

Teaching programming with Python and the Blender Game Engine

Trevor M. Tomesh

University of Worcester
Computing Dept.

Director of Studies: Dr. Colin B. Price



Shut down or restart?

The way forward for computing in UK schools

January 2012

EXCELLENCE
IN SCIENCE



THE ROYAL SOCIETY

DWINDLING ENTHUSIASM

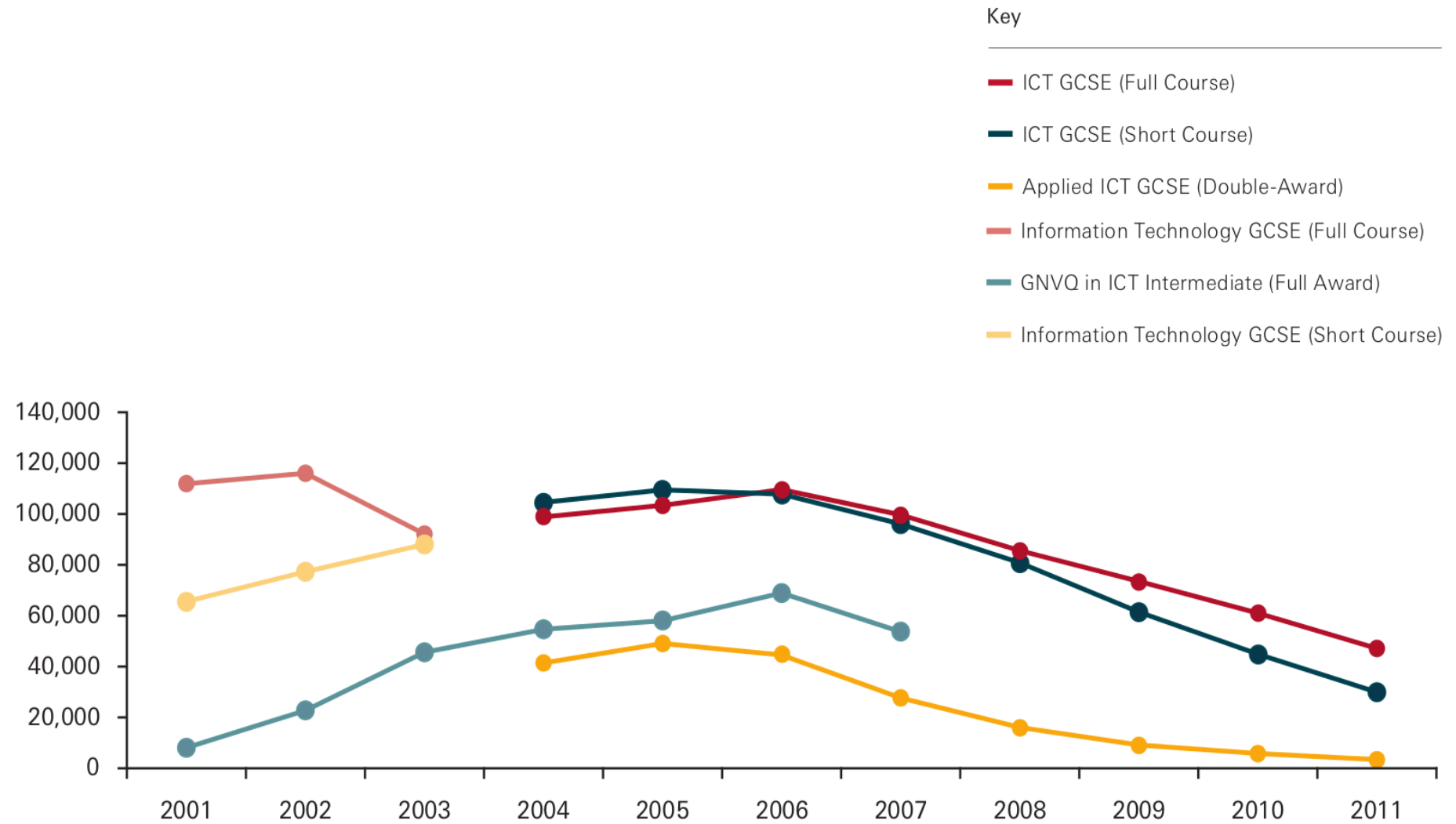
SHORTAGE OF SPECIALIST TEACHERS

HIGHLY UNSATISFACTORY

BORING

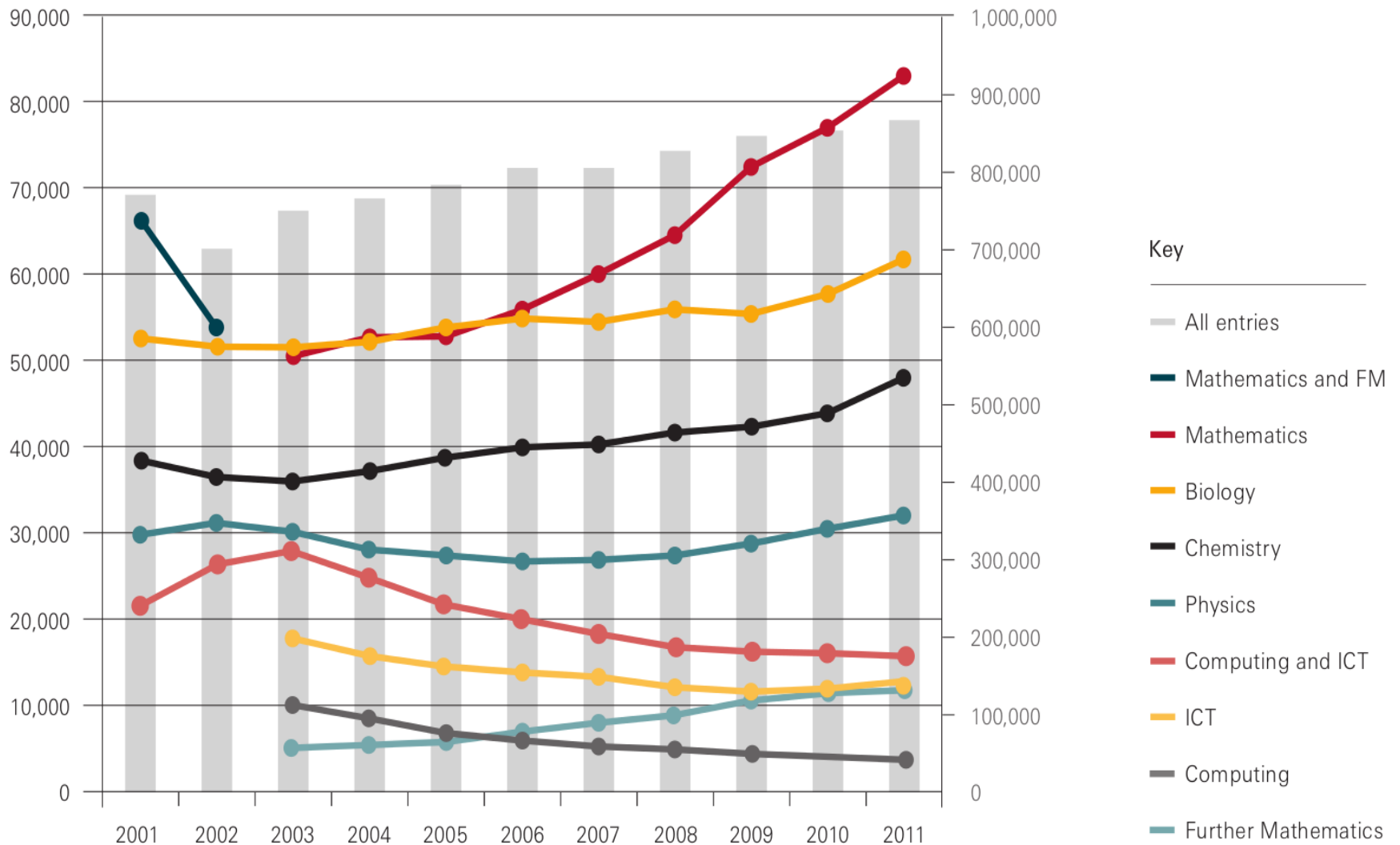
**LACK OF CONTINUING
PROFESSIONAL DEVELOPMENT
FOR TEACHERS**

Total number of GCSE entries in ICT and Computing subjects across England, Wales and Northern Ireland (2001–2011)



Source: JCQ.

Total number of UK GCE A-level entries in science and mathematics subjects (2001–2011)



Source: JCQ.

- The Royal Society

“ Suitable technical resources should be available in all schools to support the teaching of Computer Science and Information Technology. These could include pupil-friendly programming environments [...] ”

“VISUAL CONTEXT”



(Crawford and Boese, 2006)

Scratch category menu:

- Motion
- Looks
- Sound
- Pen
- Control
- Sensing
- Operators
- Variables

Variable management options:

- Make a variable
- Delete a variable
- Softpedia
- set Softpedia to 0
- change Softpedia by 1
- show variable Softpedia
- hide variable Softpedia
- Make a list

Sprite 1 information:

- Sprite 1 (locked)
- x: 10 y: 0 direction: 90
- Scripts, Costumes, Sounds tabs

```

move 10 steps
point in direction 90
change x by 10
if on edge, bounce
turn 15 degrees
turn 15 degrees
move 10 steps
change x by 10
if on edge, bounce
say Hello! for 2 secs
think Hmm... for 2 secs
change size by 10
play sound meow
set volume to 100 %
rest for 0.2 beats
pen down
set pen color to black
change pen size by 1
stamp
pen up
wait 1 secs
when space key pressed
wait 1 secs
if touching color
if mouse down?
length of world
= join hello world
  
```

Stage area:

- Softpedia 0
- Scratch cat sprite
- Coordinates: x: -62 y: -394

Sprite management area:

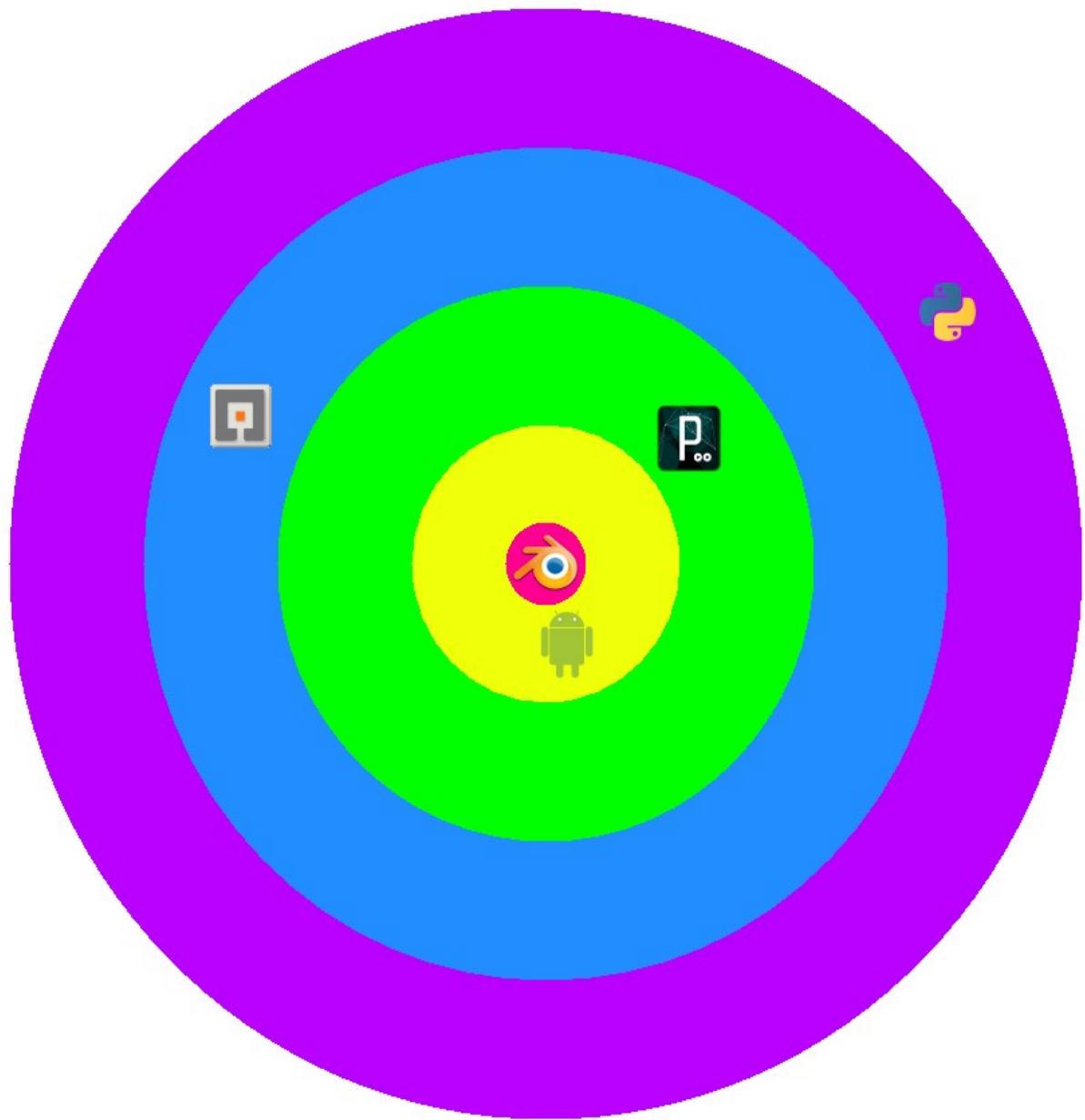
- New sprite: (add), (duplicate), (?)
- Sprite 1 (Scratch cat)
- Stage


```
skillwheel | Processing 2.0a6
File Edit Sketch Tools Help
STANDARD
skillwheel
/* @pjs preload="NXT.png, android.png, blender.png, processing.png,
*/

PImage processing;
float t = 0.0;
PImage python;
PImage blender;
PImage nxt;
PImage android;

int state = 0;

void setup() {
  background(0);
  size(1000,1000);
  processing = loadImage("processing.png");
  python = loadImage("python.png");
  blender = loadImage("blender.png");
  android = loadImage("android.png");
  nxt = loadImage("NXT.png");
}
```



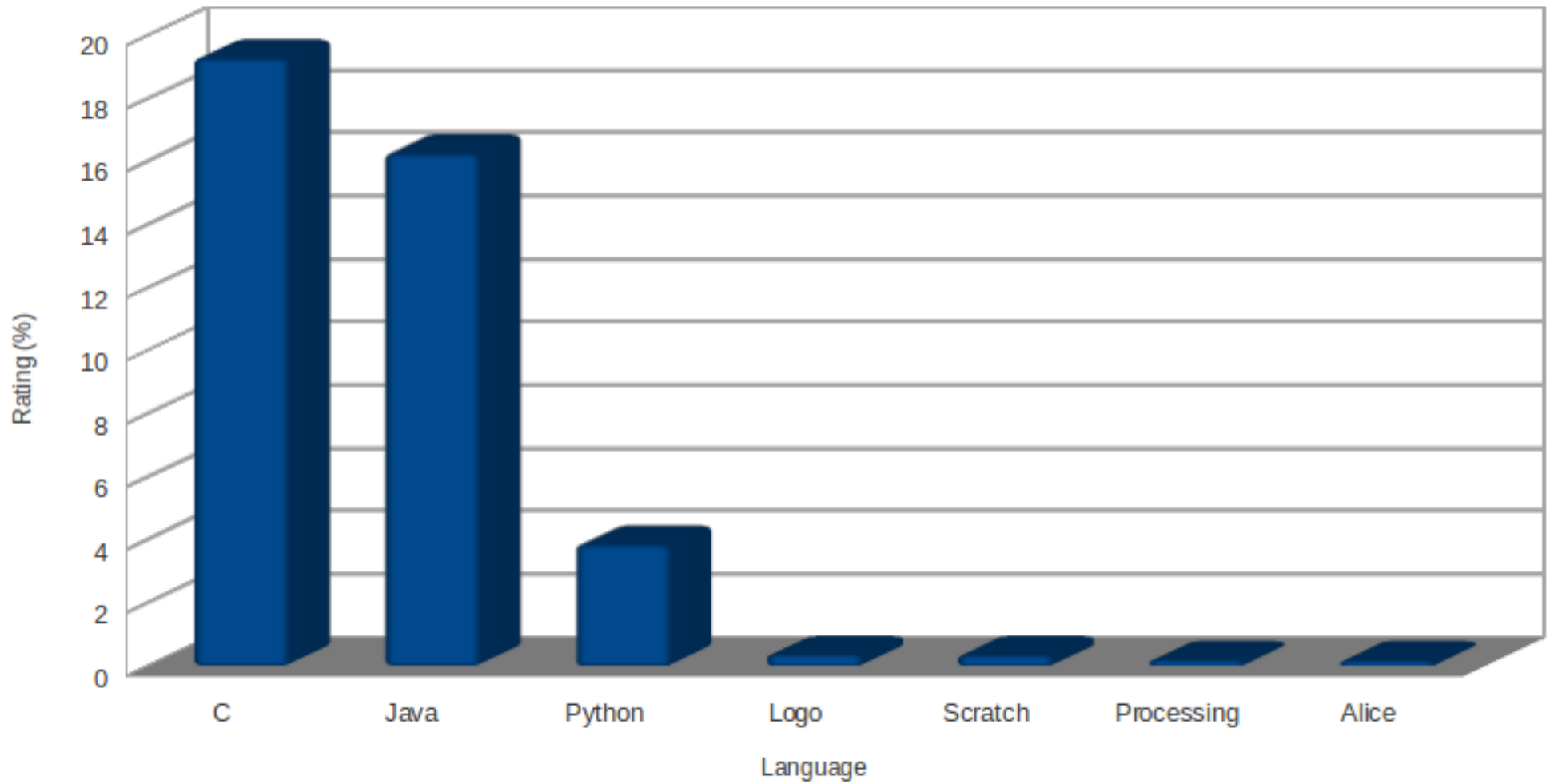


“[...] market appeal / industry demand / student demand is one of the most important factors affecting language choice in computer science education.” (Arnolds et. al.)

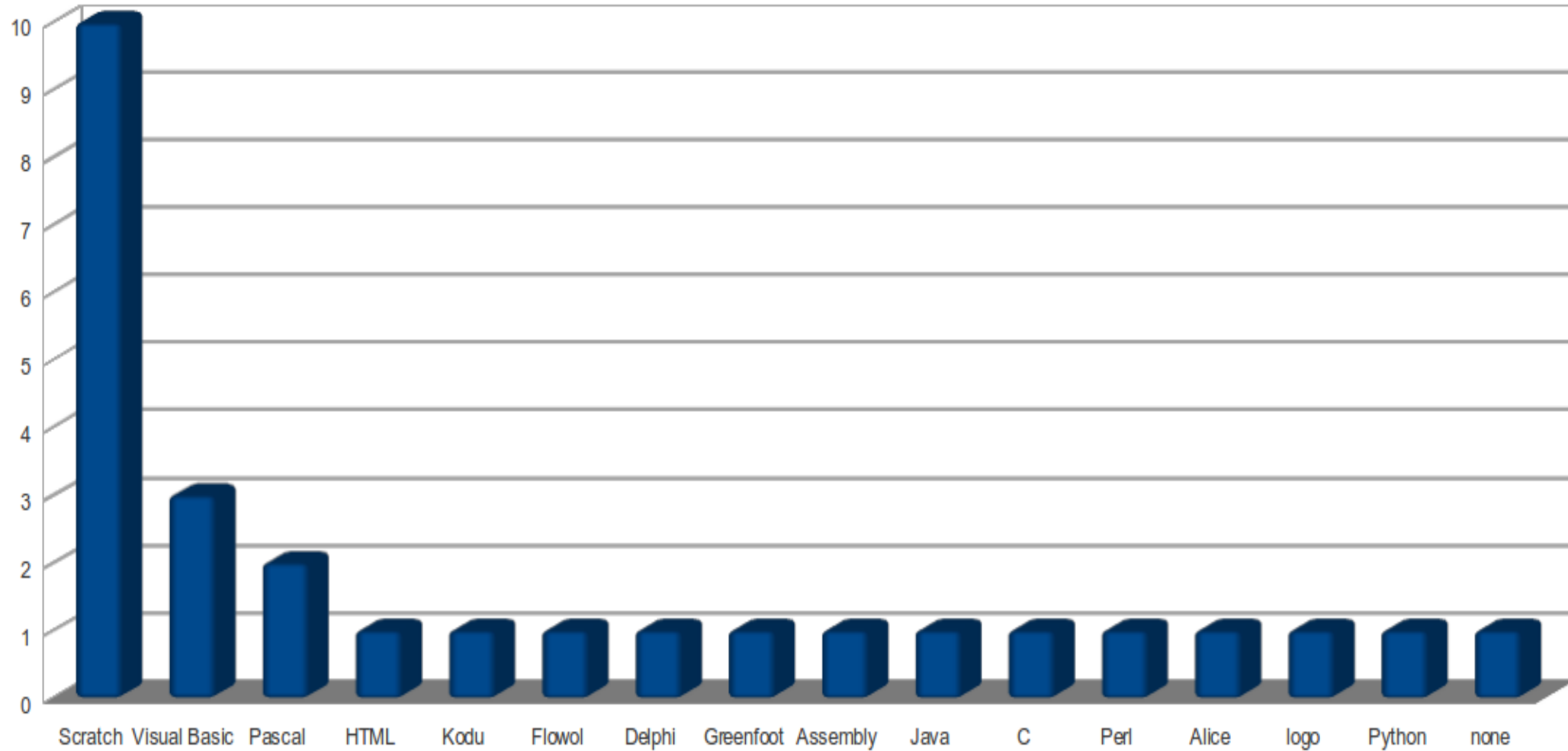
“[...] such specialized teaching environments leave [students] without a real-world programming language upon graduation” (Crawford & Boese, 2006)



TIOBE Index for September 2012

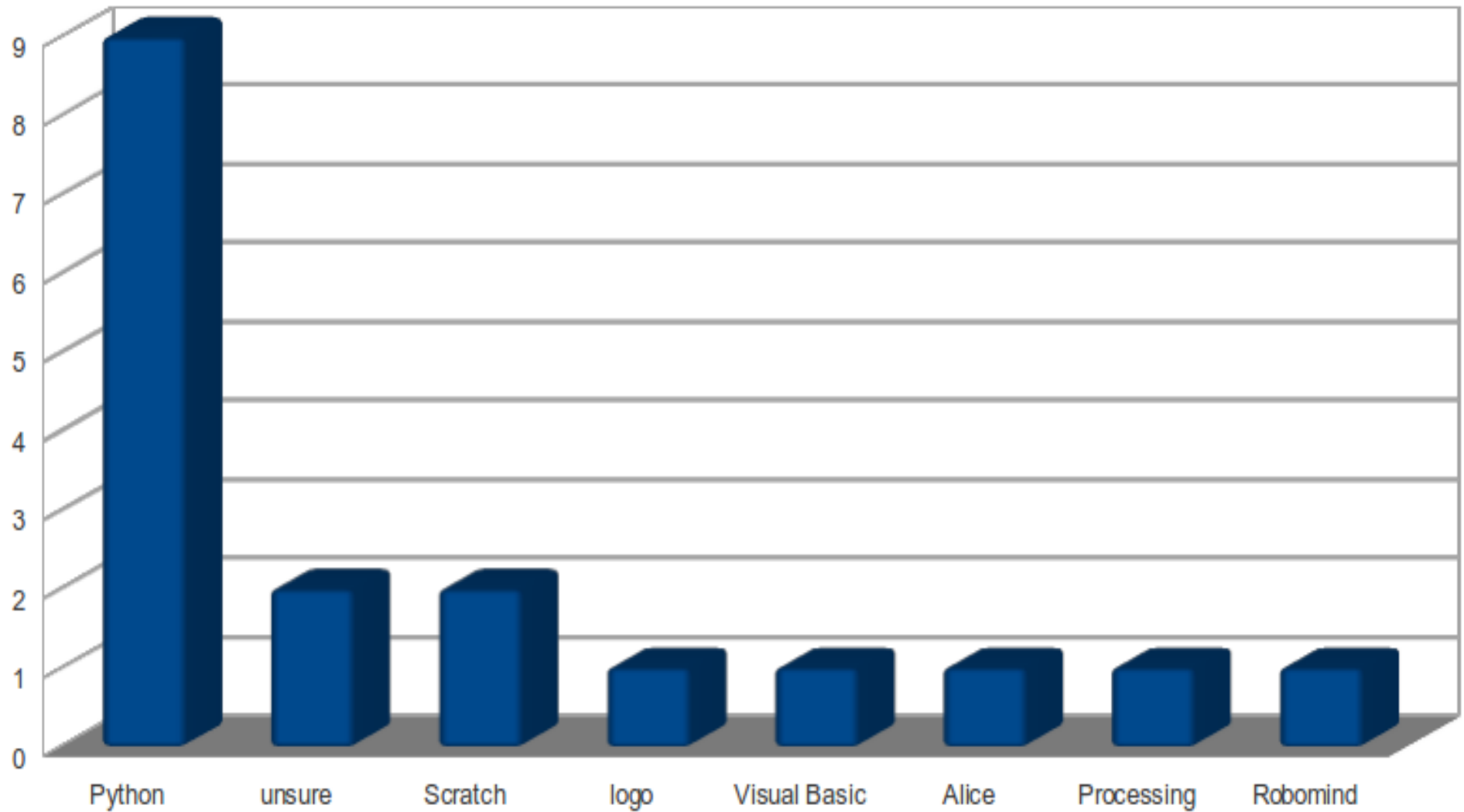


Programming Languages Currently Taught in Schools



Worcester Google Symposium (12-14 July 2012)
Delegate Pre-symposium Questionnaire

Planned programming languages to be taught at local schools



Worcester Google Symposium (12-14 July 2012) Delegate Pre-symposium Questionnaire

“ it's an excellent first teaching language ”

“Seems straight forward to pick up, and there appears to be support infrastructure available [...]”

“Clean syntax that encourages good practice.”

“Preferred by specialist staff [...]”

“It's going to be the next Pascal.”

“Python for its simplicity.”

“[...] support and also ease of functionality”



“VISUAL CONTEXT”



pygame




```
import pygame
from pygame.locals import *

class App:
    def __init__(self):
        self._running = True
        self._display_surf = None
        self.size = self.weight, self.height = 640, 400

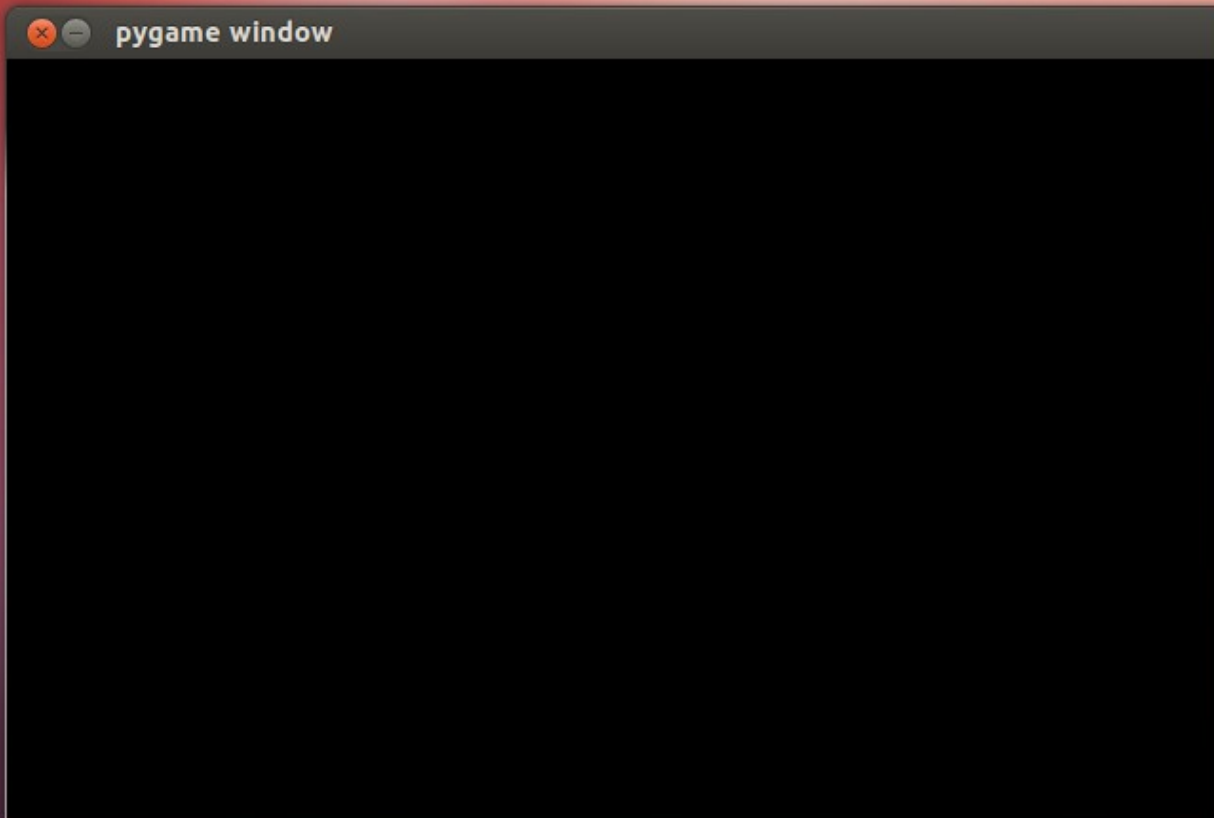
    def on_init(self):
        pygame.init()
        self._display_surf = pygame.display.set_mode(self.size, pygame.HWSURFACE | pygame.DOUBLEBUF)
        self._running = True

    def on_event(self, event):
        if event.type == pygame.QUIT:
            self._running = False
    def on_loop(self):
        pass
    def on_render(self):
        pass
    def on_cleanup(self):
        pygame.quit()

    def on_execute(self):
        if self.on_init() == False:
            self._running = False

        while( self._running ):
            for event in pygame.event.get():
                self.on_event(event)
                self.on_loop()
                self.on_render()
                self.on_cleanup()

if __name__ == "__main__" :
    theApp = App()
    theApp.on_execute()
```





Blender Game Engine



Minimal Code Overhead
Graphical / Immediate Feedback
Full Python API
Professional Applications
Multi-platform
All Skill Levels
Free and Open
Community Support

Example...



Let's Do This!

- **Create materials for classrooms**
- **Talk to schools**
- **Organize outreach**



Thank You!

Questions?

Contact: t.tomesh@worc.ac.uk

website: trevortomesh.github.com/blender-conference-2012.html

References

- Furber, S. et al. (2012) Shut down or restart? The way forward for computing in UK schools. The Royal Society.
- Crawford, S. and Boese, E. (2006) ActionScript: a gentle introduction to programming. Journal of Computing Sciences in Colleges, 21 (3), p.157
- Worcester Google Computing Symposium Home Page:<http://staffweb.worc.ac.uk/DrC/Symposium/SymposiumHome.htm>