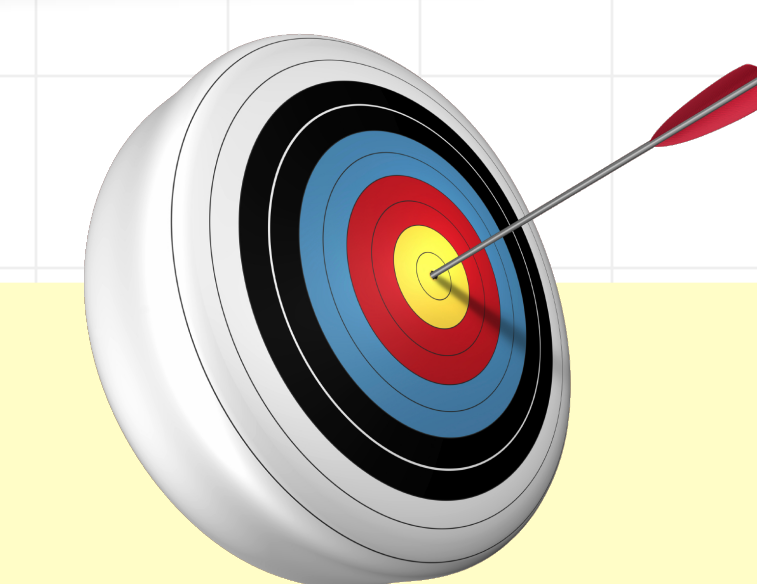
This material is based upon work supported by the National Science Foundation under Grant No. TPC-0456124. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

## INSTRUCTIONAL GOALS:

1. develop content expertise
2. prepare for future learning

⇒ help students:

- recognize & seek well-structured knowledge
- participate in productive modes of discourse
- attentively self-regulate learning



## APPLICATIONS:

status check  
exit poll  
assess prior knowledge  
provoke thinking  
elicit a misconception  
exercise a cognitive skill  
build conceptual structure  
stimulate discussion  
induce cognitive conflict  
anticipate a demonstration  
test capability  
demonstrate success  
review & remind

