

# Experiences of teaching, learning and assessment of student research skills on a Level 9 taught programme in engineering

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# Structure of presentation

1. Engineering Education at DIT
2. Module introduction
3. Experiences 2008-9
4. Actions 2009-10
5. Student presentations and peer (and tutor) assessment
6. Module reflections - assessment
7. Module reflections - student feedback
8. Module reflections - other



# 1. Engineering Education at DIT

*Kevin St.*

Electrical & Electronic

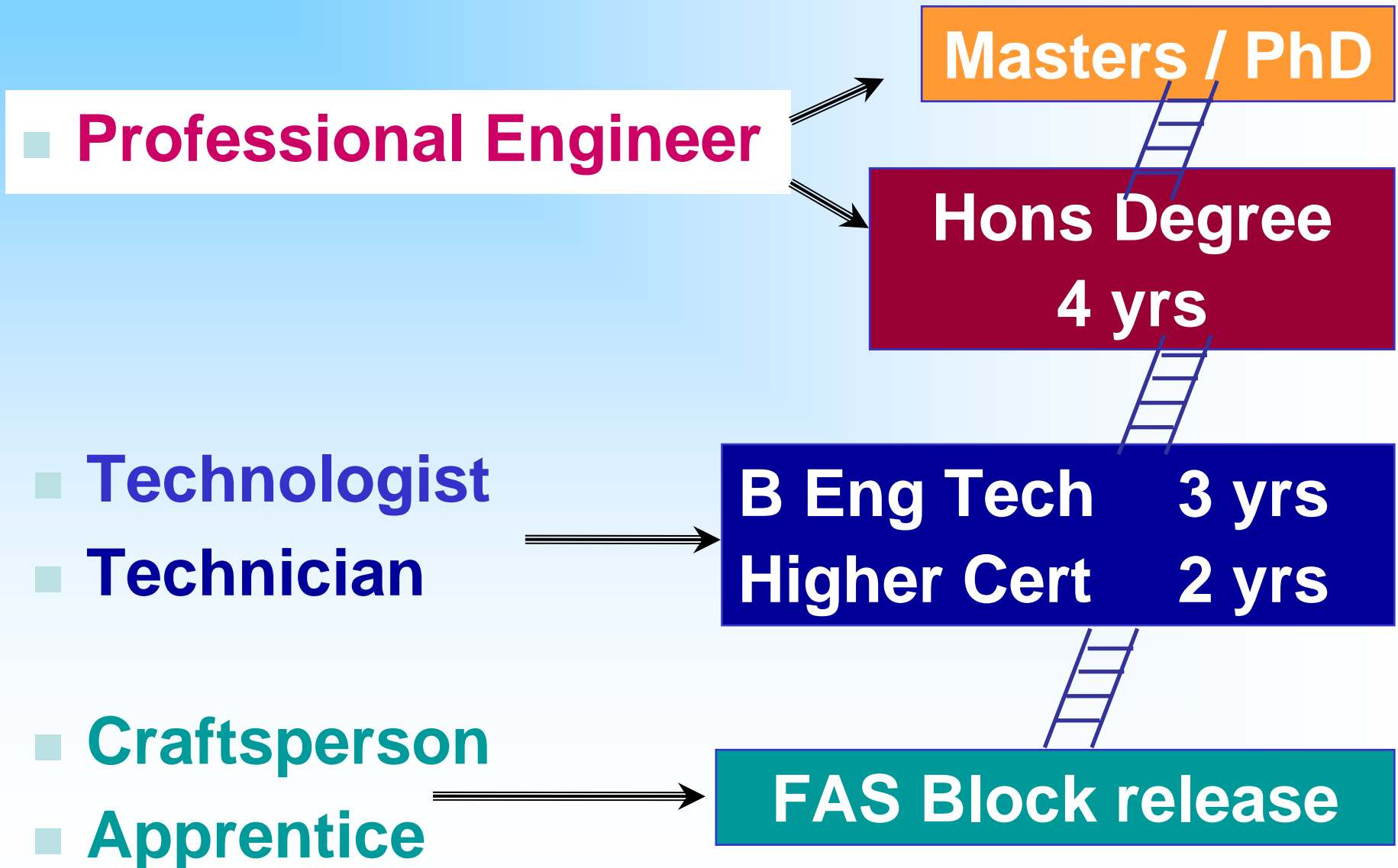


*Bolton St.*

Mechanical, Civil,  
Building Services,  
Manufacturing,  
Transport Technology



# Ladders of Opportunity



## 2. Module introduction



- ME in Mechanical Engineering, Pharmaceutical Process Control and Automation, Sustainable Electrical Energy Systems.
- Research Methods module, 5 ECTS credits. 100% continuously assessed.
- Outcome: Development of an individual research project proposal by students.
- Module run in Semester 1. A team based approach to module instruction is taken.
- Blended learning: workshops, on-line learning resources, self-directed study, peer and tutor support.

# 3. Experiences 2008-9

17 full-time and part-time students, mainly from Mechanical Engineering.

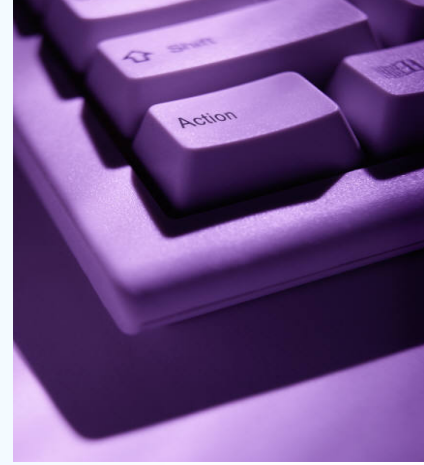
## Reflections:

- Rebalancing of assessment;
- Clear assessment criteria, with student involvement in assessment;
- Greater use of workshops;
- Electronic submission of research proposals;
- Clearer academic responsibility for the module.



## 4. Actions 2009-10

- Academic responsibility for the module was devolved to the author.
- The final research proposal report was shortened to 2000 words.
- The assessment strategy was refined; now included peer and tutor assessment based on short individual student presentations.
- All assessment criteria were detailed, and involved student consultation in their development.



# Actions 2009-10

Example: Assessment criteria for research proposal report.



	1+	1	2(1)	2(2)	P	F	
Introduction developed							Introduction not developed
Literature reviewed							Literature not reviewed
Research questions identified							Research questions not identified
Research methodology clear							Research methodology unclear
Significance of study established							Significance of study not established



# Actions 2009-10



W	Topic	Tutor
1	Workshop 1: Module introduction.	AOD
2	Library resources.	JF
3,4	Workshop 2: Brainstorming: research topics.	AOD
	Technical writing.	TB
5	Workshop 3: Feedback. Research methodologies.	AOD
6	Review Week	
7	<i>Research proposal planner submission. 10% of mark.</i>	AOD
	Critical thinking. CoRT thinking techniques.	DG
8	Workshop 4. Small group brainstorming.	AOD
9	The funding process, IP, patents.	MB
10-	<i>Student presentations. Peer and tutor marking. 20% of mark.</i>	AOD
	<i>Week 16: Submit research proposal report. 70% of mark.</i>	

# 5. Student presentations and peer (and tutor) assessment

- Enhances communication skills;
- Further develops ability to work effectively;
- Learner-centered; motivates independent learning;
- Caters to a diverse student background;
- Raises awareness of ethics;
- Unlocks student work to the benefit of all learners.



## Practicalities:

- Individual student presentations;
- Assessment weighting: 20%;
- Credit given for presentation and feedback;
- Structured guideline for assessment.



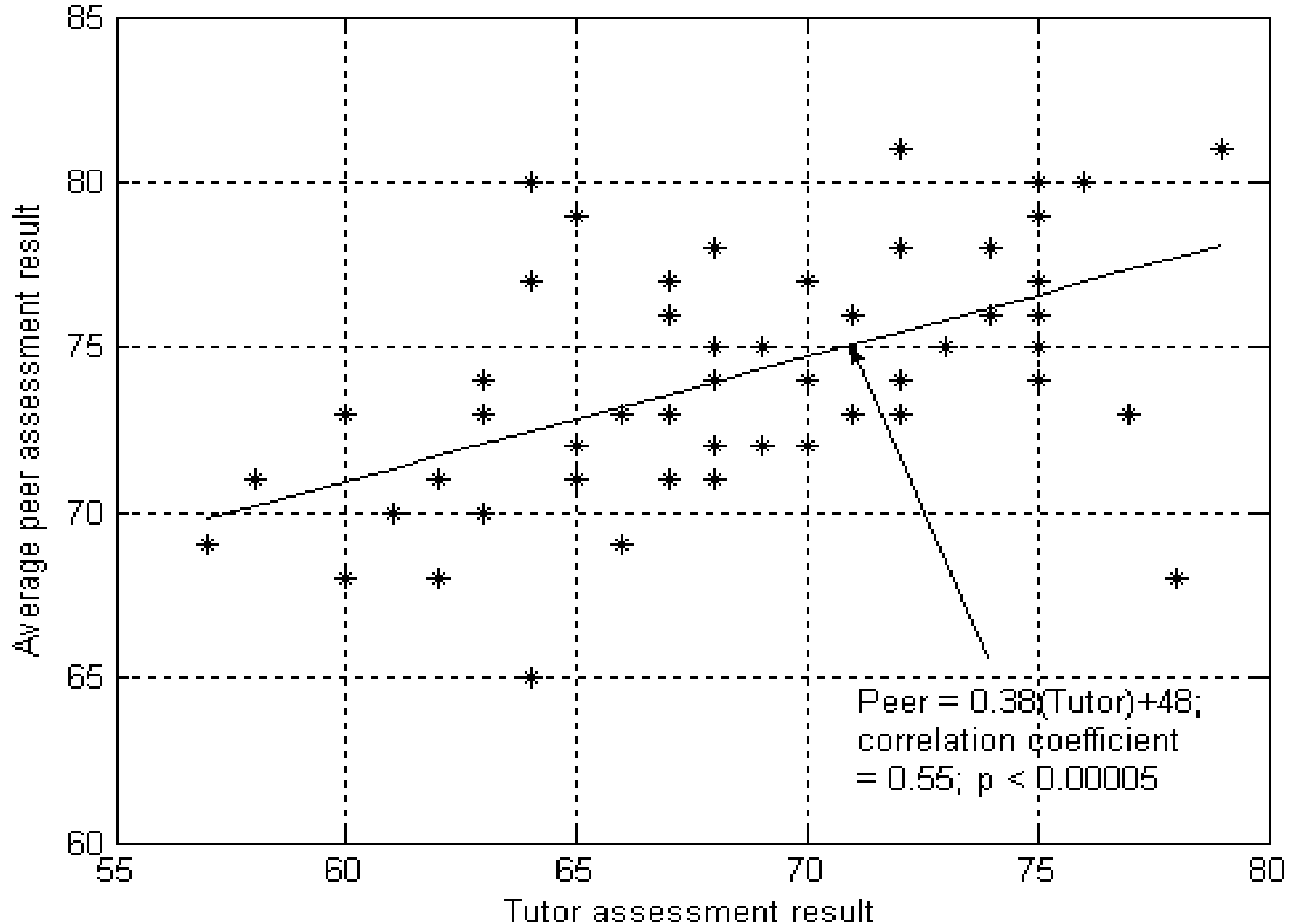
# Assessment guideline



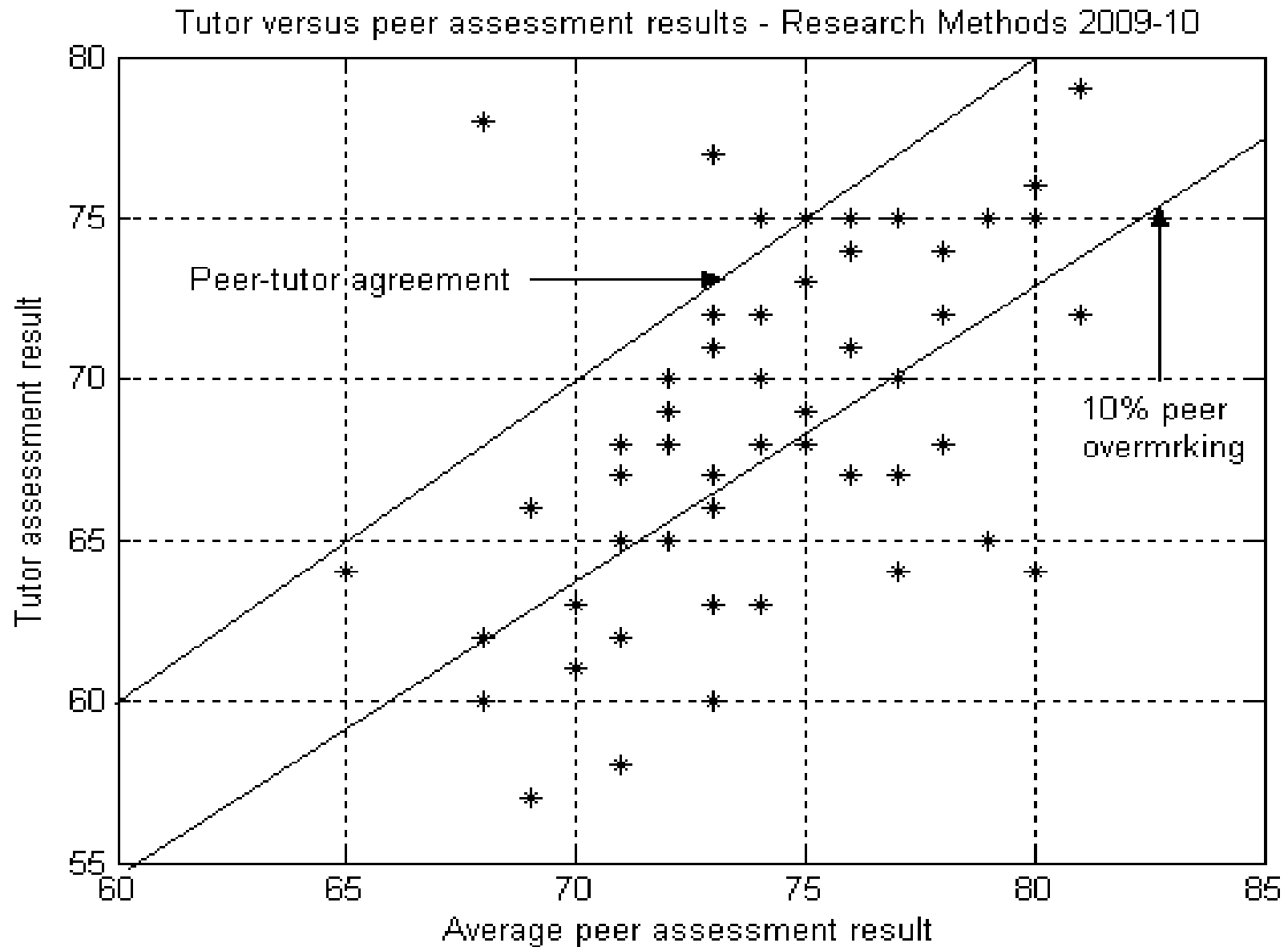
	1+	1	2.1	2.2	P	F	
<b>Content</b>	///	/	////	////	/	/	<b>Content</b>
Research question(s) identified							Research question(s) not identified
Literature review developed							Literature review not developed
Research methodology clear							Research methodology unclear
Accurate presentation of factors							Much questionable issues
Significance of study established							Significance of study not established
<b>Presentation</b>	///	/	////	////	/	/	<b>Presentation</b>
Attention-grabbing introduction							Uninspiring introduction
Convincingly argued							Argument lacks credibility
Clear and effective use of PowerPoint							PowerPoint use unclear and ineffective
Reasonable length							Too long/short
Animated tone							Flat/stilted/nervous tone

# Data analysis

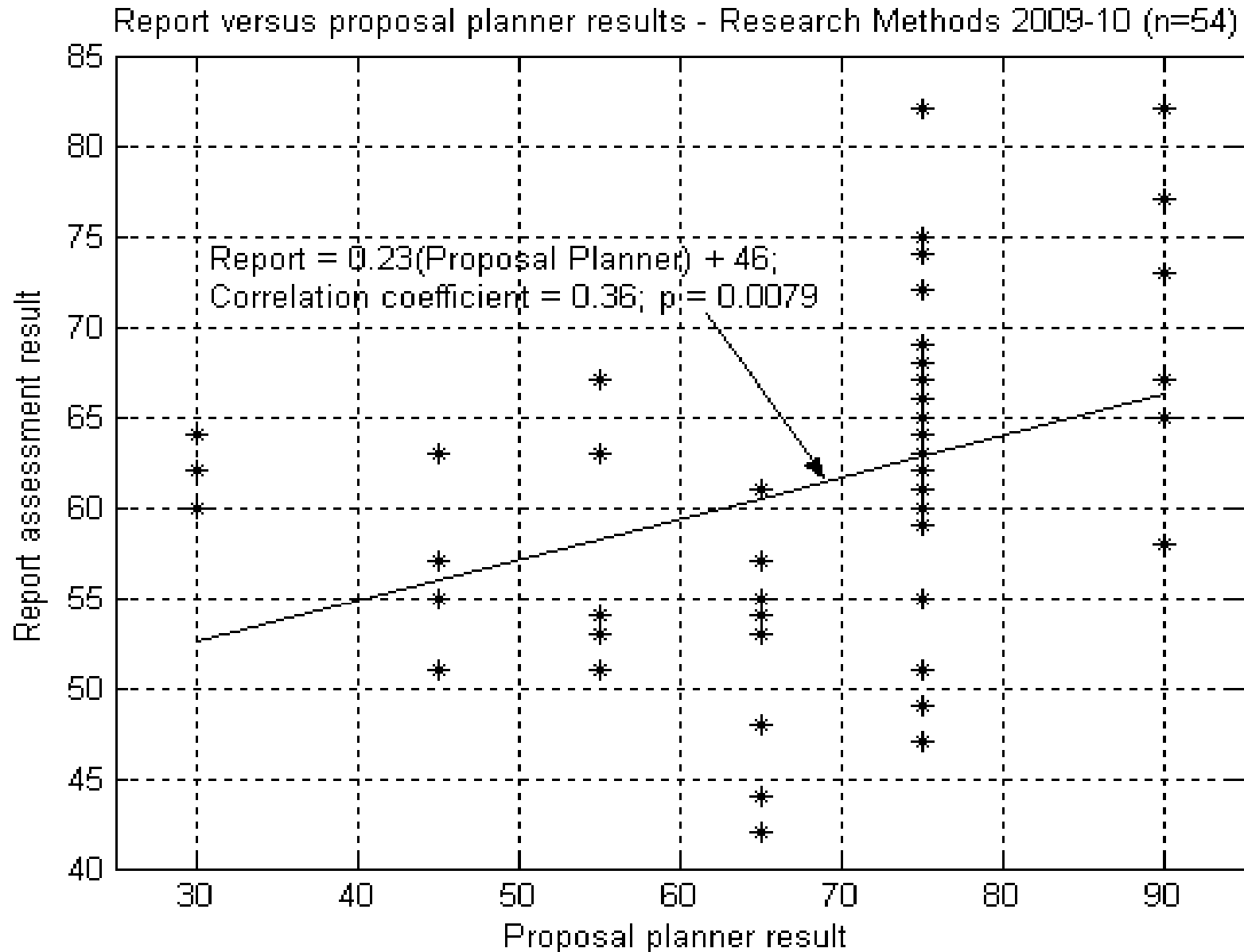
Average peer versus tutor assessment results - Research Methods 2009-10 (n=60)



# Data analysis

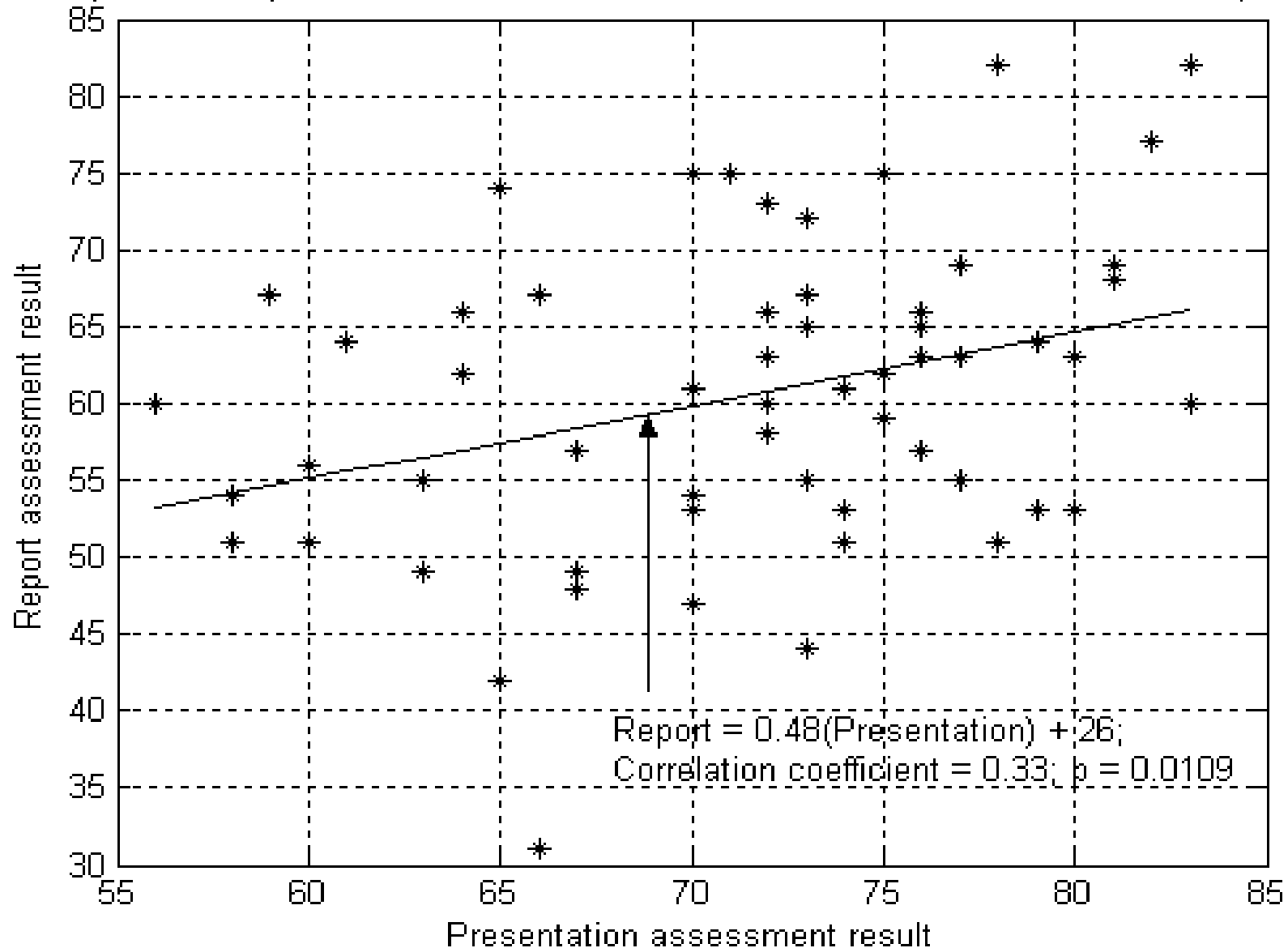


# 6. Module reflections - assessment



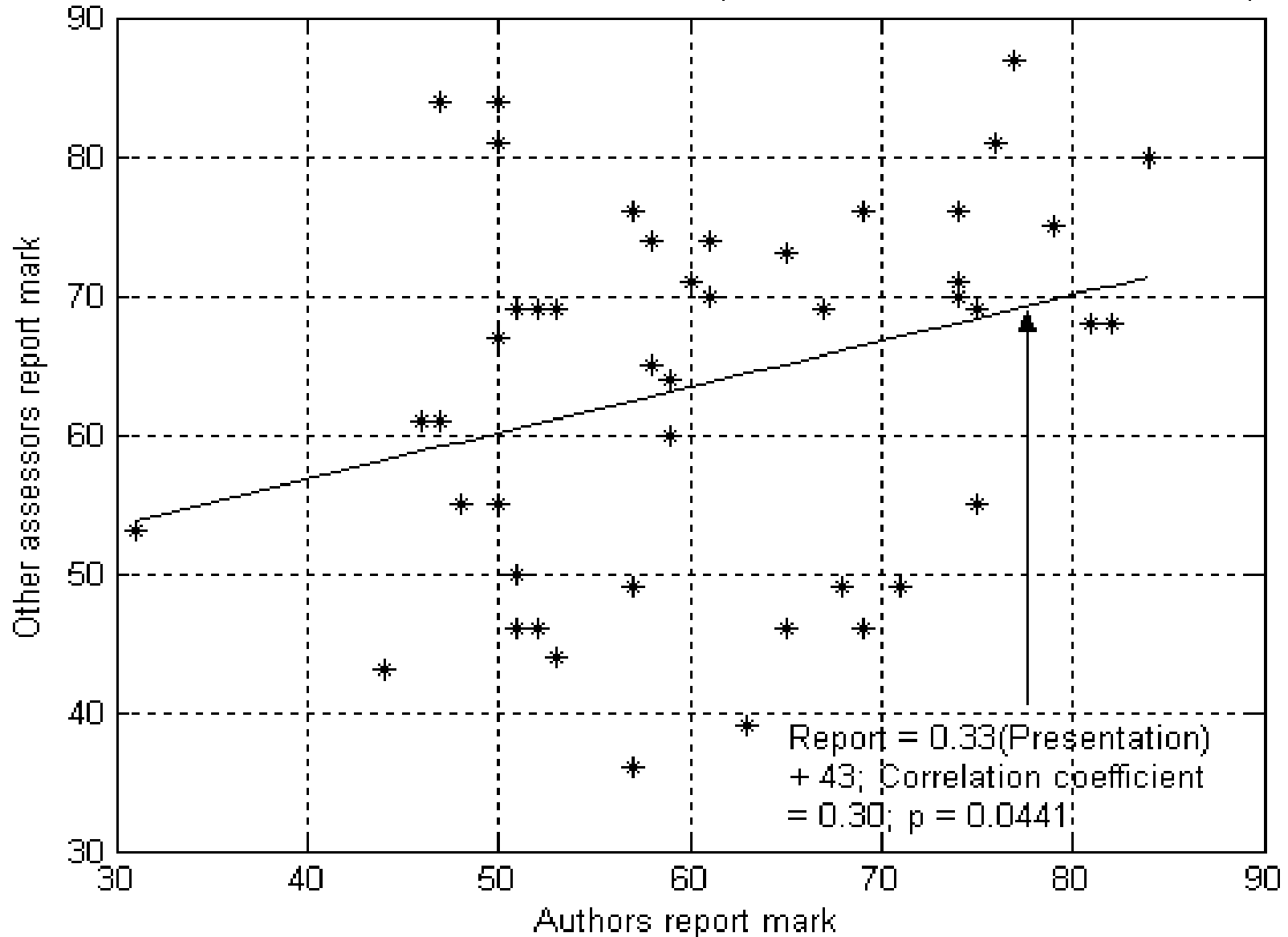
# Module reflections - assessment

Report versus presentation assessment results - Research Methods 2009-10 (n=59)



# Module reflections - assessment

Other assessors mark vs authors mark for report - Research Methods 2008-10 (n=47)



# 7. Module reflections - student feedback

- Some students found it difficult to propose and develop a research topic.
- *“Asking me what project I intend to do at the beginning of a course of study is pointless; I would have liked some guidance on a suitable project (or a methodology for finding one). Spending a considerable amount of time writing a research proposal on an idea that probably will not be pursued is a waste of time. I wanted this module to help me define a useful research topic, and how to carry it out. It may have achieved something with respect to carrying out a research project, but it completely failed to assist me in defining an area of research, which is for me a far greater difficulty”.*
- In the future, an early meeting between all research active staff and students will be organised, perhaps on a ‘speed dating’ model, to allow the seeding of research ideas to occur.

## 8. Module reflections - other

- The first workshop will be modified to discuss the purpose of the module in more detail.
- Peer learning and assessment is broadly supported by students. It is proposed to examine the use of audience response systems. The use of a wiki will also be explored.
- Student feedback will be obtained in the classroom.
- Many students did not include a project schedule chart or treat IP issues sufficiently in their research proposal reports. More generally, many project proposals were too ambitious for the project timescale.

