Point/Counter-Point: On Using Graphical Languages to Teach Programming

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Start

- Introduce: session, us, session genesis
- Overview of the session
  - Kinds of “graphical” languages
  - Points we saw
  - Our conclusions
  - Resources
- Please—Discussion at most any time
Graphics in Programming

- Typing-based programming languages
  - Graphical content, Standard context, e.g., media computation, Objectdraw, games in C, GUI (Visual Basic)
  - Graphical content, Graphical context, e.g., Greenfoot, Logo & variants, Karel the Robot, Jeroo, KPL, MooseCrossssing, Starlogo

- Visual programming languages (VPL), e.g., Stagecast Creator, Scratch, Alice, LegoMindstorms, Labview, Games Factory 2

(An informal categorization. Mention former; focus on...
Focus on logic not syntax

**Pro:**
- Simplify entering commands
- Decrease things to memorize
- Fewer syntax errors = less frustration

**Con**
- “Real” programming languages have syntax (or you have to learn it sometime)
- Still lots to “memorize”

**Rebuttal:** Focus on one thing at a time

**Rebuttal:** Slippery slope; focus of mass education
Developing Generalized Programming Skill

- **Con**
  - Requires experience in multiple contexts

- **Pro**
  - May not be the goal
  - Can do models & simulations versus stories
  - Real programming is moving in this direction

**Rebuttal:** So, consider goals and student population
It’s All About Abstraction

- **Pro:** What’s up with this “real” languages stuff, anyway
- **Con:** What does “It’s all about abstraction” mean??
- **Rebuttal:** I’m right, you’re wrong, so there!
- **Rebuttal:** I’m rubber, you’re glue!
- **Seriously, though ...**
VPLs & Visualizing Program “State”

- **Pro**
  - Microworlds explicitly show progress of programs
  - Aids/simplifies debugging

- **Con**
  - Not all programming problems are visual
VPLs Make Programming Fun!

Pro
- Visual contexts are engaging
- Need not be “dumbing it down”
- Can bring more people to computing

Con
- May be bait and switch
- But, I’m a teacher not an entertainer
- Everything cannot be fun

Rebuttal: VPLs make hard part (logic) less onerous

Rebuttal: Okay, but remember the learning goal
What Did We Miss?
Conclusions

- Identify your goal
- Identify how VPL use will advance it
- When using VPLs, provide guidance without being overly prescriptive
- For generalized programming skill, consider graphical context languages
- Using only number & text problems in CS is just wrong
- CS education must evolve; VPLs may or may not be the next species
- You teach the students you have, not the ones you want (or were)
Language Resources

- StarLogo TNG  http://education.mit.edu/starlogo-tng/
- eToys  http://www.squeakland.org/
- Scratch  http://scratch.mit.edu/
- Stagecast Creator  http://www.stagecast.com/
- Alice  http://www.alice.org/
- Games Factory 2  http://www.clickteam.com/eng/tgf2.php
Literature Resources

- [http://www-ist.massey.ac.nz/plyons/776/VPL%20papers.html](http://www-ist.massey.ac.nz/plyons/776/VPL%20papers.html)
- [http://web.engr.oregonstate.edu/~burnett/Scaling/ScalingUp.html](http://web.engr.oregonstate.edu/~burnett/Scaling/ScalingUp.html)