

Kirschner, P.A., Sweller, J., & Clark, R.E. (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.

Research Question/Goal: Suggest that based on current knowledge of human cognitive architecture, minimally guided instruction is likely to be ineffective (76).

Problems with Minimally Guided Instruction: Although the authors agree with the constructivist understanding that knowledge is constructed, they do not agree with the instructional approaches associate with guided instruction.

- *Issue 1* – learning requires the construction of mental representations and schema regardless of how much information is provided and there is no evidence that suggests less information allows for better construction of either.
- *Issue 2* – the guided instruction approach shifts the emphasis of learning a discipline as a body of knowledge to one that emphasizes learning a discipline by experiencing its processes and procedures.
- *Issue 3* – the way a person works within a discipline is not equivalent to the way a person learns in that area (78).

Research on Direct Instruction: Research indicates that when dealing with new information, learners should be explicitly shown what to do and how to do it rather than be allowed to fumble around for the answer. Furthermore, false starts that occur during a pure-discovery activity can lead to frustration, confusion, and misperception (79). Finally, students who learn via discovery show no signs of superior quality of learning.

- *Cognitive load* – Cognitive load theory argues that free exploration of a difficult environment might generate a heavy working memory load that results in less learning.
- *Worked examples* – Based on cognitive load theory, the worked example effect demonstrates that students who are required to practice/solve a problem perform worse on assessments than students who are required to study problems that have already been solved (ie. worked examples).
- *Process worksheets* – These worksheets provide a description of the process one should go through when solving problems. They also include hints or rules of thumb for each process.

Conclusions:

- There is no body of research that supports minimal guidance as an effective form of instruction.
- Evidence suggests that strong, direct instructional guidance is needed especially at the novice and intermediate level.
- There is evidence that unguided instruction has negative results like misconceptions and incomplete or disorganized knowledge.
- It is a mistake to assume that instruction should focus exclusively on application because the pedagogic content of the learning experience may not be identical to the methods and processes of the discipline (84).