

Multi-Institutional Multi-National Parsons Problems Studies

Working Group 3

ITiCSE 2023

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Turku, Finland

Working Group Members:



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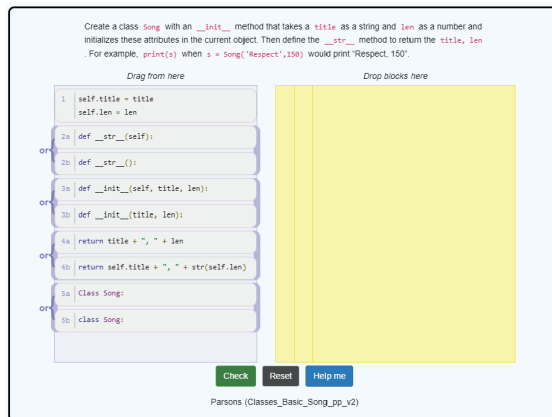
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Parsons Problems

- What are they?
 - Mixed-up code
 - Drag code over in order
 - Distractors?
 - Pick from choice?
 - Many variations
- Created 2006 by:
 - Dale Parsons
 - Patricia Haden



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Last year... WG2022 - Parsons Problems Literature Review

- Found all papers on Parsons since 2006
 - Variations of: Parsons puzzles, Parsons programs, Parsons programming
 - Is it Parsons or Parson's?
 - Interviewed Dale Parsons
 - Over 1000 papers!!
 - Narrowed to 141
- Do Studies
 - NO Time!

HOW TO DO Studies

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This year - WG 3 - Three things

- 1) Expanded Parsons Literature Search from last year
- 2) Literature Search on Multi-Institutional Multi-National Studies in Computer Science Education
- 3) Parsons Problems Studies

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1) Expanded Literature Search

- Not as extensive search
- Since last year -> 15 papers
- Most of them Research on Parsons problems, and learning programming
- On newer types of Parsons Problems
 - Adaptive Parsons
 - Framed Parsons
 - Micro Parsons

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2) Literature Review: Multi-Institutional, Multi-National Studies in CSE

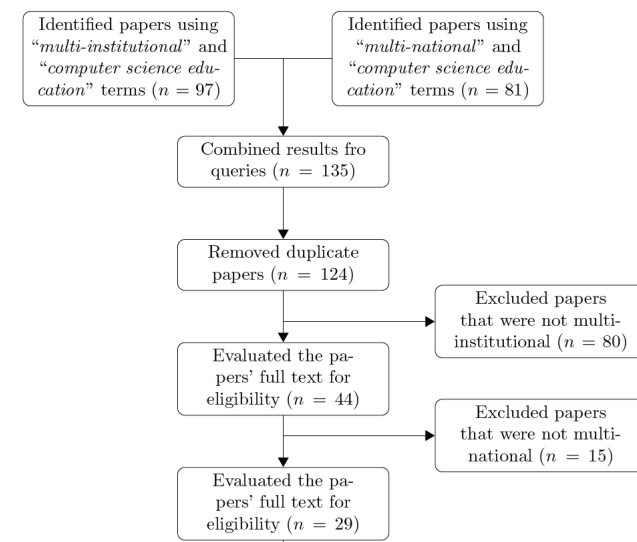
- 17 papers from the past 10 years
- 4 relevant papers from before that
- Difficult to do – so many considerations when comparing between different countries
 - Institutional Characteristics
 - IRBs
 - Languages, Translations

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Choosing papers:

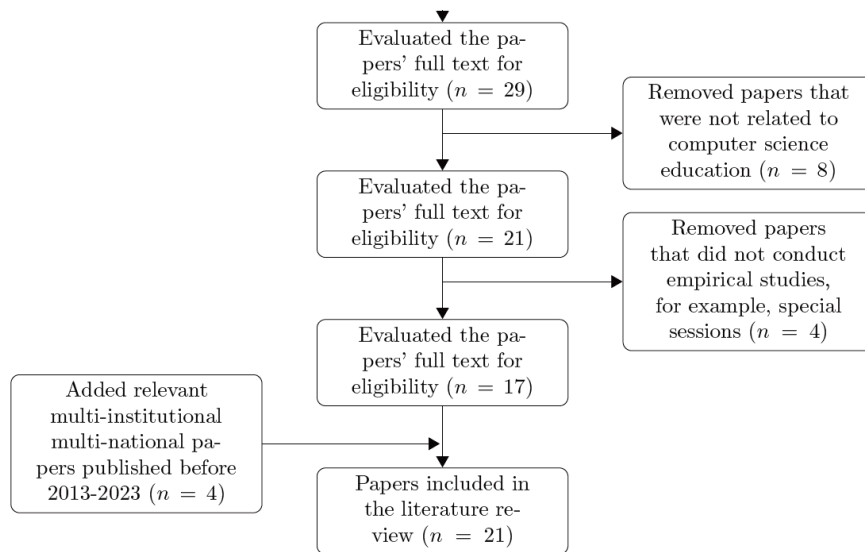


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Choosing papers (cont):



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As an MIMN Study

- Challenges:
 - Time constraints
 - Participants at different stages of learning
 - Globally distributed team
- Overcame with:
 - Team coordination
 - Onboarding package for faster ramp up, IRBs
- We could have used more time!

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3) Parsons Problems Studies

- Study in a box
- Many different studies between 14 institutions
 - Topics: Swap, Classes, etc.
 - Mostly Python
 - Runestone Academy online platform
 - Pre/Practice/Post
- Think Aloud Studies

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Here are a few results from studies we did -
More in the paper!!!

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Results: Python-swap

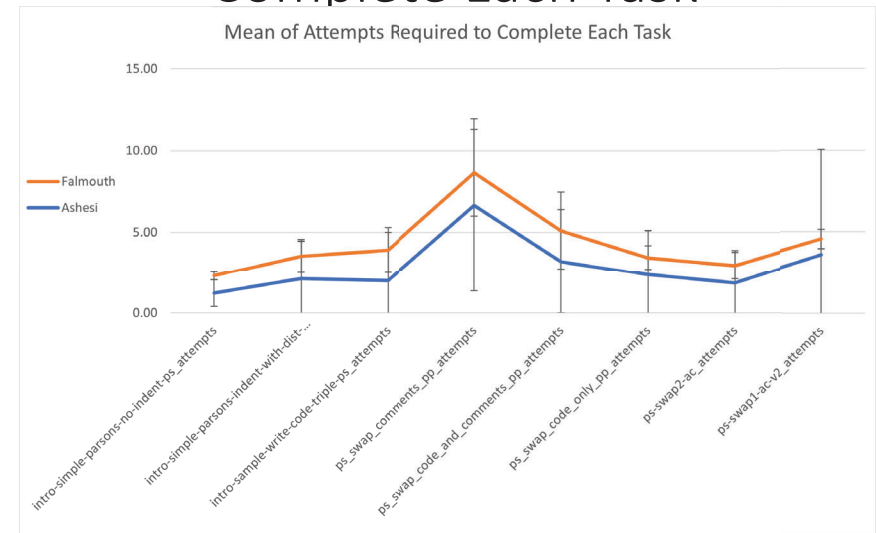
- most students were able to write the code for swap after solving three Parsons problems:
 - text comments with algorithm steps, text comments and code, and code
- similar pattern of engagement across all participating institutions; many attempts and time-taken on comment-sorting exercise – 80% completion rate
- no correlation between prior familiarity and success on the final post-test task
- success on first training task, and time on the comment-sorting parsons exercise predicted success on the final post-test task; suggestive of scaffold

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Mean of Attempts Required to Complete Each Task

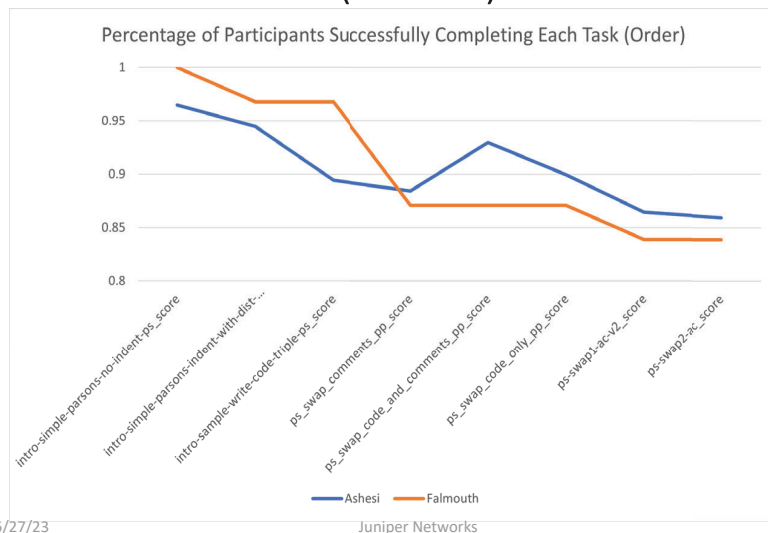


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Percentage of Participants Successfully Completing Each Task (Order)



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Recommend - WGFS:

- SIGCSE encourage:
 - Working Groups For Studies (WGFS)
 - Large MIMN Studies
- Need an earlier deadline (Sept/Oct?)
 - Time for IRBs
 - Different countries are on different school schedules
 - Not many MIMN studies done!
- SIGCSE should consider this type of WG

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Questions?
do a study? Cor

