Graphic Designers Who Program as Informal CS Learners

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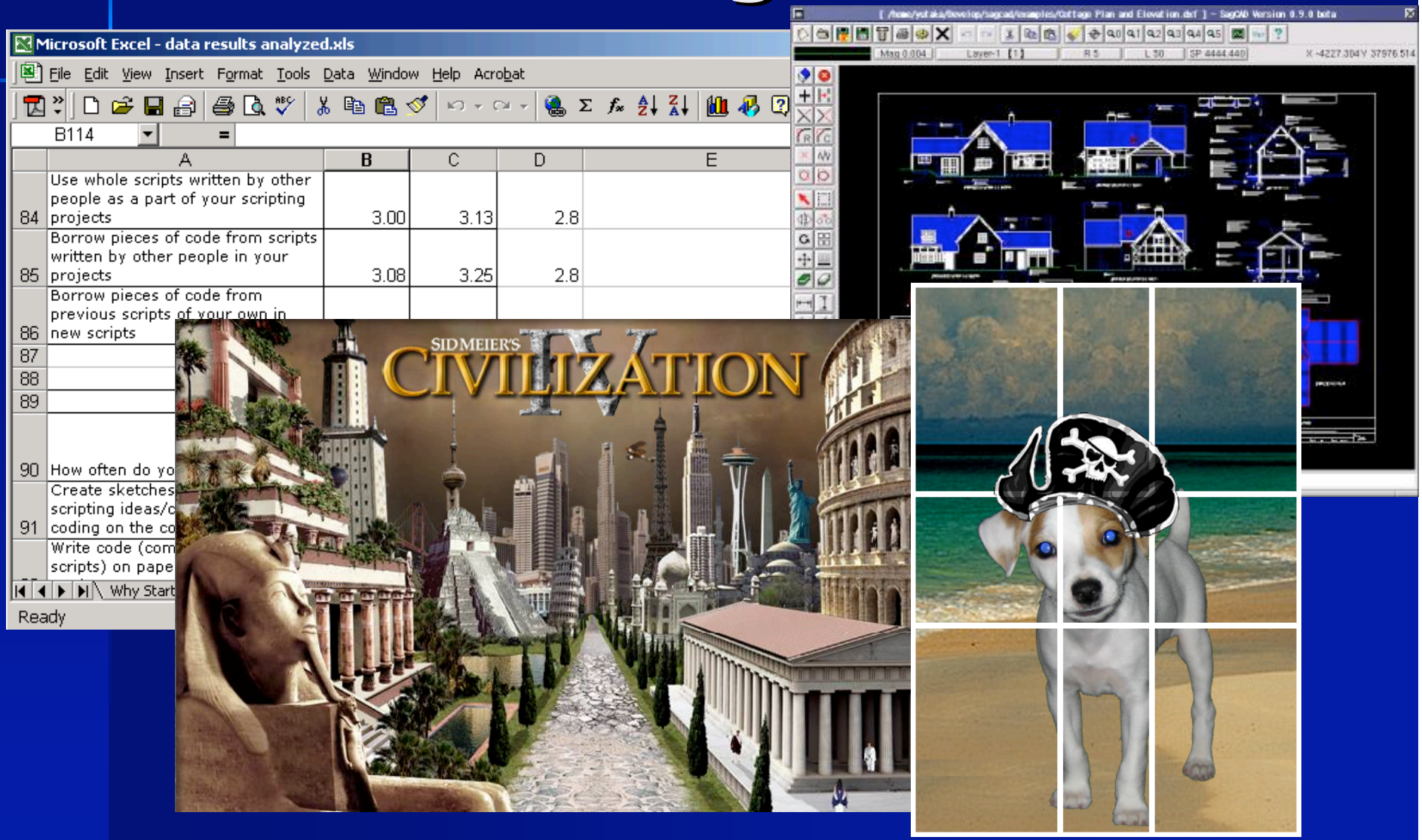
Outline

- End User Programmers
- Survey Method
- Respondent Demographics
- Results
  - Why Program?
  - Evidenced CS Knowledge
  - Learning Strategies
- Discussion

End User Programmers



End User Programmers

- Make use of features like scripting, declarative specification, automation
- Face common problems as in general-purpose languages
- Struggle with issues of testing and reusability (Panko, 1998)

Why Study EUP in CS Ed?

- A significant and growing population
  - Outnumber (or will soon) professional programmers by a factor of 4:1 (Scaffidi, Shaw, and Myers, 2005)
  - EUP-developed software errors are just as costly (Panko, 1995)
  - Perhaps software design techniques could help?
- Potential to inform CS learning (formal & informal)
  - What motivates them to take up programming?
  - How did they learn (naturally) what they learned?
  - Can we leverage this in our classrooms?

Graphic Design End Users

- An emergent, but unstudied group
- Use tools like Photoshop, GIMP
- Engage in scripting through JavaScript, Python, and Scheme
- Build automate batch jobs, custom effects, etc

Sample Script

- Golden Ratio Builder
  1:1.618
- 558 line script
- Adobe Studio Exchange
- Has value for users

Sample Script

```
var docRef = app.activeDocument
…
var phi = (Math.sqrt(5)-1) / 2
var goldx = Math.round( sizex * phi)
…
if (grDraw == true)  {
    //Gold ratio
    var artLayerRef = docRef.artLayers.add()
    //prawa pionowa
    if (this.params["right"]==true)  {
            var shapeRef = [Array(goldx-hthick,0), Array(goldx+hthick,0), … ]
            docRef.selection.select(shapeRef)
            docRef.selection.fill(gFillColor)
            …
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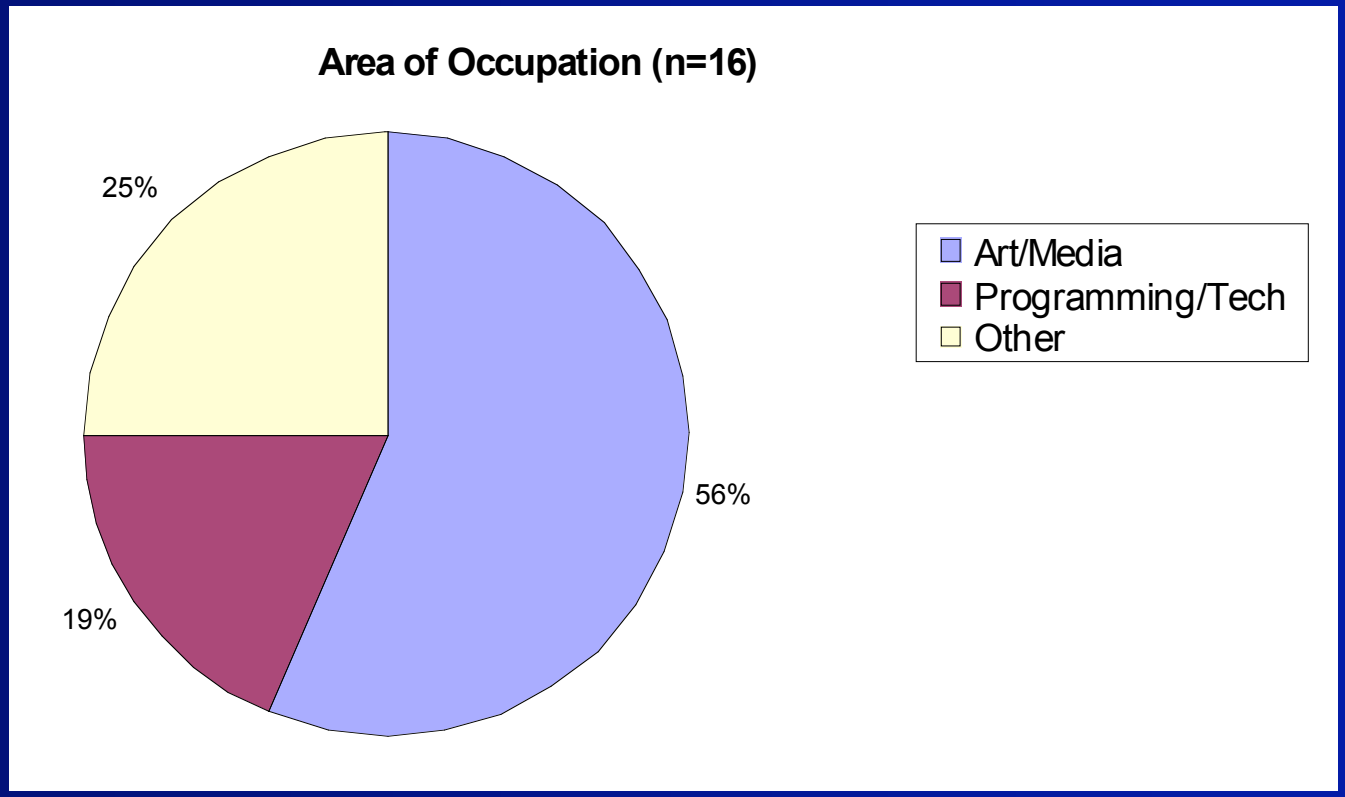
Survey Method

- Goal: Who? What?
- Extended questions from previous EUP studies
  - Informal web developers (Rosson, Ballin, and Rode, 2005)
  - Business application users (Scaffidi, Ko, Myers, and Shaw, 2005)
- 39-question survey for users of Photoshop, Illustrator, GIMP
  - Tool use habits, Motivation for scripting, Programming concept familiarity, Development behaviors

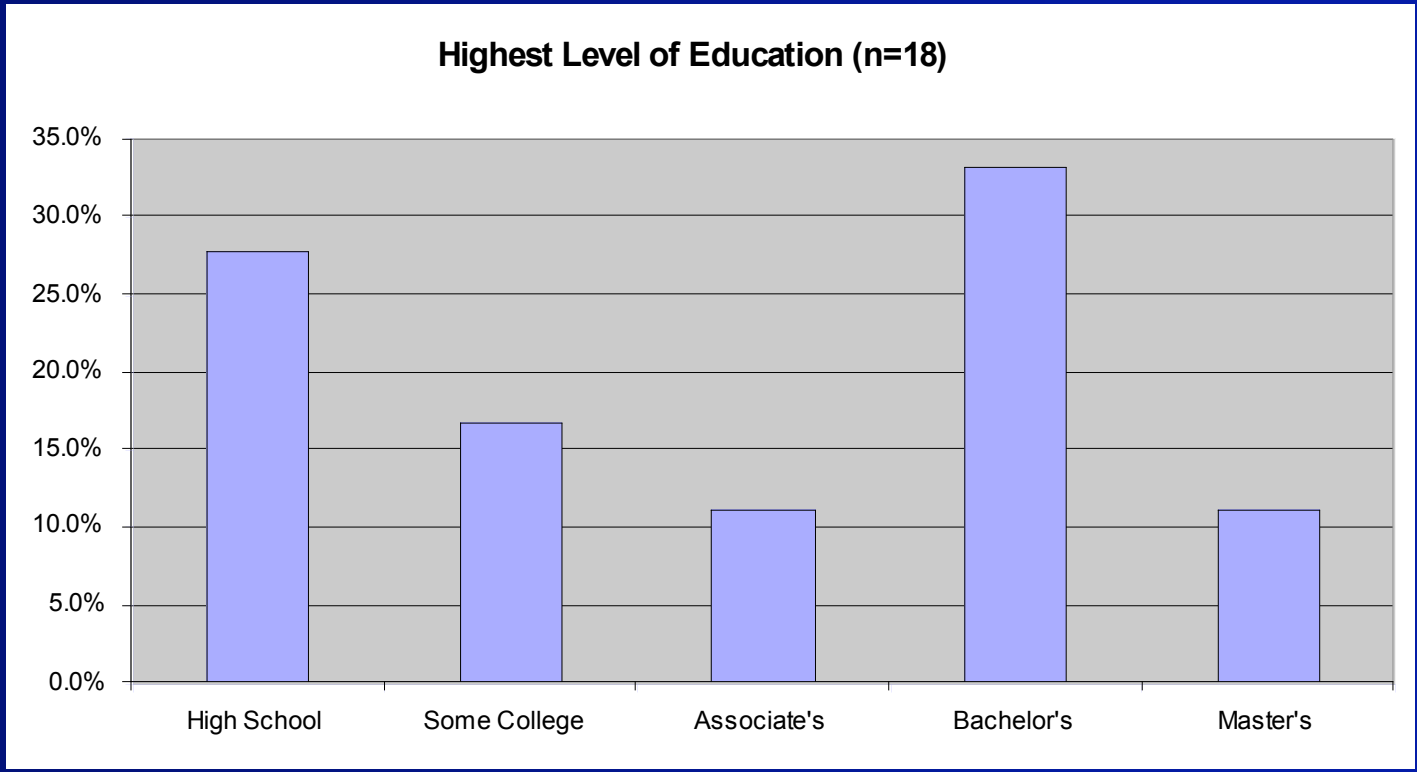
Survey Method

- Recruited from 6 online communities
- Targeted *local developers* (Nardi, 1993), but open to all
- Small sample size overall (~20)
  - Varied by question
  - Prevented statistical comparison

Demographics



Demographics

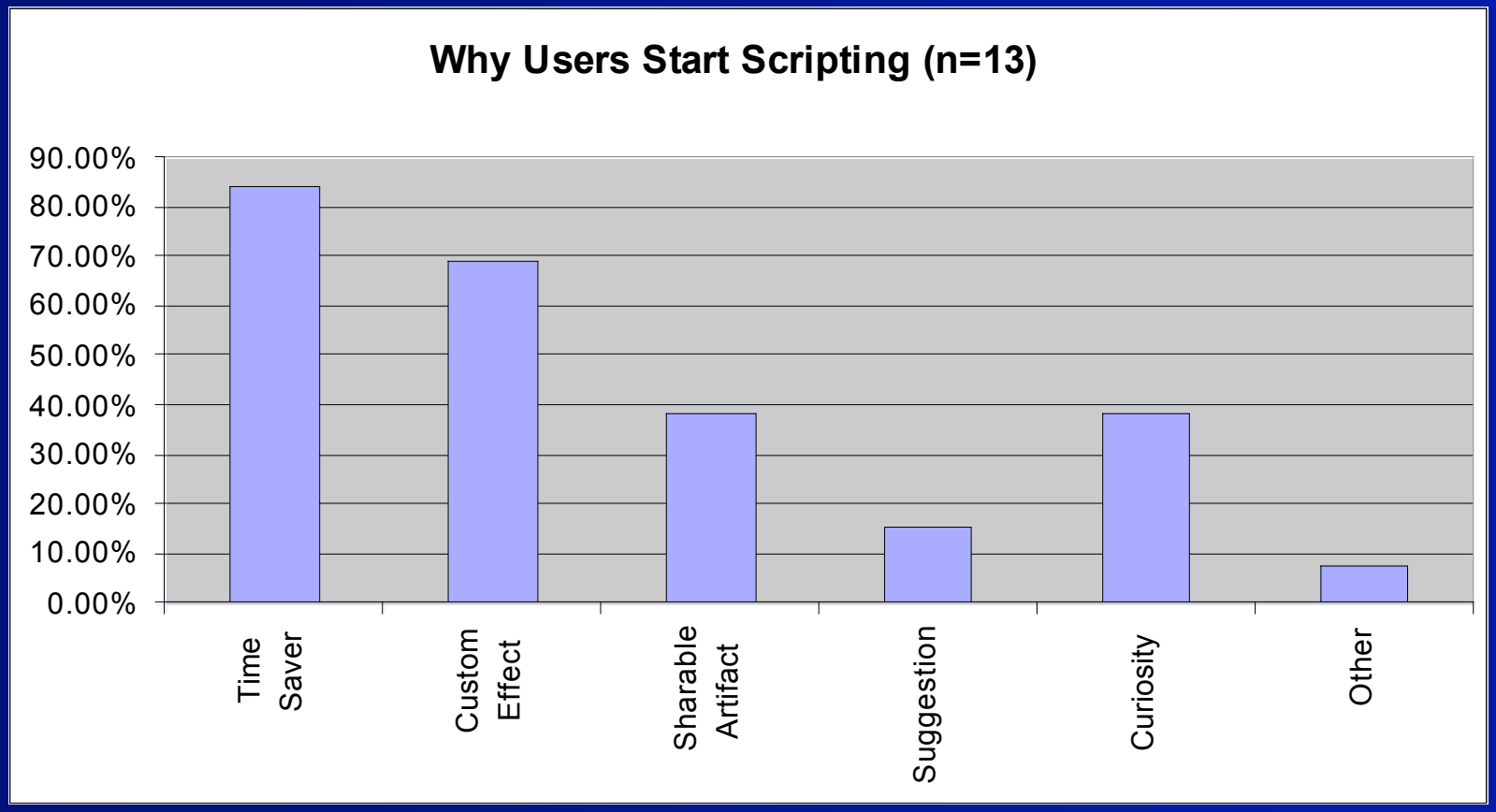


- 70% (n=13) majored in photography, art, or media

Demographics

- 61.1% (n=18) had NO formal training in programming
- 83.3% said "I'm not a programmer"
- But yet: *"I build database-populated pages for print and CD catalog distribution"*

The Path to Programming



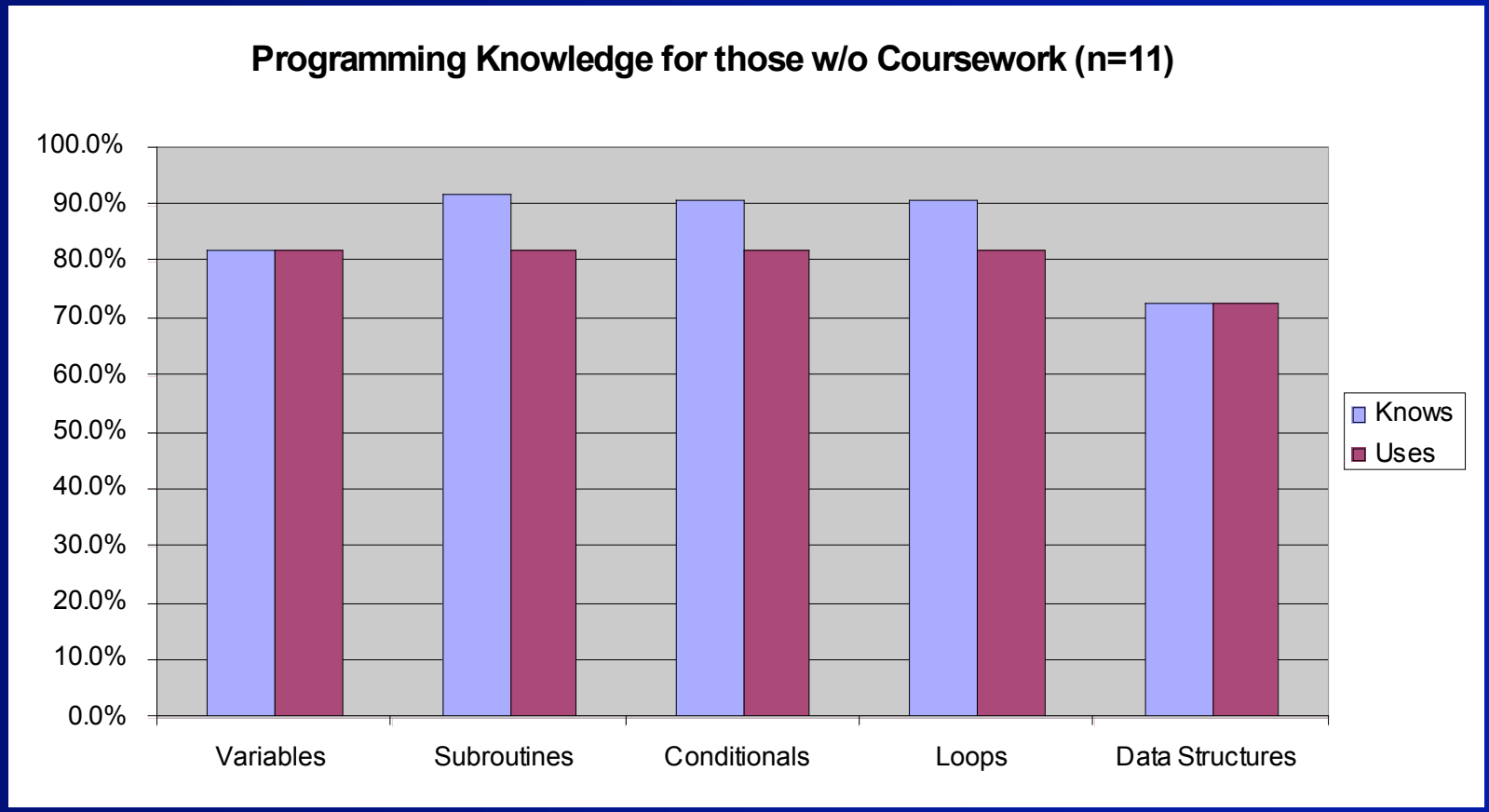
Commonly Reported Uses

- Iterative action application within project (85%, n=20)
- Batch processing multiple files (75%)
- Conditional action application (60%)

Elementary Programming

- Inquired about term familiarity and use of *variable, subroutine, conditional, loop,* and *compound data structure.*
- Examined those with and without formal coursework separately
  - 100% recognition for course (n=7)
  - 80+% among w/o course (n=11)

Elementary Programming



Software Development

- Investigated tendencies to engage in development practices
- Provided free-form response areas for elaboration

Software Development

- Design Habits
  - Most (60%, n=13) never pre-plan on paper
  - Design by template (reuse old code)
  - Design by "experiment-and-record"
- Reuse Habits
  - Share/borrow code often
  - But, few design for reuse
- Testing Habits
  - Likely to test, but lack structure

Sources for Learning/Support

- What they use:
  - Examples, code snippets, related projects
  - FAQs, books, tutorials
- What they don't:
  - Classes
  - Tech Support
- Where it's not clear:
  - Wizards

Discussion

- Results from this initial study suggest:
  - Graphic designer programmers exist
  - And we underestimated them
  - Lack “formal” training
  - Similar habits to other EUP domains

Why Study EUP in CS Ed?

- Help a large body of informal learners
  - Increase effectiveness
    - reliability
    - share-ability
  - Introduce CS as a discipline
- Insight for CS classrooms
  - Power of a context
    - programming is a relevant activity
  - New methods for teaching/learning
    - case-based, discovery, collaboration

Acknowledgements

- You!
- Survey participants
- National Science Foundation (CISE)
- Travel funds:
  - NSF
  - GVU, Georgia Tech

Questions

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