Papers we've read:

- Distributed constructionism theory paper - using theory to guide design
  https://dl.acm.org/doi/10.5555/1161135.1161173
- Using SOLO taxonomy to guide data analysis
  https://dl.acm.org/doi/10.1145/3291279.3339405
- Using theory in CS education
  https://dl.acm.org/doi/10.1145/3230977.3230992
- CLT for Parson's Problems, Subgoals
  https://dl.acm.org/doi/10.1145/2839509.2844617
- Spatial theory
  https://dl.acm.org/doi/10.1145/3291279.3339414
- Feedback
  https://dl.acm.org/doi/10.1145/2737596

- outlier - we won't do this one today since it has a study
Goals for today

Analyze the steps of theory research

Developing the idea

Motivating need for paper

Arguing the paper is correct (without traditional experimental data)
Genre: Survey Paper

Read a ton of papers (use specific search criteria, inclusion criteria)

Synthesize what you learn from the papers

Make it more than a “laundry list” of the current research
How did people come up with new theory / work?

- Distributed Constructionism
- Spatial Encoding Strategy Theory
- SOLO taxonomy
- Feedback survey paper
- ICER how theory is used paper
Distributed Constructionism

Reaction to the new technologies

Looks at common features of previous research through lens of new technology -

- come up with what might be new and/or missing

- Point out disadvantages and how this can improve it

Connecting different topics

Distributed cognitism + constructionism
Spatial Encoding Strategy Theory

Took disparate results, chose a few they thought were representative, and built theory around it (e.g. landmarks)

Spatial is a transferable skill, which is an anomaly and doesn’t follow current cognitive theory, so wants to explain it

Previous studies have shown individual instances of transfer, but no theory behind why it worked (important for designing things in the future)

Reaction to Greg Nelson’s paper that says we shouldn’t do interdisciplinary theory development any more
Feedback survey paper

Use ed research has been done to inform foundational knowledge on how feedback should be given

Existing ed research is one-offs about how to improve one class

Reaction to studies that show students are largely dissatisfied with feedback

Previous research didn’t ground itself in theory
Paper rigour taxonomy

Marco Polo paper - classroom ideas with no more than survey results of student satisfaction

Real study with results but it doesn’t place itself in the larger context of previous research and theoretical frameworks

Small-scale studies with real results in theoretical frameworks but too small of a sample size to generalize results

Large-scale studies perhaps with no control

Randomized controlled trials - comparison study with large enough sample size to make results meaningful
How did they convince readers there is a need for their paper?

- Distributed Constructionism
- Spatial Encoding Strategy Theory
- SOLO taxonomy
- Feedback survey paper
- ICER how theory is used paper
Distributed Constructionism

Presenting two conventional approaches with information and contrasting his approach

Emphasizing that they are groups of researchers

Not just individuals

Makes it relevant to now
Spatial

Points out the anomaly

This one can be transferred, and we want to know why (currently unexplained)

Real-world positive consequences (hugely applicable to CS Ed - important)
What did they use in lieu of study results?

Distributed Constructionism
Spatial Encoding Strategy Theory
ICER how theory is used paper
Distributed Constructionism

Didn’t convince the reader it’s “true”

Interesting, “cool” examples, described them, and explained how they fit in that category

Combining two things that exist, so it’s not a huge stretch
Spatial Encoding Strategy Theory

Examples of how it’s been applied in several fields, CS similar enough.

Explanation of theory: Built off of psychology and neurology for explanation, tied to results of CS Ed studies

Use of theory: Fits her theory into past results to explain those results that had no good explanation
Use of theory

It is true that there are few CS-specific theories

Provides a reasonable categorization for how theory is used

Diagrams explained his points well

Had specific suggestions based on the arguments
Feedback paper - how did they present survey results w/out laundry list?

Use guiding framework to divide / organize the results into different topics
Separate the non-CS context and CS context
Made an “essay” with conclusions out of the research
Organized not by paper but by what we learned from the papers
For Thursday

I’ll post 3 more papers with questions

You settle on the topic of your quarter project

Choose the research venues you’ll search for papers
  (default: SIGCSE, ICER, CHI, TOCE) - discuss with me to choose beyond that

For Tuesday:

Read 2 papers related to your topic (you choose)
Read 2 papers related to class (I choose)
What new theory could we tackle?