

Critiques of Student-Led Activities in the Classroom

Craig Miller

School of Computing

Last Spring at the Conference

Personalized Adage

Your Nemesis

Sometimes you get the bear...
And sometimes the bear gets you.

```
2 <html>
3 <head>
4 <meta charset="UTF-8">
5 <title>Personalized Adage</title>
6
7 <script>
8 function create()
9 {
10     var nemesis = document.getElementById("nemesisField").value;
11     var message = "Sometimes you get " + nemesis + "... " +
12         "<br>And sometimes " + nemesis + " gets you.";
13
14     document.getElementById("adageElement").innerHTML = message;
15
16 }
17 </script>
18
19 </head>
20
21 <body>
22
23 <h1>Personalized Adage</h1>
```

Why watch someone do a problem rather than work through it? I don't get it.

Craig is locked into the 20th century teaching model. Class needs to be used for discussion not lectures.

Kirschner, Sweller & Clark (2006):

Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching

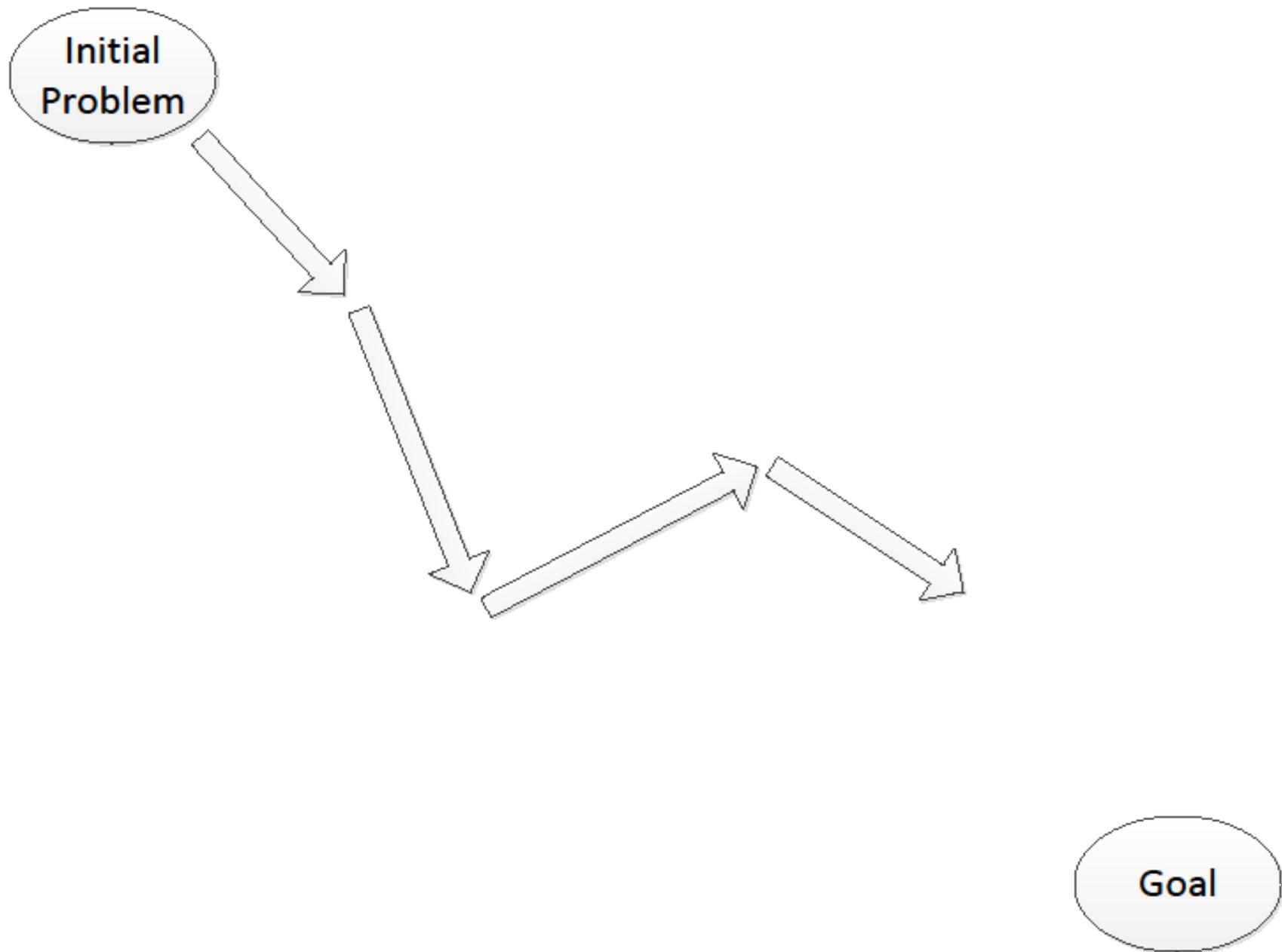
Educational psychologist, 41(2), 75-86.

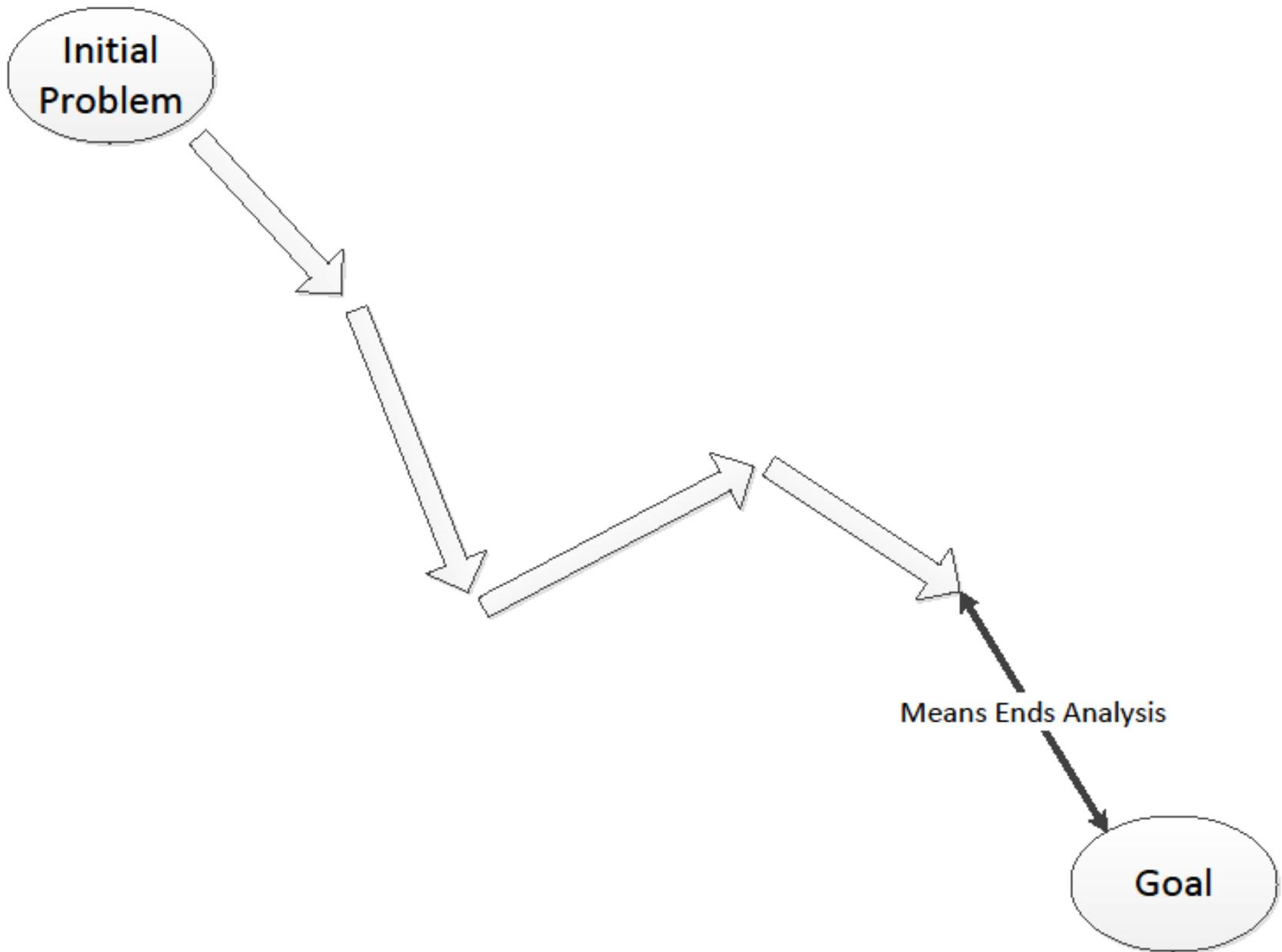
Key Findings from Kirschner et al.

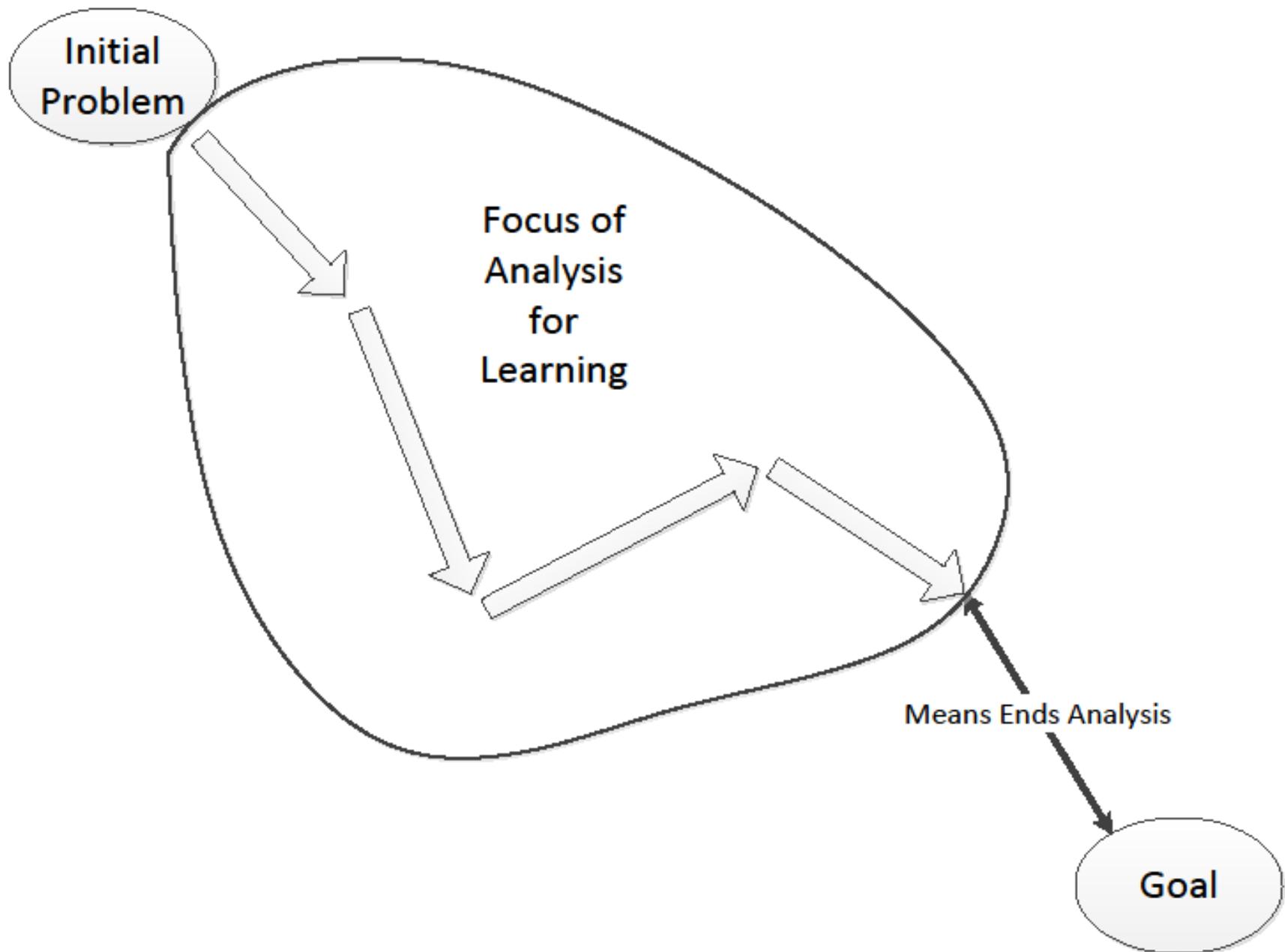
- Compared to problem-solving activities, studying worked examples produces superior learning---even when measured by problem-solving ability
- Supported by controlled studies
- Studies mostly involve physics, math and computer programming, but other disciplines have been studied (e.g. visual literacy, Rourke & Sweller, 2008)

I'm NOT claiming that

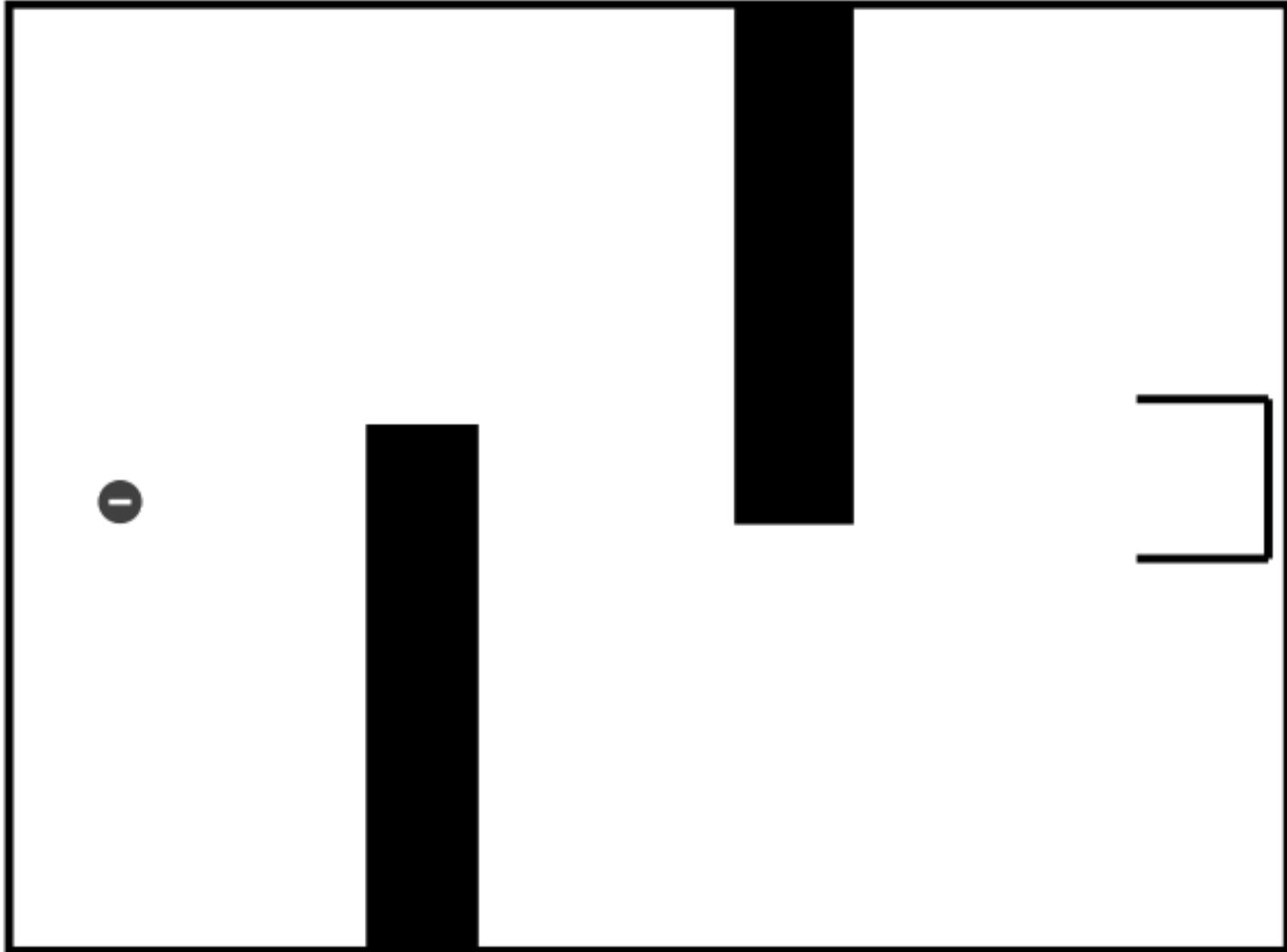
- Constructivism as a theory of learning is wrong (see Clark & Mayer, 2008)
- Problem-solving is not important
- The flipped classroom is a bad idea
- We don't want to engage students in the classroom
- Problem-solving is never a good activity for learning

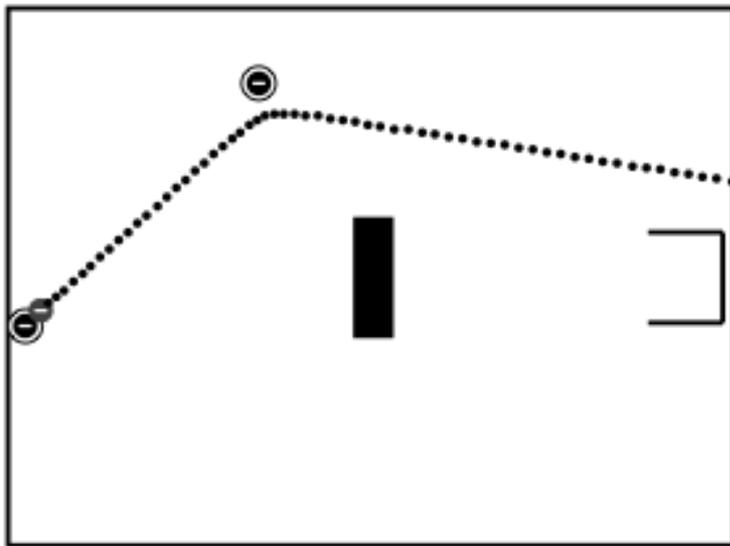




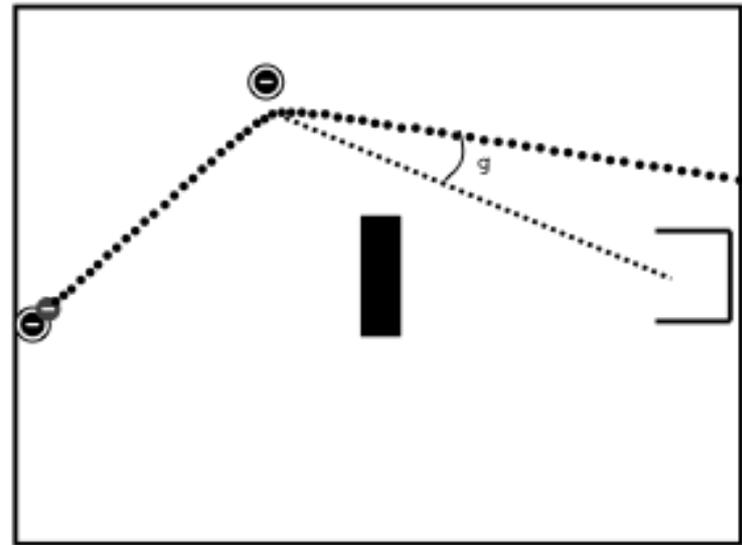


Electric Field Hockey: Problem-Solving in an Electrostatics Microworld

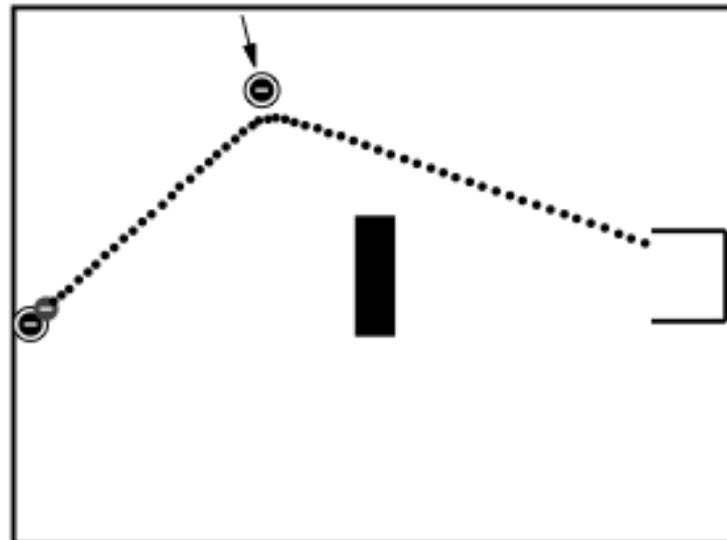




(a) Trajectory missing goal



(b) Noting difference between intended trajectory and resulting trajectory



(c) Moving charge closer for more bend

Alternatives to Student-Led Problem-Solving

- Study of worked examples
- Instructor-led problem solving
 - Includes live coding (Rubin, 2013)
- Self explanation
 - See Amber Settle's talk this afternoon
- Scaffolded problem-solving
 - Example: provide explicit subgoals

Role of Problem-Solving

- Often effective for advanced learners
- Provides motivation
- Less studied for non-STEM disciplines
- Run your own study
 - We did! (Miller & Settle, 2011)

References

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