Working Group Members:

(L to R)
- Kostos Liaskos
- Jan Pearce
- Francisco Gutierrez
- Barbara Ericson
- Andrew Csizmadia
- Susan Rodger
- Jayakrishnan Warriem
- Rita Garcia
- Aadarsh Padiyath
- Angela Zavaleta Bernuy
- David Smith
- Michael Scott
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
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
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
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
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
Choosing papers:

- Identified papers using “multi-institutional” and “computer science education” terms (n = 97)
- Identified papers using “multi-national” and “computer science education” terms (n = 81)

Combined results from queries (n = 135)

- Removed duplicate papers (n = 124)
- Evaluated the papers’ full text for eligibility (n = 44)

  Excluded papers that were not multi-institutional (n = 80)
  Excluded papers that were not multi-national (n = 15)

- Evaluated the papers’ full text for eligibility (n = 29)
Choosing papers (cont):

- Evaluated the papers’ full text for eligibility ($n = 29$)
  - Removed papers that were not related to computer science education ($n = 8$)
  - Evaluated the papers’ full text for eligibility ($n = 21$)
    - Removed papers that did not conduct empirical studies, for example, special sessions ($n = 4$)
    - Evaluated the papers’ full text for eligibility ($n = 17$)
      - Added relevant multi-institutional multi-national papers published before 2013-2023 ($n = 4$)
      - Papers included in the literature review ($n = 21$)
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!
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
Here are a few results from studies we did -
More in the paper!!!
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
Mean of Attempts Required to Complete Each Task

Mean of Attempts Required to Complete Each Task

- **Falmouth**
- **Ashesi**

Tasks Compared:
- intro-simple
- intro-simple-no-indent
- intro-simple-indent
- intro-simple-indent-with-distance
- intro-sample
- intro-sample-code-triple
- intro-sample-code-triple-with-indent
- ps_swap_code_and_comments
- ps_swap_code_only
- ps_swap2_ac
- ps_swap1_ac
- ps_swap1_ac2
Percentage of Participants Successfully Completing Each Task (Order)
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
Questions?
Want to do a study? Contact us!