Motivating all our students?

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ITiCSE 2011 Working Group: Interim report
http://www.iticse2011.tu-darmstadt.de/wgs/wg1

Abstract

Academics expend a large amount of time and effort to sustain and enhance the motivation of undergraduate students. Typically based on a desire to ensure that all students achieve their full potential, approaches are based on an understanding that students who are highly motivated will learn more.

Furthermore, institutional rewards accrue from effective use of academics' time, along with financial benefits associated with high levels of retention and progression.

This working group report, based on practice in Europe, Australasia and North America, builds on previous work. It provides an updated and revised literature review, analyses a larger collection of survey data and has sought to triangulate earlier findings with qualitative data from practitioner interviews.

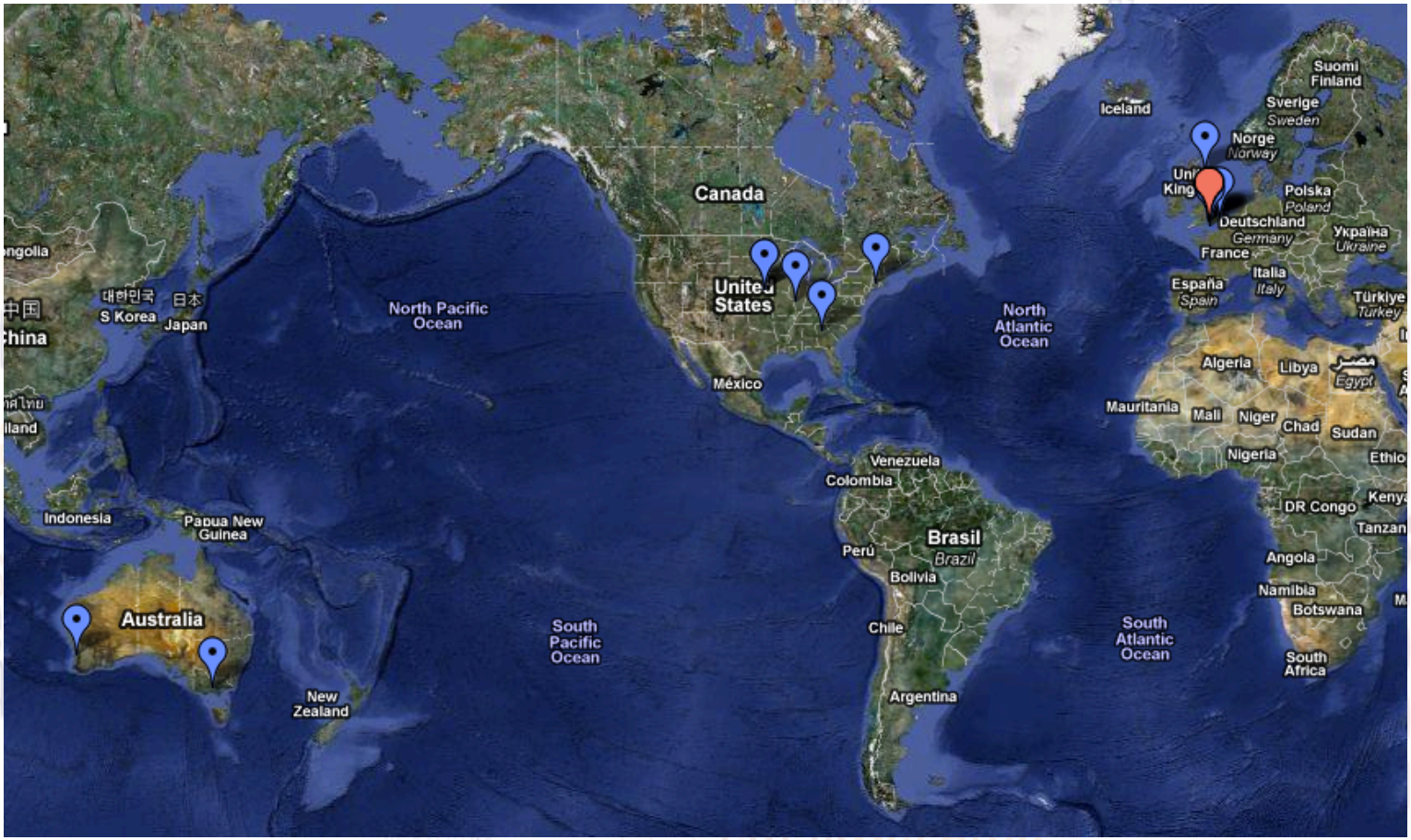
The report covers established approaches in teaching, support and extra-curricular activities. It tracks emerging practice such as streamed and differentiated teaching, and research based and authentic learning.

It also considers contemporary innovations in student activities. Finally it reports on a repository of tips and techniques which has been established to support faculty wishing to change or review current methods.

Who we are – insert pic

Three continents, ten universities,
a diverse range of backgrounds, institutions and perspectives
… understanding that differences may persist

Where we come from



Three continents, ten universities,
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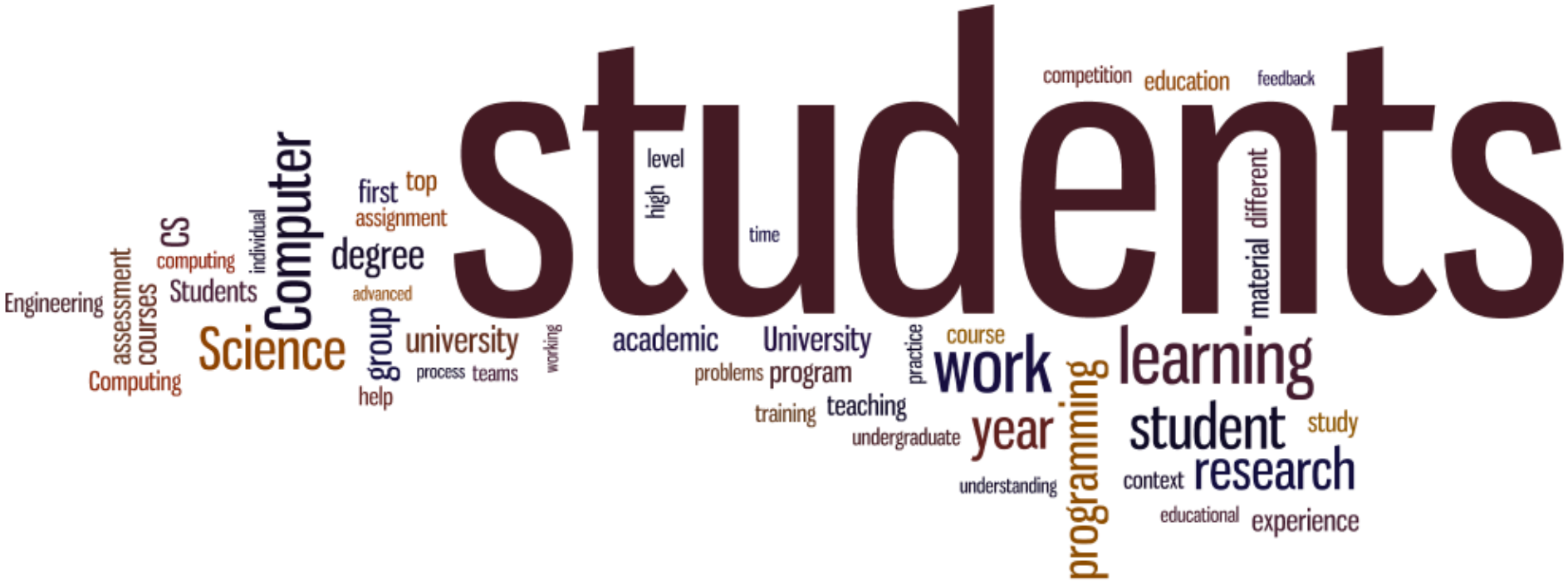
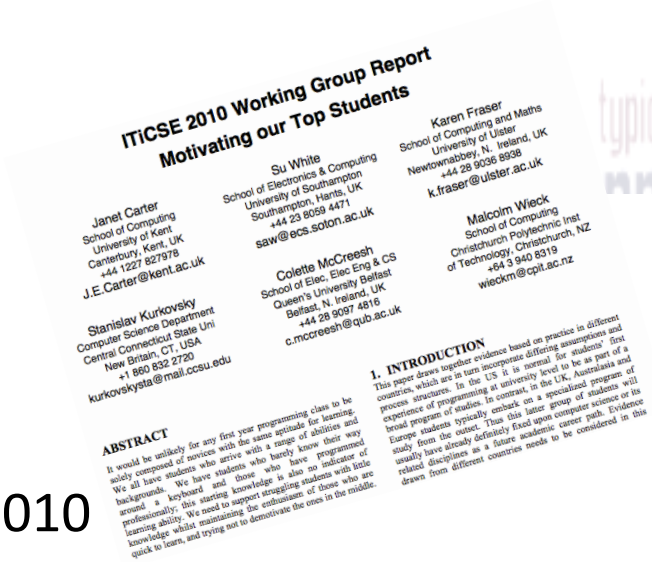
Our Perspectives/Enquiry



The first year experience
Learning to program

2010 -> 2011



ITiCSE 2010 Working Group Report
Motivating our Top Students

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ABSTRACT

It would be unlikely for any first year programming class to be solely composed of novices with the same attitude for learning. We all have students who arrive with a range of abilities and backgrounds. We have students who barely know their way around a keyboard and those who have programmed professionally; this starting knowledge is also no indicator of learning ability. We need to support struggling students with little knowledge whilst maintaining the enthusiasm of those who are quick to learn, and trying not to demotivate the ones in the middle.

1. INTRODUCTION

This paper draws together evidence based on practice in different countries, which are in turn incorporate differing assumptions and process structures. In the US it is normal for students' first experience of programming at university level to be as part of a broad program of studies. In contrast, in the UK, Australasia and Europe students typically embark on a specialized program of study from the outset. Thus this latter group of students will usually have already definitely fixed upon computer science or its related disciplines as a future academic career path. Evidence drawn from different countries needs to be considered in this

2010
Literature review

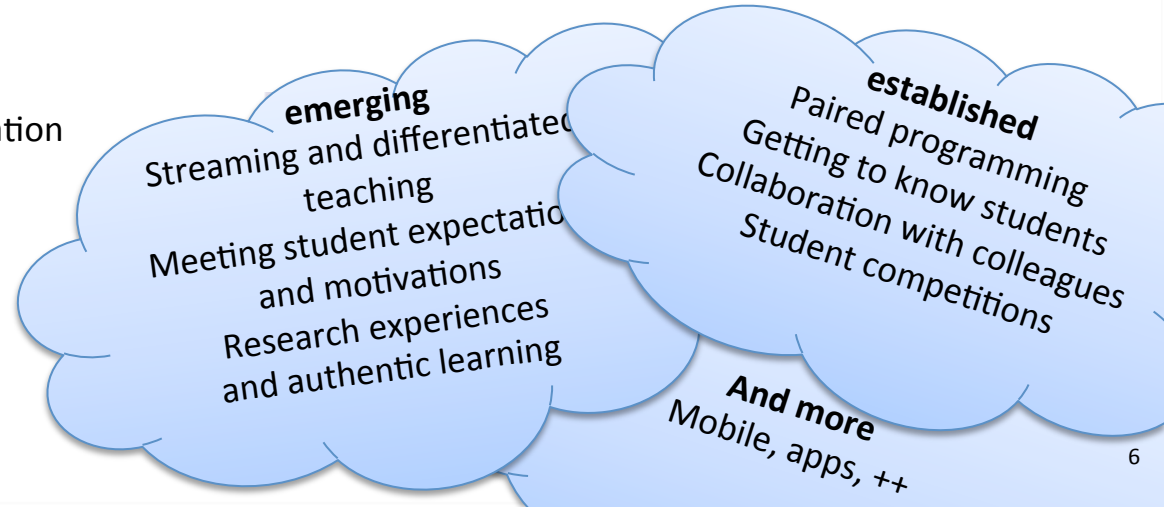
- Range of perspectives
  - Strugglers
  - Background narrative
    - methods and education the long view

2011
Extended, revised

2010
Survey (thank you ☺)

- ~80 respondents, ~40 full sets
- Quantitative and (rich) qualitative

2011
Further survey data
Triangulation via in-depth interviews



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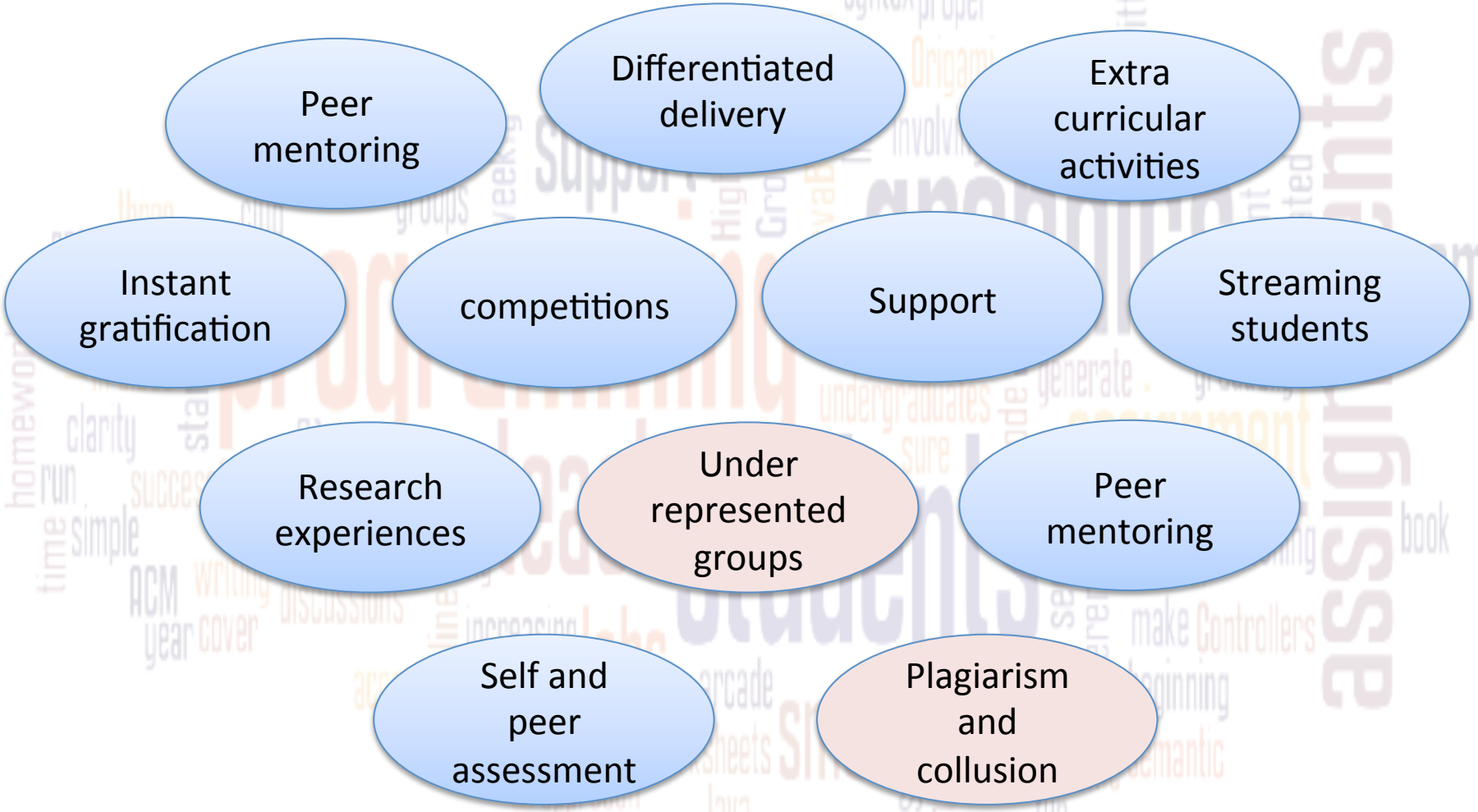
Let's consider some questions

- What **motivates** our students?
- Why do students **progress** differently?
- How do we obtain **optimal outcomes** for the greatest number?
- What **interventions** do we devise and use?
- What are the **range** of important factors?
- What important **different perspectives** exist?

Themes and interests



The student voice

"It was really intense, but great fun".

"I liked that we were supposed to work at our natural pace and that we had to think".

"Working together was great, everyone worked amazingly well in teams…I felt I learnt an enormous amount from the activity, and I thank you sincerely for making it available to us".

"Its great – thank you for organizing it".

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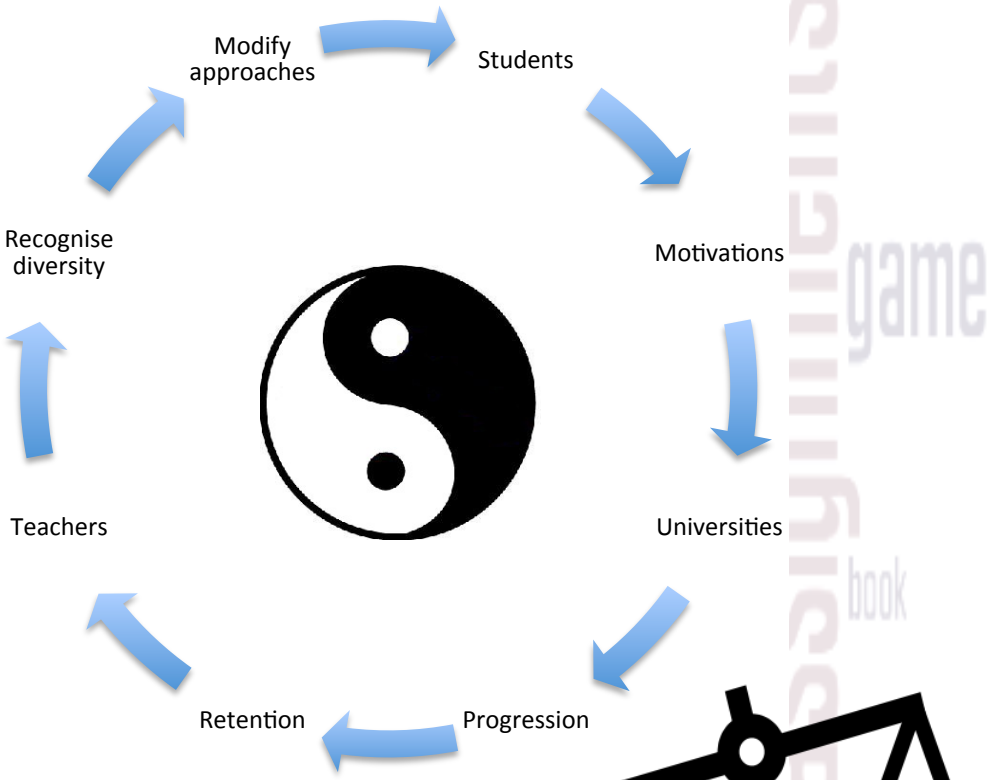
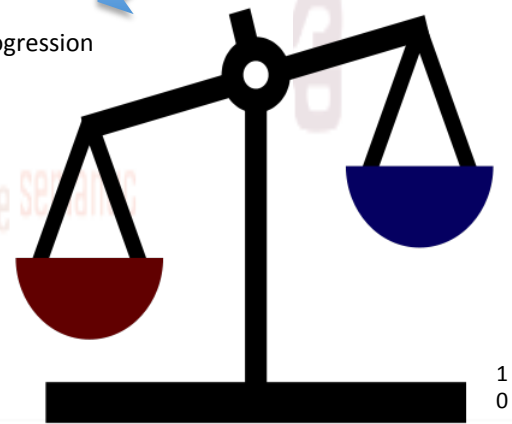
Considering Motivations

- Students
  - diverse backgrounds
  - differing needs
  - differing individual motivations
- Universities
  - differing contexts
    - Australasia Europe majors from year 1
    - North American minors and majors
- Teachers
  - differing perspectives and objectives

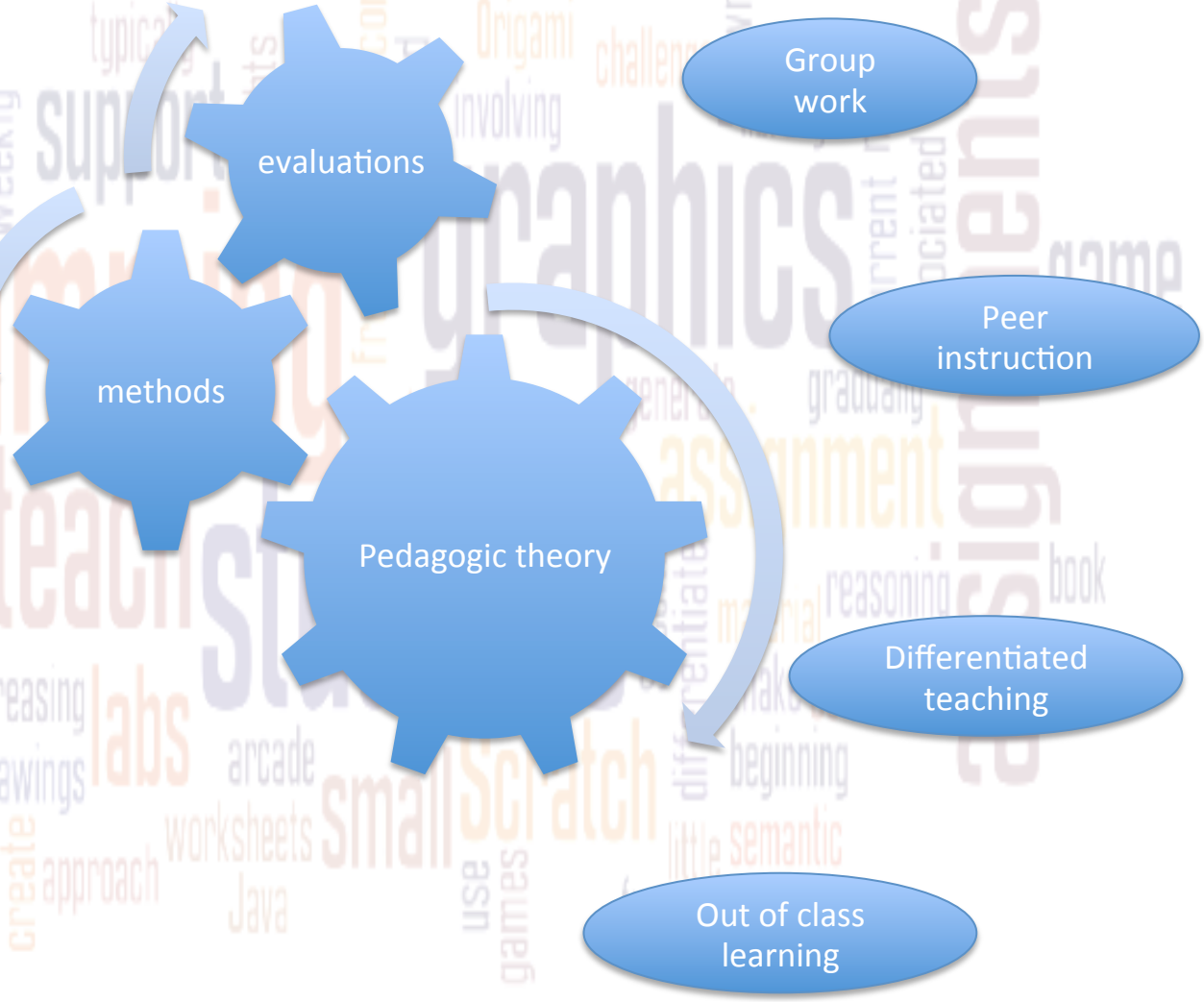




Why enhancing motivation is crucial

- Students who are well motivated learn more
- We want to ensure that **all** students achieve their full potential

Mechanisms: pedagogic interventions



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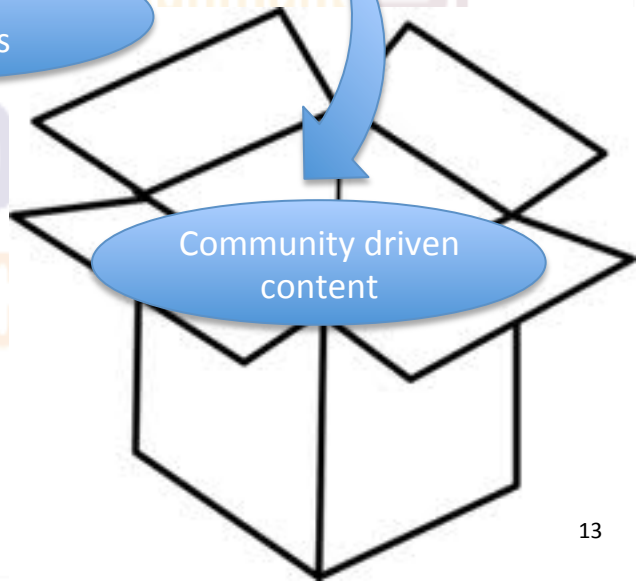
Repository

resources

Bibliographies

Tips and techniques



Thank You ☺

- Questions? Comments?
- Now, and later
  - Chat with working group members
  - Read our paper(s)
  - Keep an eye out for our repository and future developments

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Last year (for notes/info)

http://eprints.ecs.soton.ac.uk/21328/

- Green background indicates last year's slide :-)

Introductory Programming

Heterogeneous student profiles

Diverse/divergent prior experience

- Learning to program
- Differentiated teaching
- Motivation

How do we prevent the most able becoming

- De-motivated
- Disillusioned
- Bored
- Lost

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Our methods

Literature review

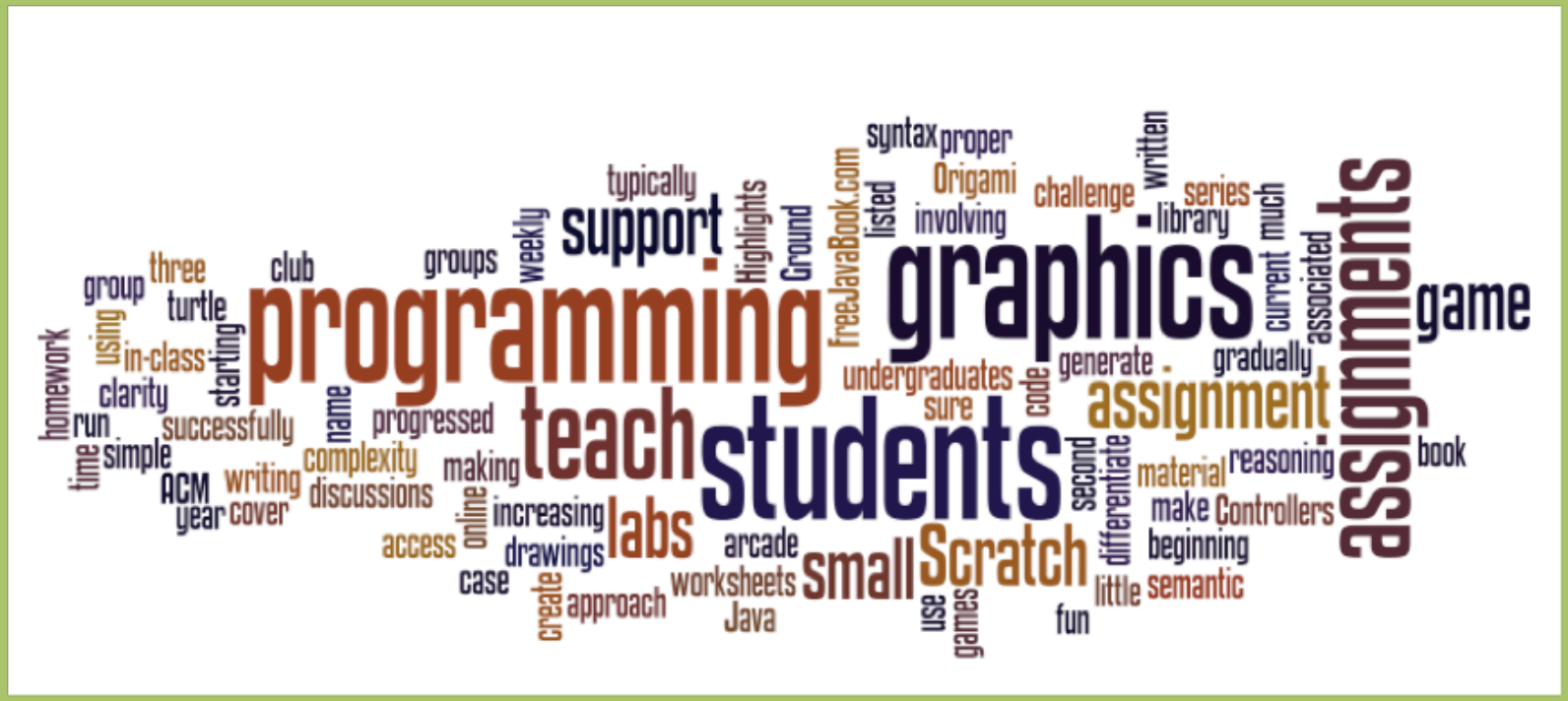
- Range of perspectives
  - Strugglers
  - Background narrative
    - methods and education over time

Survey (thank you ☺)

- ~80 respondents, ~40 full sets
- Quantitative and (rich) qualitative

Survey

- What we do
- Why we do it



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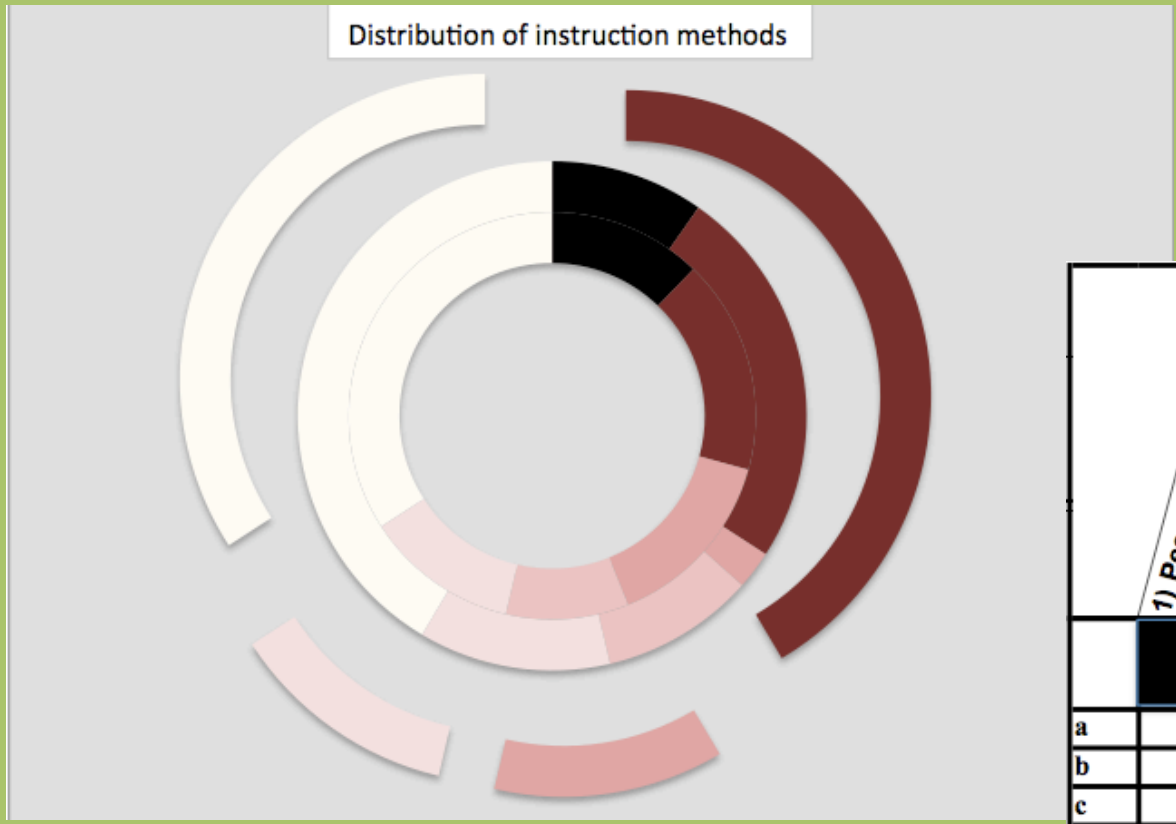
Looking for patterns…



	1) Peer support	2) Differentiated teaching	3) Slow pace	4) Novelty	5) External motivation	6) Business as usual
a	5	7	6	4	5	14
b	4	10	1	4	5	17
c	0	17	0	5	5	14
	9	34	7	13	15	45

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Initial Interventions

Struggling -> Coping-> Advanced

Intervention method	strugglers	copers	experienced
1) Peer support	5	4	0
2) Differentiated teaching	7	10	17
3) Slow pace	6	1	0
4) Novelty	4	4	5
5) External motivation	5	5	5
6) Nothing	14	17	14

Later interventions

Intervention method	Strugglers	Over achievers
1) Peer support	5	0
2) Differentiated teaching	3	0
3) Extra Help	24	19
4) Nothing	9	22

Preferred/predominant approaches

- Paired programming
- Getting to know students
- Collaboration with colleagues
- Student competitions

Emergent approaches/practice

Evolution/extension of existing practice

- includes
  - Streaming /differentiated teaching
  - Meeting student expectations /motivation
  - Research experiences /authentic learning