
Delivery and assessment issues involved in very large group teaching

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IEE/1



Very large group teaching

- Serving a large number of departments and programmes introduces severe timetabling constraints
- Large groups raise many pedagogical issues
 - Diverse student group in terms of nationality, prior experience, ability, maturity, learning styles and motivation.
 - Many traditional approaches do not work well e.g. blackboards, OHPs
 - Need to provide a rich learning environment that supports the various modes of learning used by students with different backgrounds, objectives and values
- Requires efficient and effective assessment

IEE/2



Learning Materials

- Study guide
 - explains module structure and assessment
 - Each topic introduced , with a definition of learning objectives, content, learning outcomes and self-assessment questions
- Lectures – PowerPoint with data projection pace learning
- Detailed notes – supplement lecture notes and course texts
- Case studies – explain the practical application and introduce additional methods e.g. spreadsheets
- Tutorial questions and solutions
- Automated self-assessment tests.

IEE/3



Blackboard Managed Learning Environment

- Architecture based upon a relational database and a web-server that is accessed by users' browsers.
- Password authentication ensures that only registered students can access materials.
- Users' Blackboard environment automatically provides access to all their modules that have MLE support.
- User interface provides uniform structure for accessing course materials.
- Hierarchical structure provides an effective mechanism for structuring learning materials.

IEE/4



Seasons Greetings!

from the Blackboard Team



My University Courses

TOOLS

- Announcements
- Calendar
- Tasks
- My Grades
- Send E-mail
- User Directory
- Address Book
- Personal Information

SEARCH THE WEB

Welcome, Chris!

My Announcements

Training 1402

- Office Hours

[more...](#)

My Calendar

You have no calendar events today.

[more...](#)

My Courses

Courses you are teaching:

- Introduction to Business Management
- Management 1
- Manufacturing Processes and Systems
- Manufacturing Systems II
- Manufacturing Systems III
- Manufacturing Systems IV
- Manufacturing Technology I

Courses in which you are participating:

- Training 1402 (T.A.)

Seasons Greetings!
from the Blackboard Team

Home Help Logout

My University Courses

COURSES > ENG201

- Announcements
- Course Information
- Staff Information
- Course Documents
- Assignments
- Communication
- Groups
- External Links
- Tools
- Resources
- Course Map
- Control Panel

Announcements

VIEW TODAY VIEW LAST 7 DAYS VIEW LAST 30 DAYS VIEW ALL

December 24 - 31, 2001



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Blackboard: Courses - Microsoft Internet Explorer [Cpu usage:0% Free memory: 210416 of 392688 KByte]

File Edit View Favorites Tools Help

Address http://two.ncl.ac.uk/bin/common/course.pl?course_id=_4464_1&frame=top

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My University Courses


COURSES > ENG201


Announcements
Course Information
Staff Information
Course Staff Information
Assignments
Communication
Groups
External Links
Tools
Resources
Course Map
Control Panel

Staff Information

Current Location: Staff Information

 **Dr Christian Hicks**
E-mail: Chris.Hicks@newcastle.ac.uk
Work phone: 0191 222 6238
Office Location: M18 Stephenson Building



 **Mr Ashley Wilton**
E-mail: A.M.Wilton@ncl.ac.uk
Work phone: 0191 222 8635
Office Location: Department of Law
21-24 Windsor Terrace

http://two.ncl.ac.uk/bin/common/staff.pl?action=LIST&course_id=_4464_1&render_type=DEFAULT Internet

Start [Taskbar icons] 11:20

Blackboard: Courses - Microsoft Internet Explorer [Cpu usage:2% Free memory: 209484 of 392688 KByte]

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Refresh

Address http://two.ncl.ac.uk/bin/common/course.pl?course_id=_4464_1&frame=top Go Links >>

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My University Courses

COURSES > ENG201

Announcements

Course Information

Staff Information

Course Documents

Assignments

Communication

Groups

External Links

Tools


Resources


Course Map


Control Panel

Course Documents

Current Location: Course Documents

 [Accounting](#)

 [Law](#)

 **Minimising printing costs**
[Minimise_printing_costs.doc](#) (167936 Bytes)

Done Internet

Start [Taskbar icons: Word, Excel, PowerPoint, Outlook, Internet Explorer, etc.] 11:20

Blackboard: Courses - Microsoft Internet Explorer [Cpu usage:0% Free memory: 207968 of 392688 KByte]

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Address http://two.ncl.ac.uk/bin/common/course.pl?course_id=_4464_1&frame=top Go Links >>

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My University Courses

COURSES > ENG201

Announcements

Course Information

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Course Map


Control Panel


Course Documents


Current Location: Accounting


[Top] : Accounting

 **Business Structures**

 **Financial Accounting**

 **Management Accounting**

 **Accounting Study Guide**
[Link to File](#) (76894 Bytes)

 **How to use accounting course materials**
[Link to File](#) (23040 Bytes)

Done Internet

Start [Taskbar icons: p.p., 1., p.p., H., D., T., B., EN, 11:20]

Blackboard: Courses - Microsoft Internet Explorer [Cpu usage:0% Free memory: 205560 of 392688 KByte]

File Edit View Favorites Tools Help

Address http://two.ncl.ac.uk/bin/common/course.pl?course_id=_4464_1&frame=top

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My University Courses

COURSES > ENG201

Announcements

Course Information

Staff Information

Course Documents

Assignments

Communication

Groups

External Links

Tools

Resources


Course Map


Control Panel

Course Documents


Current Location: Financial Accounting

[Top] : [Accounting] : Financial Accounting

 **Renolds PLC Case Study**

 **Notes on financial accounting**
[Link to File \(47865 Bytes\)](#)

 **Notes on reading company accounts**
[Link to File \(37674 Bytes\)](#)

 **Balance Sheet**
[Link to File \(341481 Bytes\)](#)

Done Internet

Start [Taskbar icons] 11:22

Blackboard: Courses - Microsoft Internet Explorer [Cpu usage:0% Free memory: 204948 of 392688 KByte]

File Edit View Favorites Tools Help

Address http://two.ncl.ac.uk/bin/common/course.pl?course_id=_4464_1&frame=top

Seasons Greetings!
from the Blackboard Team

Home Help Logout

My University Courses

COURSES > ENG201

Announcements

Course Information

Staff Information

Course Documents

Assignments

Communication

Groups

External Links

Tools

Resources


Course Map


Control Panel


Course Documents

Current Location: Renolds PLC Case Study

[Top] : [[Accounting](#)] : [[Financial Accounting](#)] : Renolds PLC Case Study

 **Renolds PLC Annual Report (pdf format)**
[Link to File](#) (1788674 Bytes)

 **Notes on reading Renolds PLC Annual Report 2000**
[Link to File](#) (483759 Bytes)

 **Renolds PLC 2000 Spreadsheet**
[Link to File](#) (44544 Bytes)

Internet

Start

11:22

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My University Courses

COURSES > ENG201

- Announcements
- Course Information
- Staff Information
- Course Documents
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- Communication
- Groups
- External Links
- Tools
- Resources
- Course Map
- Control Panel

E18 = -1.7

	A	B	C	D	E
1	Group Cash Flow Statement				
2	for the financial year ended 1st April 2000				
3					
4					
5			2000		1999
6		Note	£m	£m	£m
7	Cash flow from operating activities	21		12.70	
8					
9	Servicing of finance	22		(.60)	
10					
11	Taxation			(4.70)	
12					
13	Capital expenditure				
14	-Purchase of tangible fixed assets			(9.50)	
15					
16	Acquisitions				
17	-Purchase consideration including costs				(35.30)

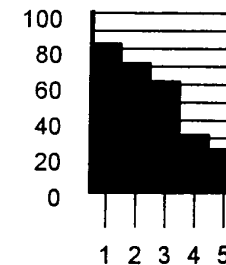
Assessment

- Speedwell multiple choice software
 - “Item bank” contains questions, their history and statistics
 - “Multiquest” processes answer sheets, produces marks lists, histograms, item analysis and audit reports
- “Automated” allows 300 answer sheets to be fully processed in 3-4 hours.

Question 5

Mean Score:	0.544	Thirds	Right	Wrong	R-W	Void
33% Item discrimination:	0.502	% All	54.4	45.0	9.4	0.6
Point Biserial:	0.467	Upper	77.7	21.4	56.3	1.0
Correct Answer:	C	Lower	27.5	72.5	-45.1	0.0
		Facility	54.4			

% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	0.6	13.6	15.2	54.4	4.9	11.3



IEE/13



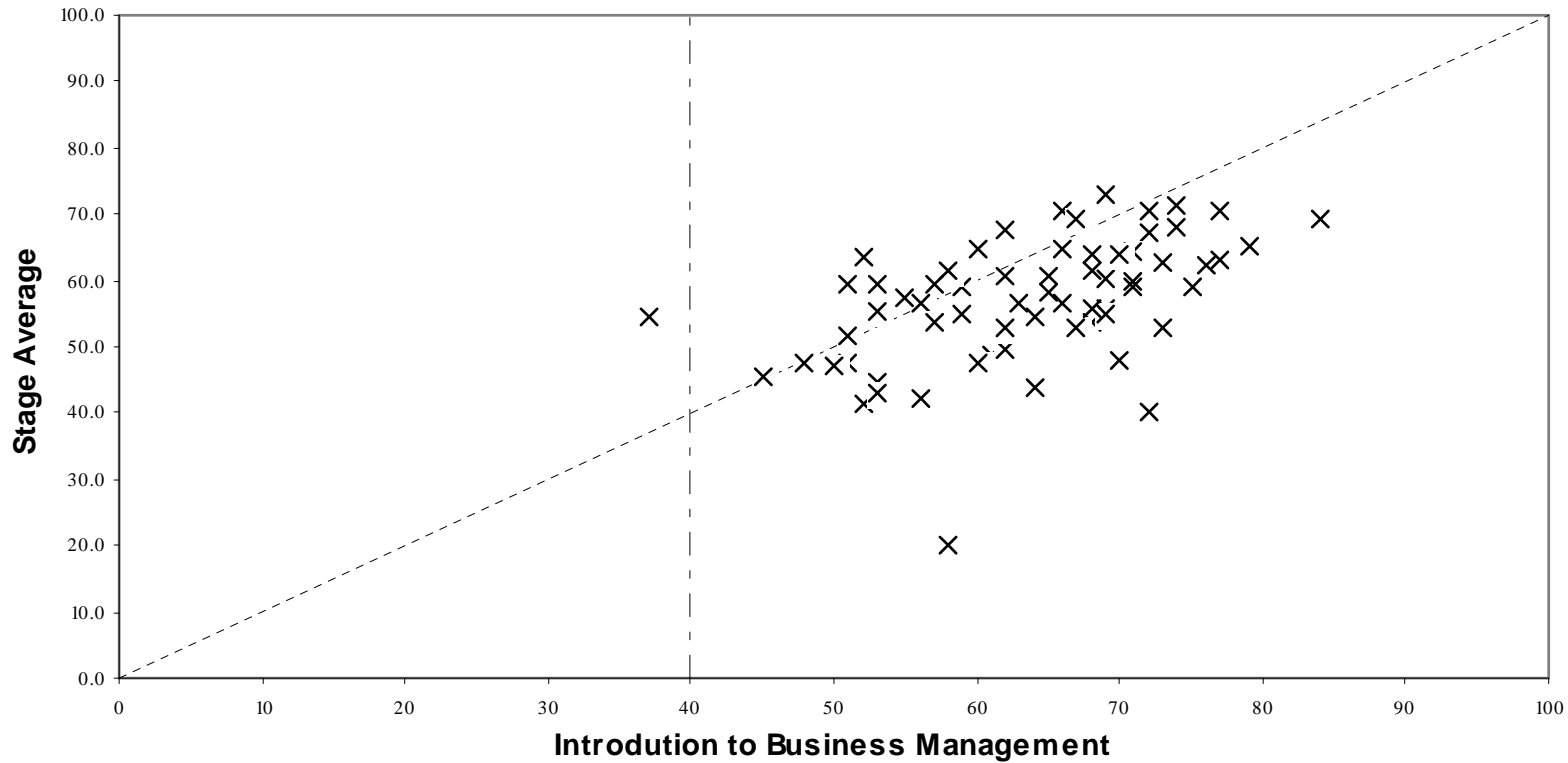
Types of MCQ question

- Multiple choice questions (MCQ) are particularly well suited to questions that involve factual information.
- Lists with an incorrect element;
- Sequence based questions;
- Calculations with numerical responses;
- Case study based questions - five cases are offered and candidates are invited to associate statements with the most appropriate case;
- Correct/incorrect assumptions for some theory / calculation.

IEE/14



Business Management vs Stage Average Results
(Department of Mechanical, Materials & Manufacturing Engineering)



Module marks tend to be 'right shifted'

IEE/15



Compensation for guessing

- MCQ style used was single correct answer with 4 distracters, therefore random selection would achieve a mark of 20%.
- Effect of randomness low for good students, but high for weak students.

Compensation formula

Adjusted mark = actual mark

– expected benefit from guessing

= actual mark – ((100 – actual mark) X 0.25)

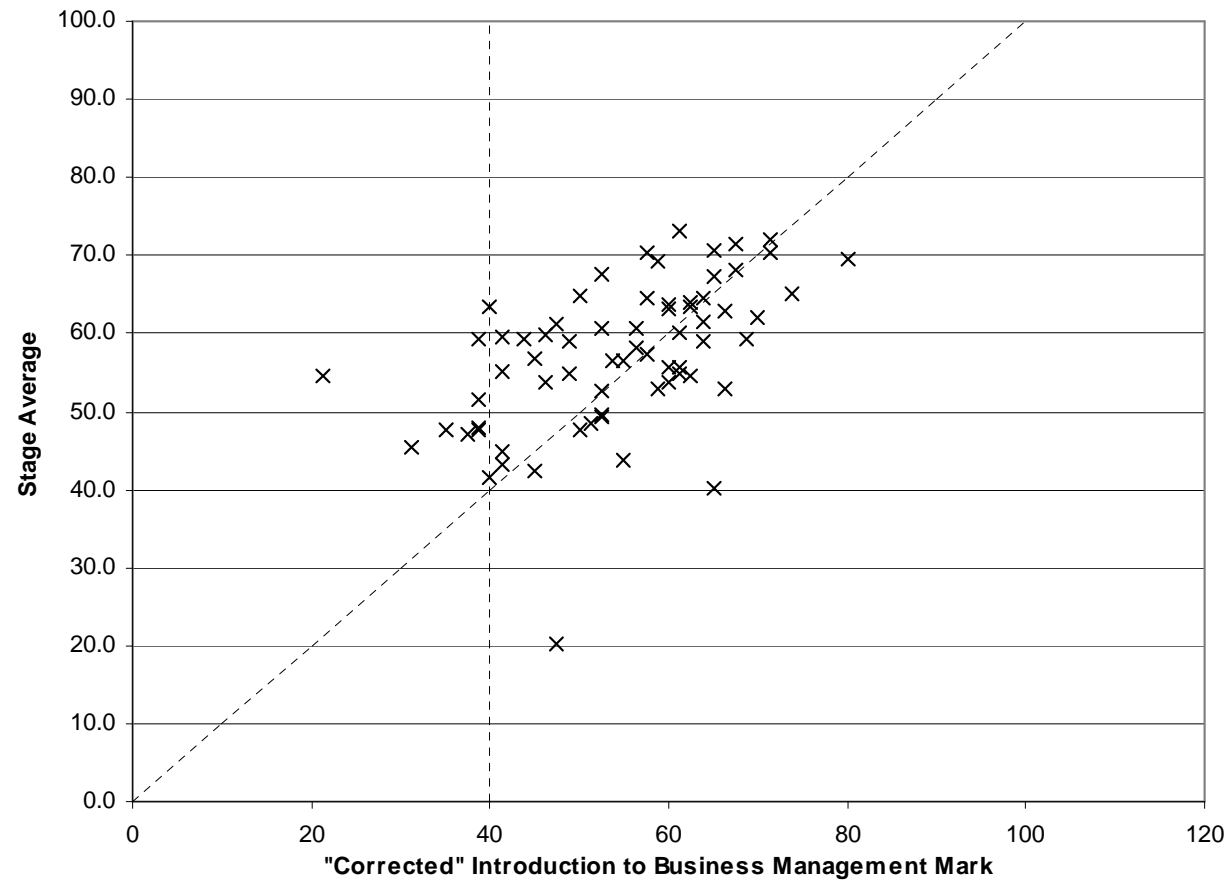
IEE/16



Business Management vs Stage Average Results
(Department of Mechanical, Materials & Manufacturing Engineering)

Notes:

- 1) More symmetric distribution;
- 2) Increased number of failures.



IEE/17



Compensation issues

- Based upon the *expected* impact of guessing not the *actual* impact which is a random variable.
- Assumes that candidates answer all questions.
- A mark of 52% with MCQ corresponds with a pass mark of 40% if the expected impact of guessing is taken into account.
- The alternative is to use negative marking, but this approach is likely to be resisted by students.
- Negative marking probably best left until MCQ use is more widespread.

IEE/18

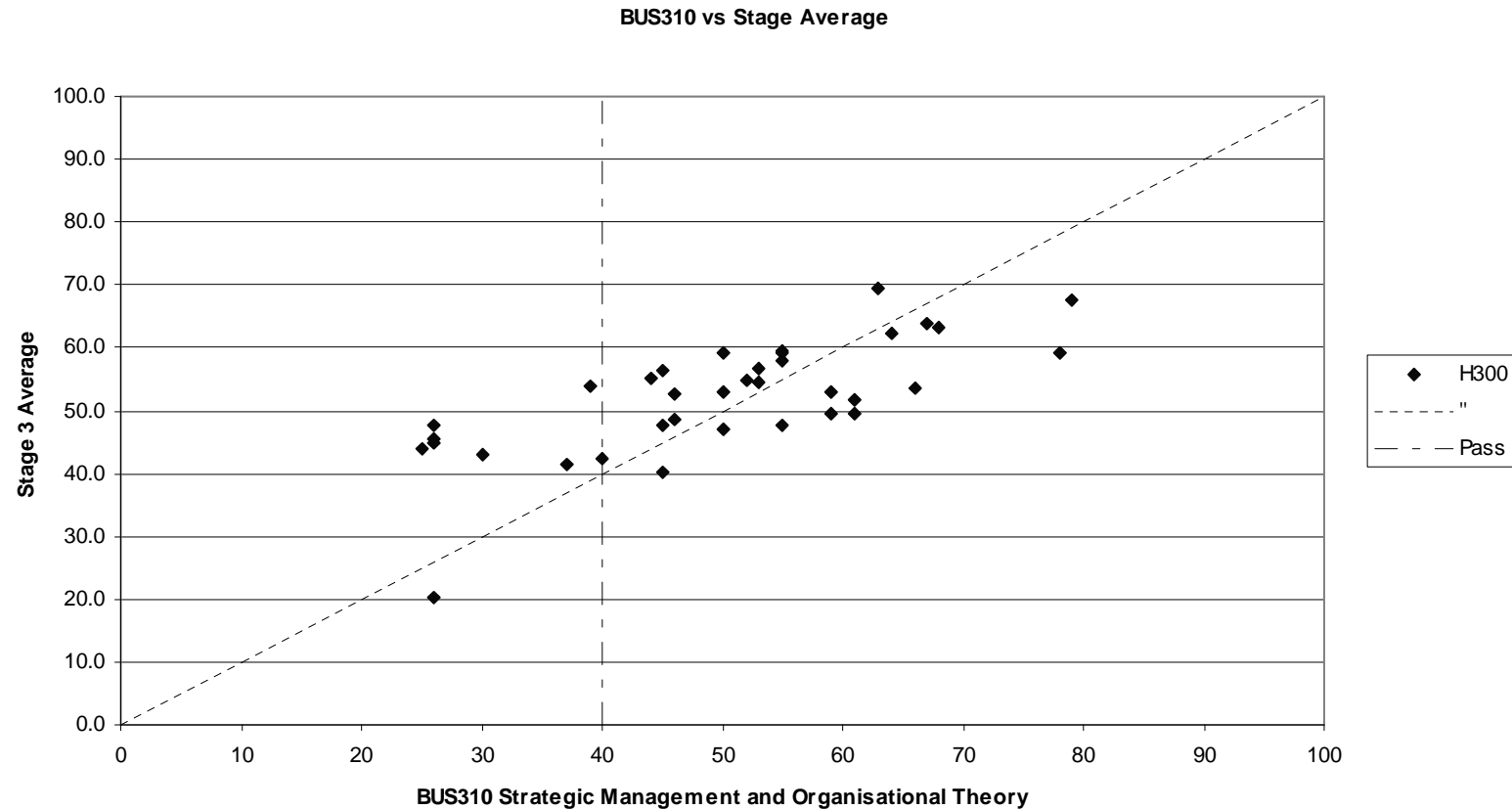


Analysis of Traditionally Assessed Modules

IEE/19



School of Management Module (descriptive)

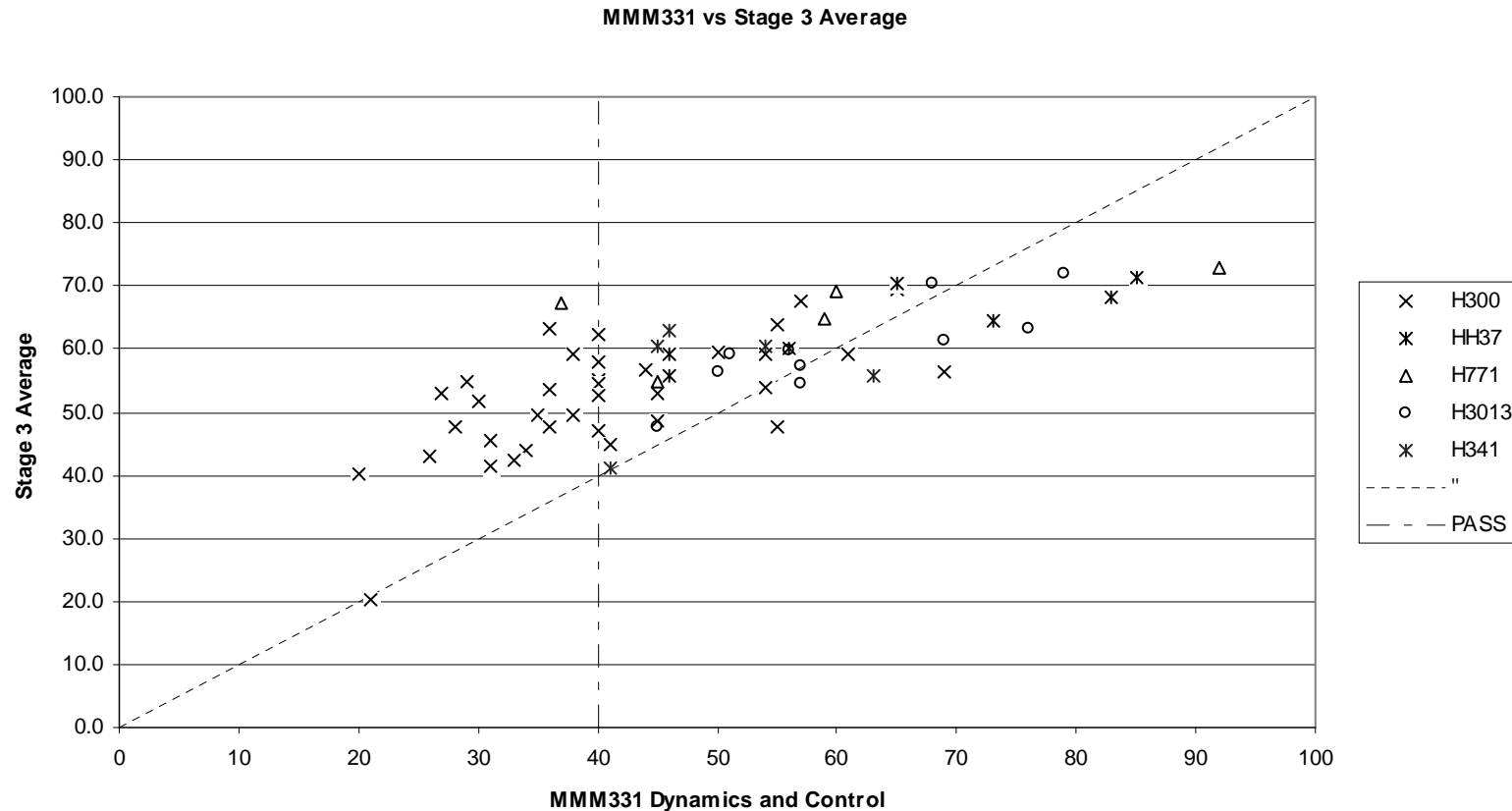


Reasonably symmetric

IEE/20



Dynamics and Control (Analytical, MMM Eng)

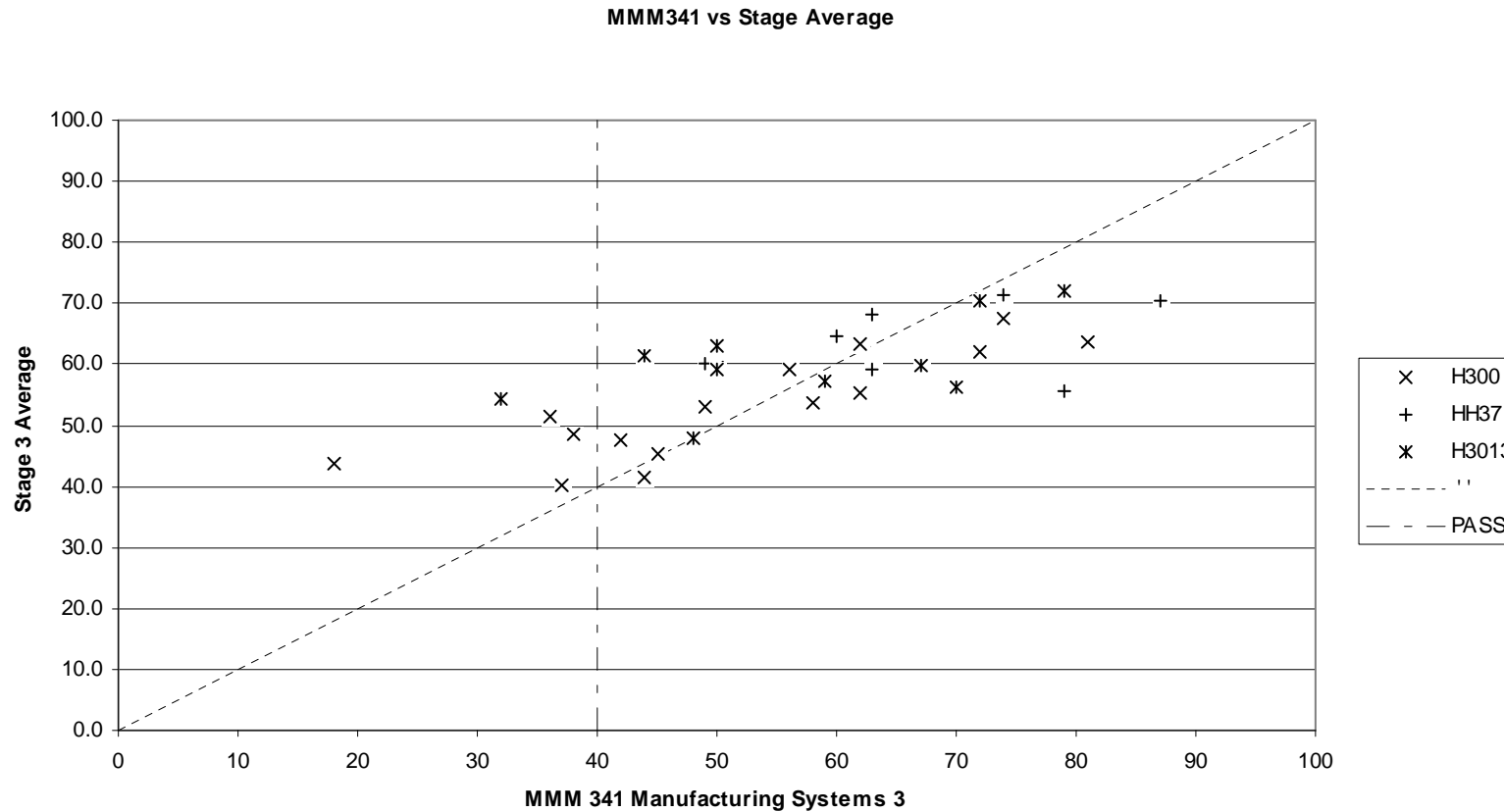


Hard and more discriminating than average

IEE/21



Manufacturing Systems III, MMM Eng, descriptive

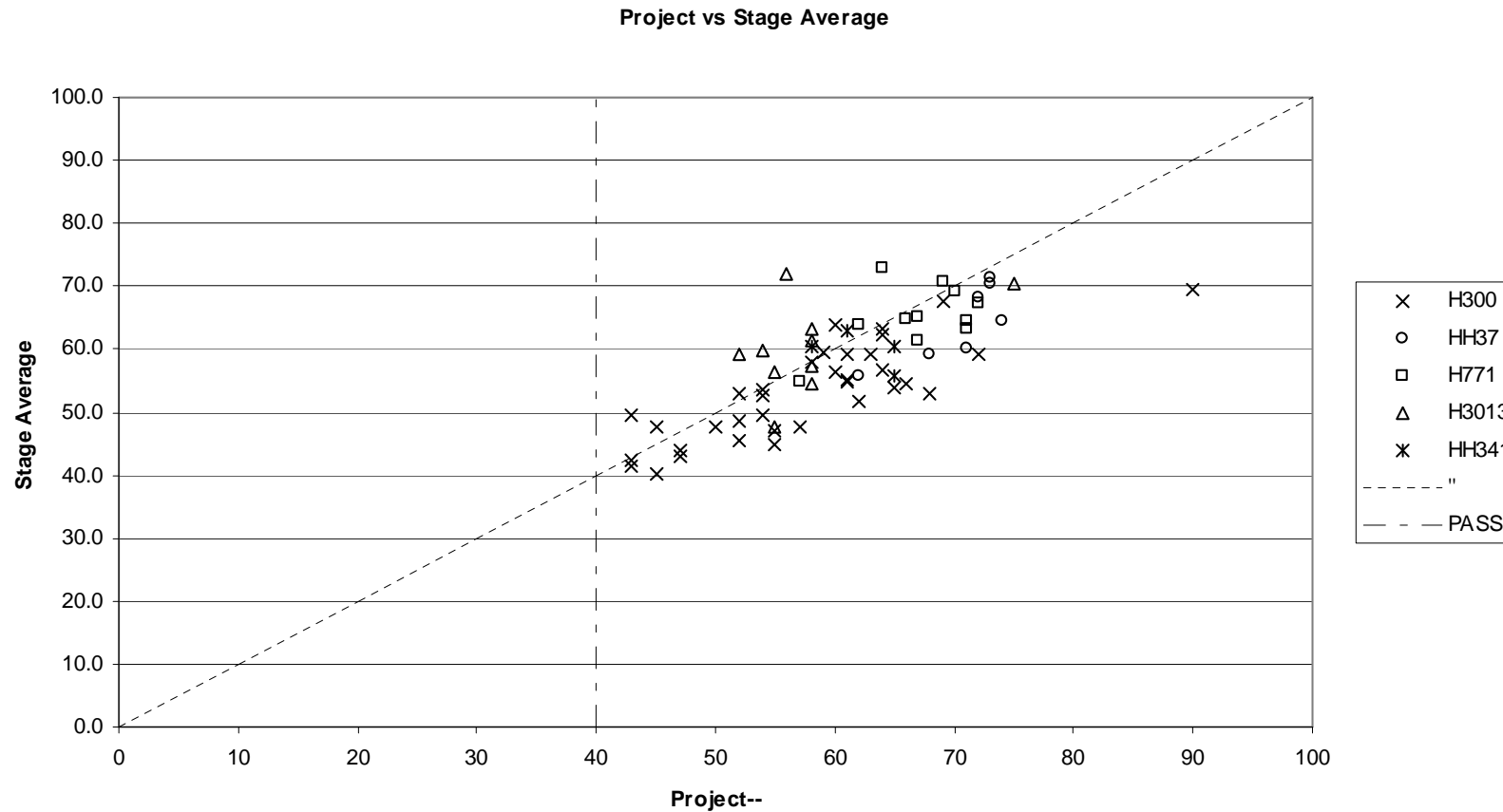


Symmetric, very discriminating

IEE/22



Projects, MMME coursework



Narrow range, slightly easier than average, no failures

IEE/23



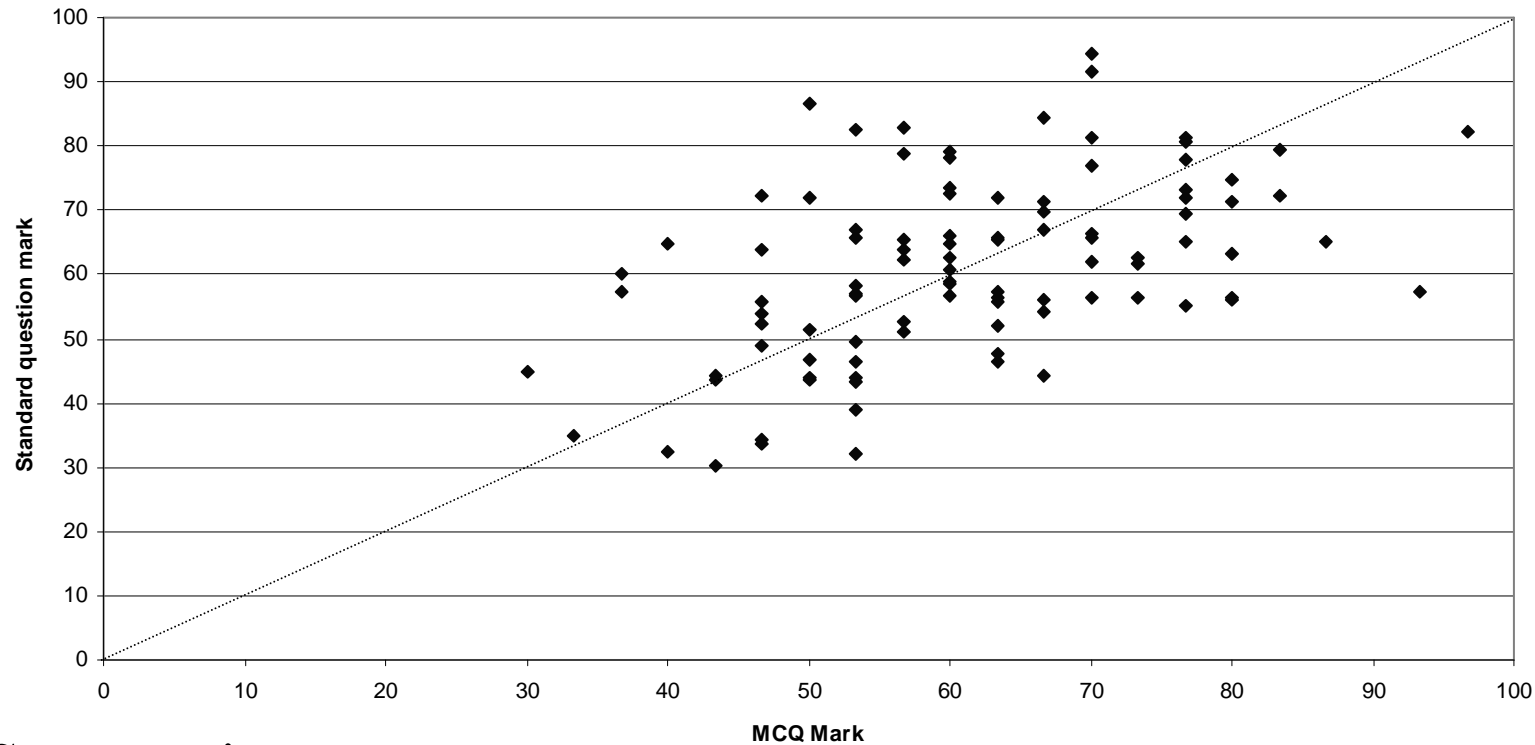
Comparison of MCQ, traditional questions and coursework (BUS215)

IEE/24



Traditional questions vs. MCQ

Correlation between MCQ and standard question marks

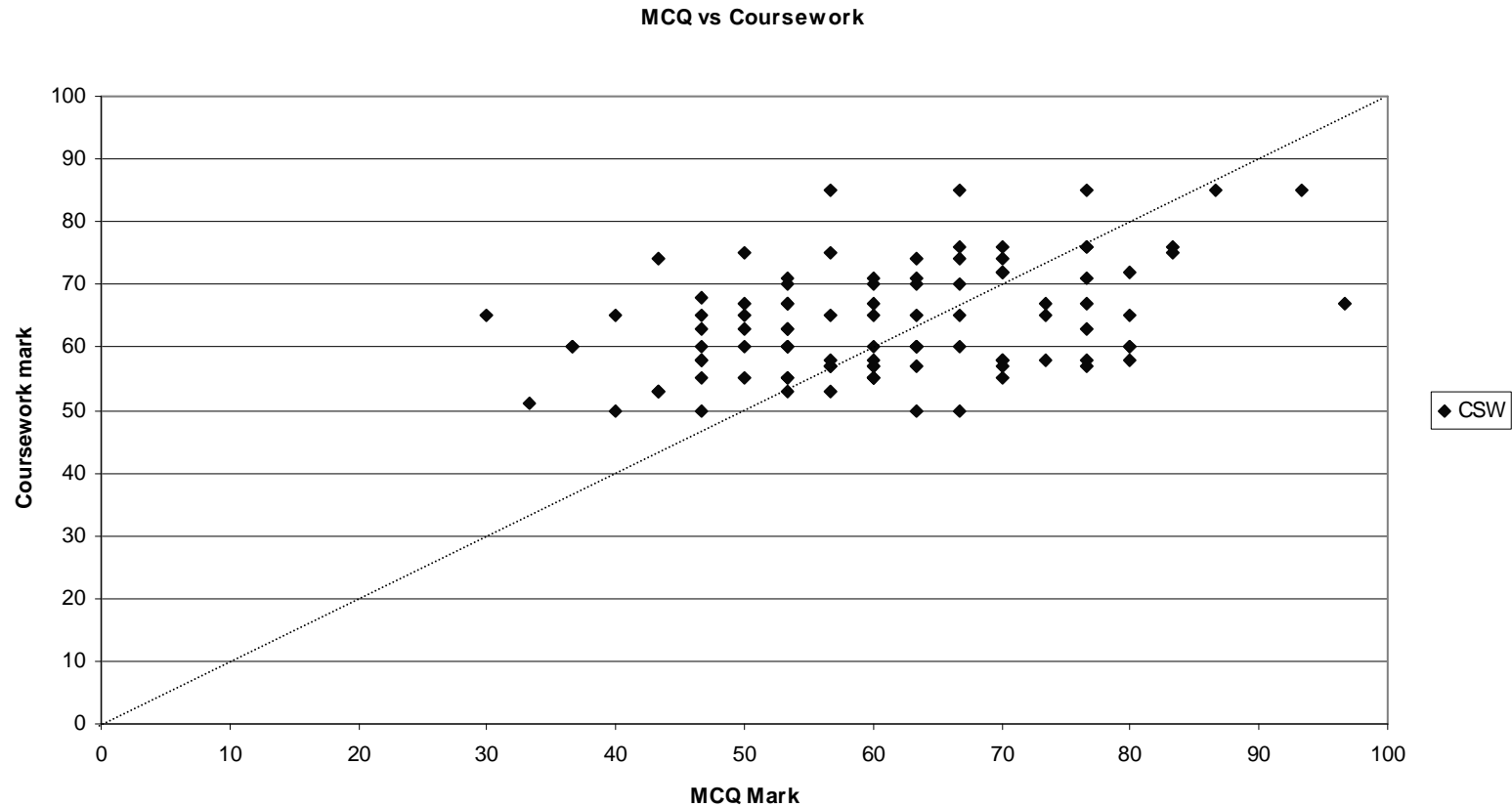


Symmetric

IEE/25



Coursework vs. MCQ



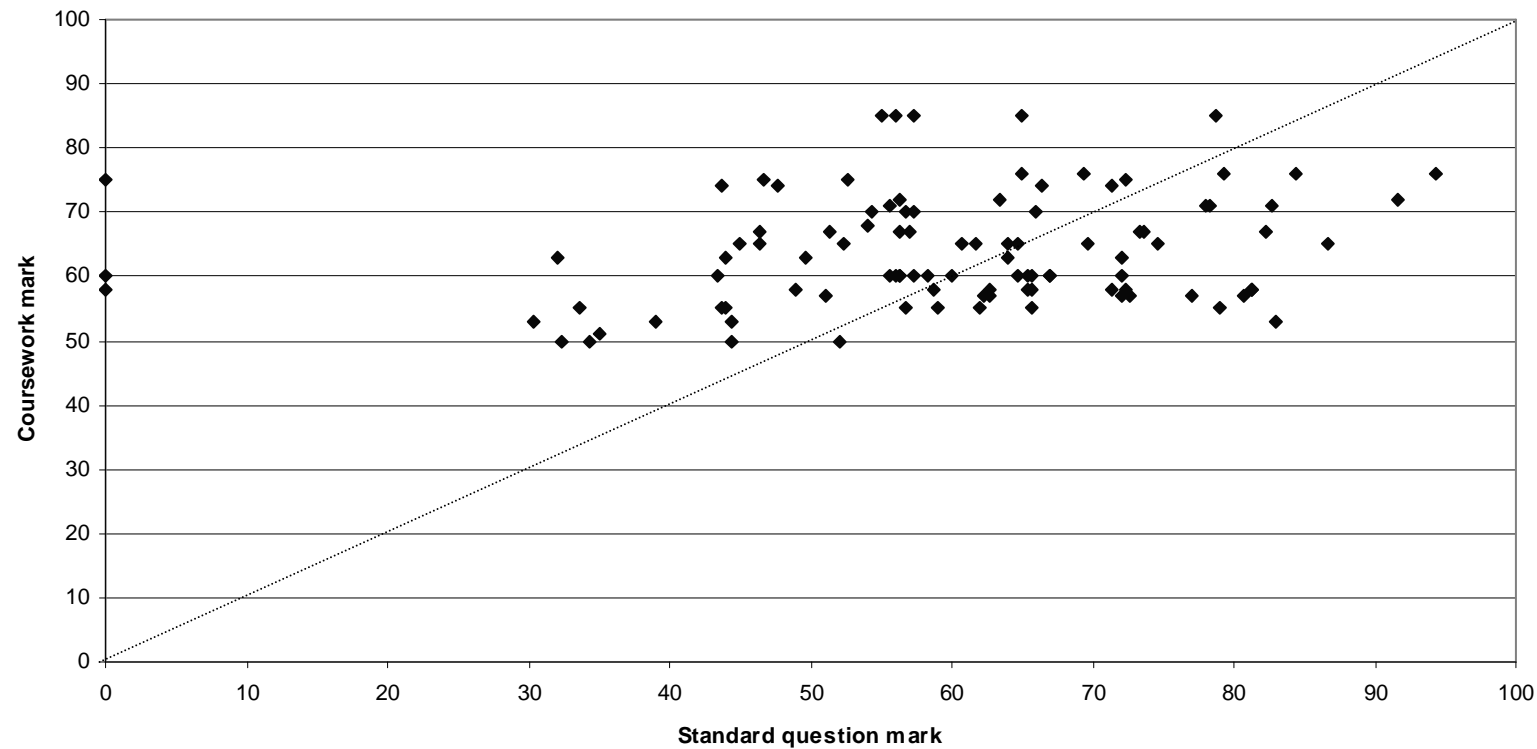
MCQ more discriminating

IEE/26



Traditional questions vs. coursework

Standard questions vs coursework marks



Traditional questions more discriminating

IEE/27



The University of Newcastle upon Tyne - MMME
 Multiquest for Windows Report
 File: BUS215

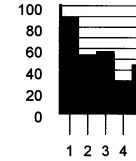
Item Analysis Report (Response Order)
 BUS215 BUSINESS OPERATIONS & INNOV MAN

Exam statistics: Mean: 18.3 (61.1%) St. Dev.: 3.98 (13.26%) Candidates: 98 KR20: 0.642

Question 1

	Thirds	Right	Wrong	R-W	Void
Mean Score:	0.551	% All 55.1	44.9	10.2	0.0
33% Item discrimination:	0.341	Upper 75.2	24.8	50.4	0.0
Point Biserial:	0.331	Lower 41.1	58.9	-17.9	0.0
Correct Answer:	C	Facility 55.1			

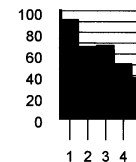
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	0.0	37.8	3.1	55.1	0.0	4.1



Question 2

	Thirds	Right	Wrong	R-W	Void
Mean Score:	0.633	% All 63.3	35.7	27.6	1.0
33% Item discrimination:	0.381	Upper 79.9	20.1	59.8	0.0
Point Biserial:	0.391	Lower 41.8	55.2	-13.4	3.1
Correct Answer:	D	Facility 63.3			

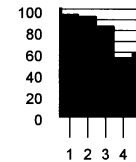
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	1.0	5.1	13.3	2.0	63.3	15.3



Question 3

	Thirds	Right	Wrong	R-W	Void
Mean Score:	0.776	% All 77.6	21.4	56.1	1.0
33% Item discrimination:	0.401	Upper 95.3	4.7	90.7	0.0
Point Biserial:	0.361	Lower 55.2	41.8	13.4	3.1
Correct Answer:	D	Facility 77.6			

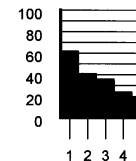
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	1.0	1.0	8.2	3.1	77.6	9.2



Question 4

	Thirds	Right	Wrong	R-W	Void
Mean Score:	0.367	% All 36.7	63.3	-26.5	0.0
33% Item discrimination:	0.311	Upper 50.7	49.3	-1.5	0.0
Point Biserial:	0.288	Lower 19.6	80.4	-60.7	0.0
Correct Answer:	A	Facility 36.7			

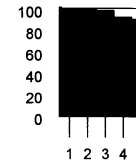
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	0.0	36.7	19.4	15.3	9.2	19.4



Question 5

	Thirds	Right	Wrong	R-W	Void
Mean Score:	0.959	% All 95.9	4.1	91.8	0.0
33% Item discrimination:	0.086	Upper 100.0	0.0	100.0	0.0
Point Biserial:	0.200	Lower 91.4	8.6	82.8	0.0
Correct Answer:	B	Facility 95.9			

% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	0.0	0.0	95.9	3.1	1.0	0.0



IEE/28



The University of Newcastle upon Tyne - MMME
 Multiquest for Windows Report
 File: BUS215

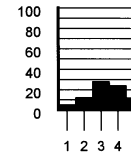
Item Analysis Report (Response Order)
 BUS215 BUSINESS OPERATIONS & INNOV MAN

Exam statistics: Mean: 18.3 (61.1%) St. Dev.: 3.98 (13.26%) Candidates: 98 KR20: 0.642

Question 21

	Thirds	Right	Wrong	R-W	Void	
Mean Score:	0.163	16.3	82.7	-66.3	1.0	
33% Item discrimination:	-0.089	Upper	7.7	92.3	-84.5	0.0
Point Biserial:	-0.100	Lower	16.6	80.4	-63.8	3.1
Correct Answer:	C	Facility	16.3			

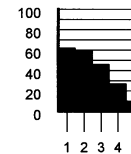
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	1.0	44.9	22.4	16.3	11.2	4.1



Question 22

	Thirds	Right	Wrong	R-W	Void	
Mean Score:	0.408	40.8	59.2	-18.4	0.0	
33% Item discrimination:	0.455	Upper	61.5	38.5	23.0	0.0
Point Biserial:	0.386	Lower	16.0	84.0	-68.0	0.0
Correct Answer:	A	Facility	40.8			

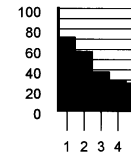
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	0.0	40.8	7.1	22.4	18.4	11.2



Question 23

	Thirds	Right	Wrong	R-W	Void	
Mean Score:	0.449	44.9	52.0	-7.1	3.1	
33% Item discrimination:	0.388	Upper	67.6	32.4	35.3	0.0
Point Biserial:	0.364	Lower	28.8	65.1	-36.2	6.1
Correct Answer:	C	Facility	44.9			

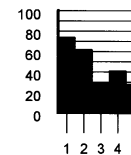
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	3.1	13.3	7.1	44.9	26.5	5.1



Question 24

	Thirds	Right	Wrong	R-W	Void	
Mean Score:	0.469	46.9	52.0	-5.1	1.0	
33% Item discrimination:	0.416	Upper	72.3	27.7	44.6	0.0
Point Biserial:	0.338	Lower	30.7	66.2	-35.5	3.1
Correct Answer:	A	Facility	46.9			

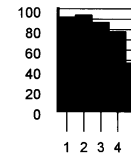
% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	1.0	46.9	12.2	26.5	13.3	0.0



Question 25

	Thirds	Right	Wrong	R-W	Void	
Mean Score:	0.796	79.6	19.4	60.2	1.0	
33% Item discrimination:	0.325	Upper	93.9	6.1	87.8	0.0
Point Biserial:	0.388	Lower	61.4	35.5	25.9	3.1
Correct Answer:	B	Facility	79.6			

% Answer Frequency						
Multi	Blank	A	B	C	D	E
0.0	1.0	10.2	79.6	1.0	1.0	7.1



IEE/29



MCQ Issues

- Questions hard to set
- Recycling of questions is part of methodology.
- Statistical information improves over time
- Reuse of questions means exam papers need to be closed
- Need procedures for making sure papers do not escape
- Examinations Office / invigilation arrangements sometimes poor
- Some question theft quite imaginative – moving to single side A3 question paper

IEE/30



Evaluation

- Student questionnaires – similar results to smaller group teaching
- Independent evaluation by Learning Technology Support Network produced positive results and identified areas for improvement
- Blackboard usage - 30,590 hits from 310 students (00/01), 24,465* from 227 students (01/02)

* Module ongoing

IEE/31



Conclusions

- Very large group teaching supported by a managed learning environment with computer assisted assessment has provided an efficient and effective learning environment.
- Developing materials and administering their delivery takes a lot of time – contact hours are almost insignificant. This is a big issue if academics are measured in terms of contact time.
- The approach adopted emphasised pedagogical issues i.e. the content, structure and presentation of materials. Supporting a very diverse group is particularly challenging.
- The methods used require considerable investment which is justified by the income associated with the very large group.

IEE/32

