

Multi-Institutional

Multi-National

Parsons Problems Studies

Working Group 3

ITiCSE 2023

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Turku, Finland

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

Create a class `Song` with an `__init__` method that takes a `title` as a string and `len` as a number and initializes these attributes in the current object. Then define the `__str__` method to return the `title`, `len`. For example, `print(s)` when `s = Song('Respect',150)` would print "Respect, 150".

Drag from here

Drop blocks here

1 self.title = title
self.len = len

2a def __str__(self):

2b def __str__():

3a def __init__(self, title, len):

3b def __init__(title, len):

4a return title + ", " + len

4b return self.title + ", " + str(self.len)

5a class Song:

5b class Song:

Check Reset Help me

Parsons (Classes_Basic_Song_pp_v2)

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 Par~~X~~son'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

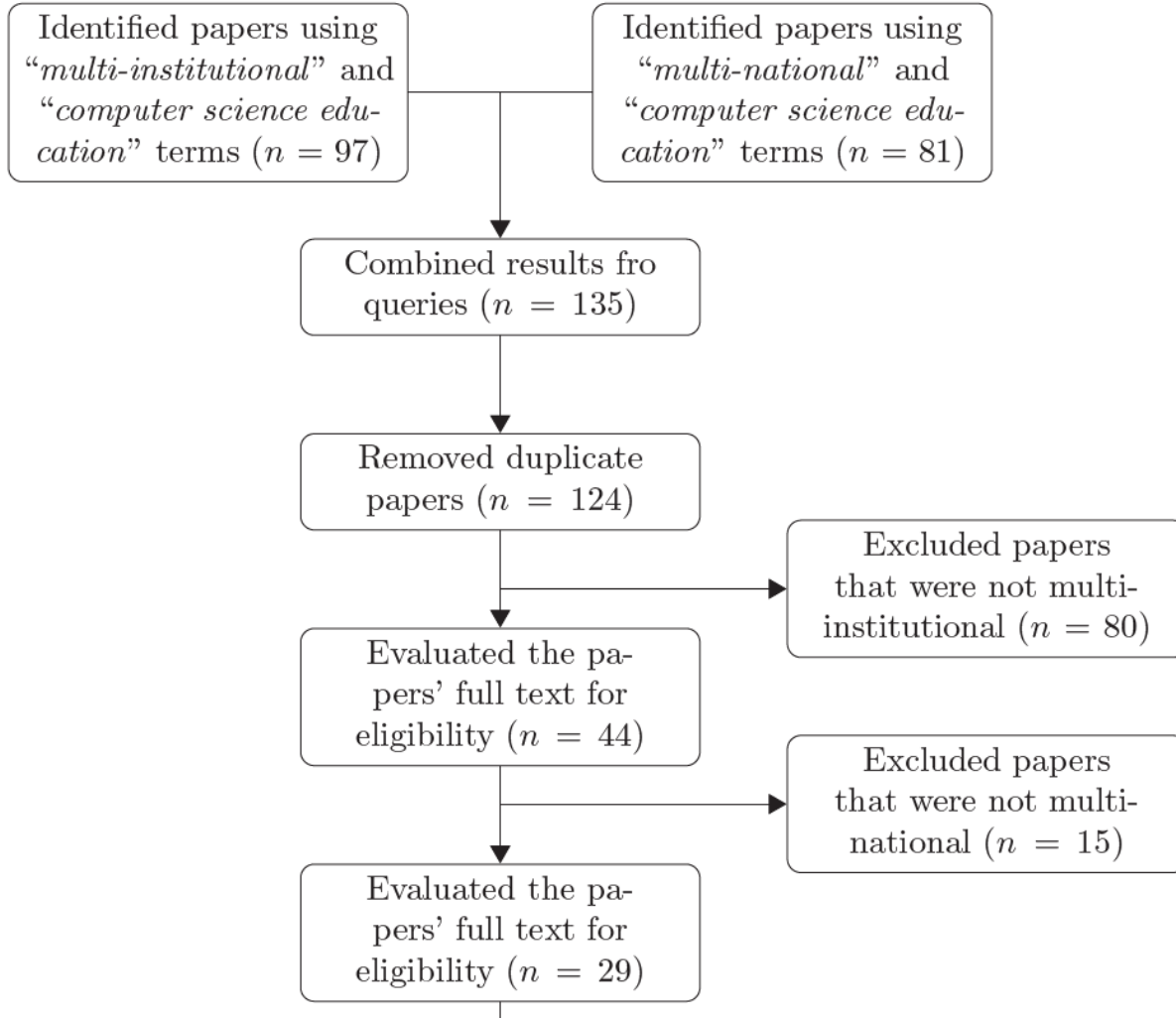
1) Expanded Literature Search

- 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

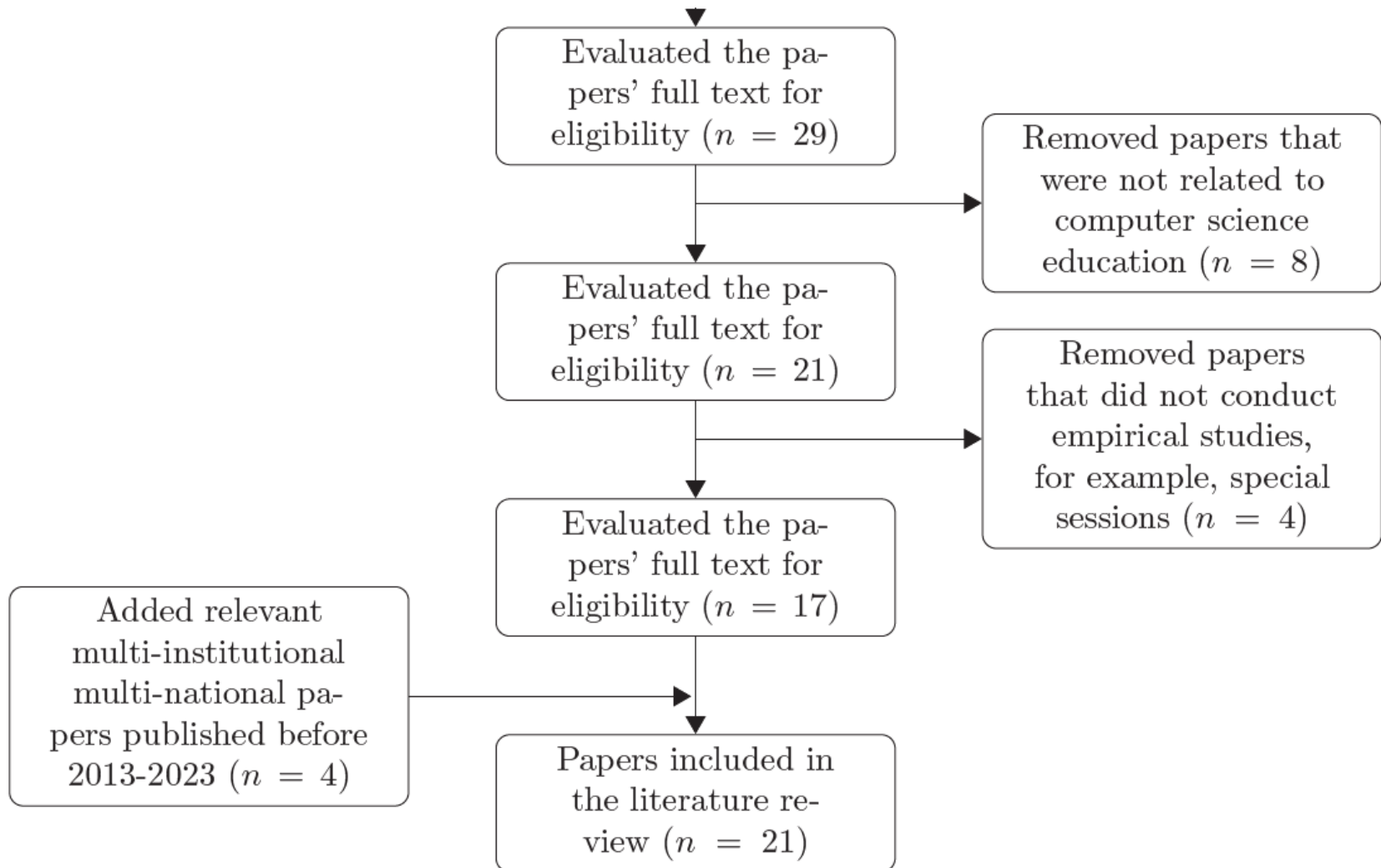
2) Literature Review: Multi-Institutional, Multi-National Studies in CSE

- 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:



Choosing papers (cont):



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

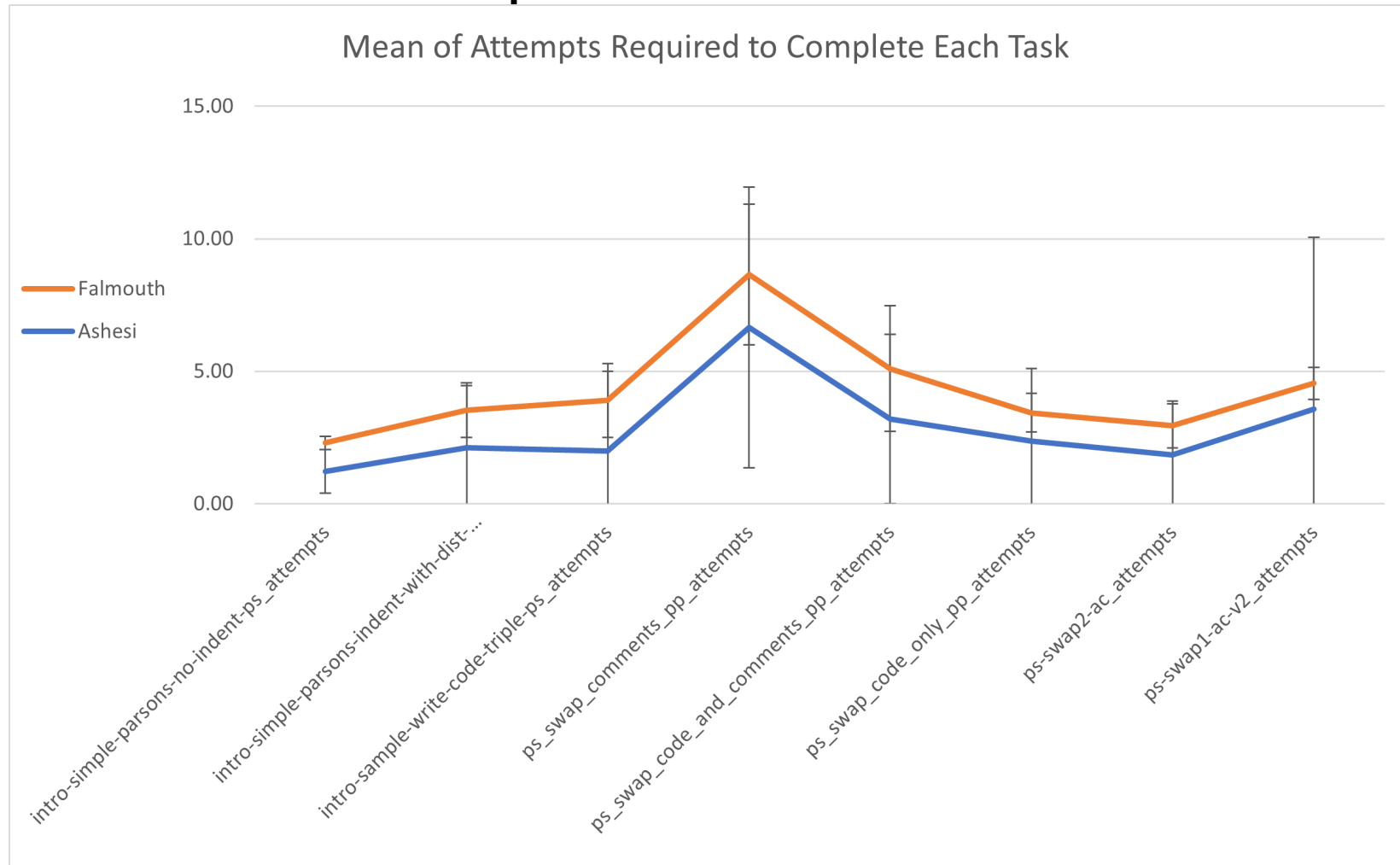
- Study in a box
- Many different studies between 14 institutions
 - Topics: Swap, Classes, etc.
 - Mostly Python
 - Runestone Academy online platform
 - Pre/Practice/Post
- Think Aloud Studies

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

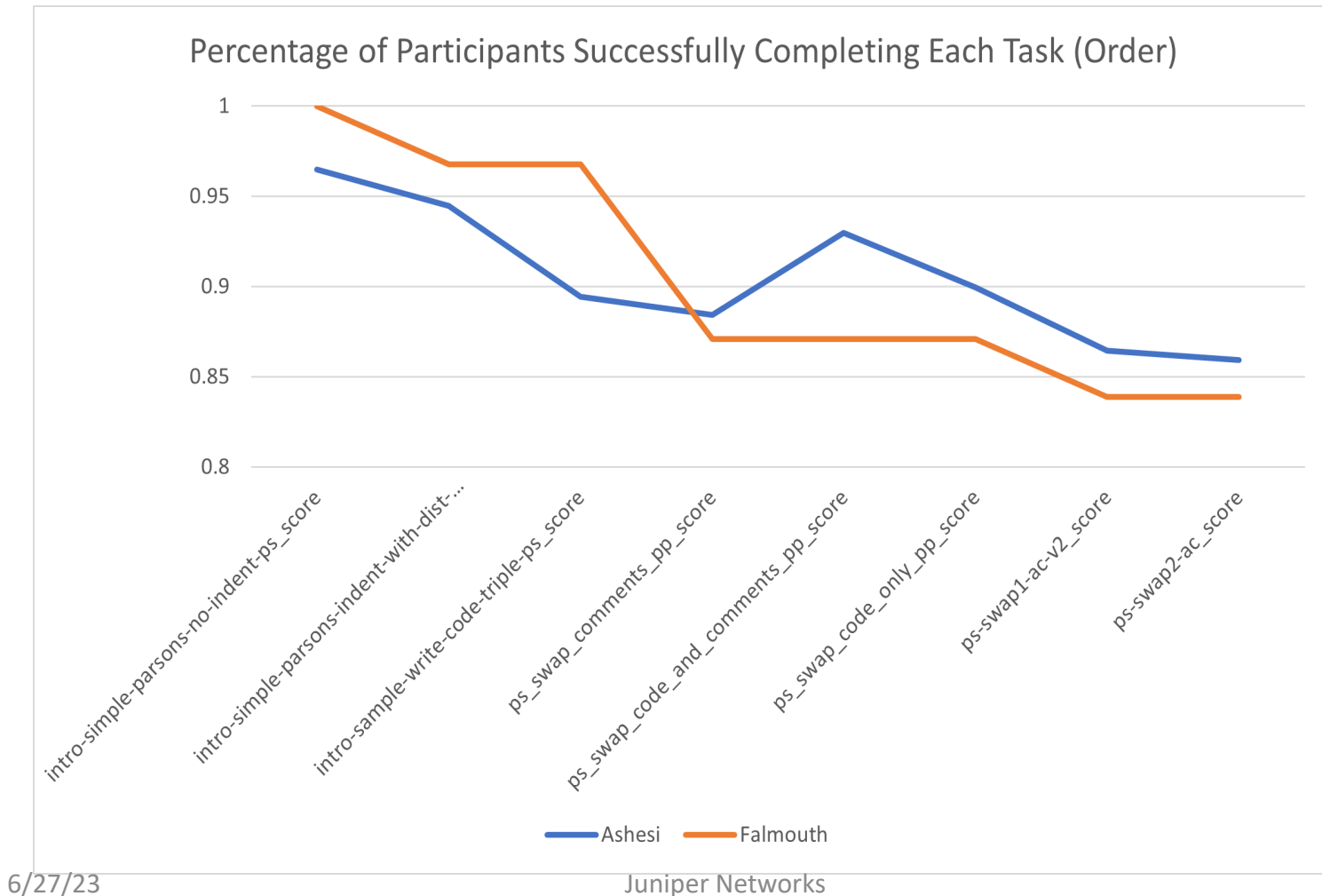
Results: Python-swap

- 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



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!

1
can
new

education
programming
researchers
introduction
table
performance
knowledge
analysis
review
section
literature
practice
working
proceedings

2
also
conducted
language

parsons
studies
distractors
time
research
university
ability
post-test
high
work
paper
context
pgpt
questions
self-efficacy
computer
machinery

3
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problem
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institutions
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adaptive
instruments

4
courses
usa

problems
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assessment
multi-national
college
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variables
made
science
institution
association
python-swap
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challenges
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conducting
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multiple
swap
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