

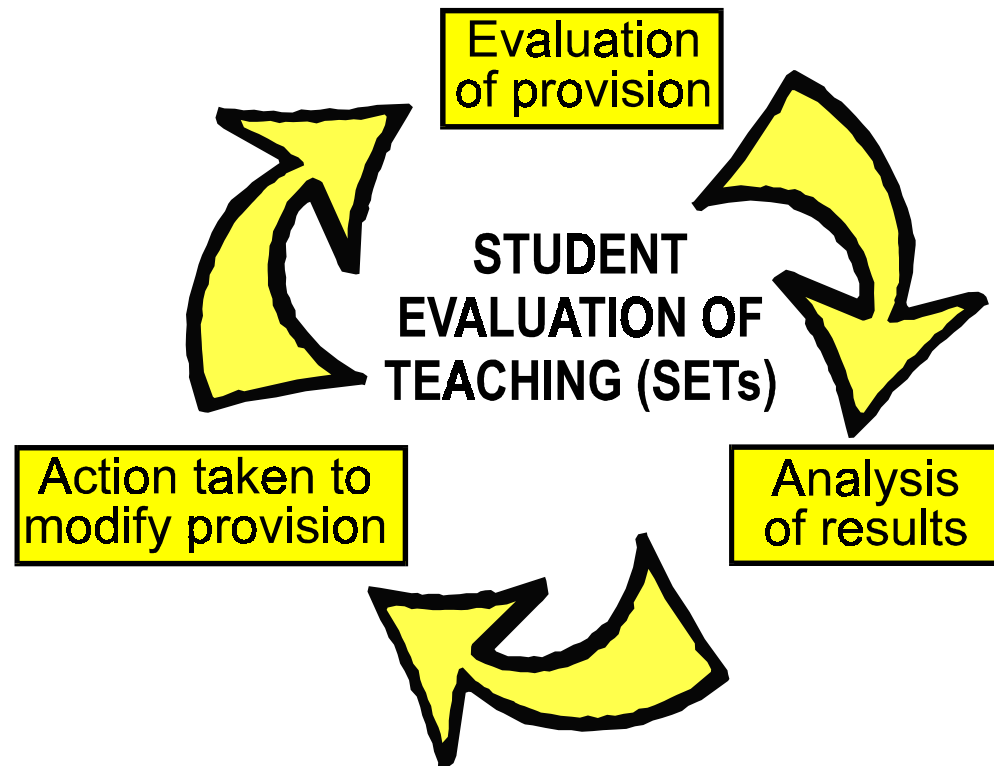


# **In-Course Optimization of Teaching Quality**

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## QUALITY ASSURANCE CYCLE



### Outcomes intended for

- Improving teaching/learning
- Promotion/tenure decisions

### Negative outcomes include

- Lower academic standards (Grade inflation & dumbing down courses)

Gillmore, G. M. & Greenwald, A. G. (1999). Using statistical adjustment to reduce biases in student ratings. *American-Psychologist*. 54(7): 518-519



## Alignment Method

Improves academic standards by:

- Optimizing teaching
- Promoting critical thinking

### What is aligned?

Changes expected by students with changes expected by lecturer.

Alignment = changes expected by students - changes expected by lecturer

Zero is the perfect score.

**Theory** - students achieve higher standards if they and their lecturer are working towards the same changes.



## **Alignment on 3 process objectives emphasised in teaching and assessment**

1. Skills – learning of facts/processes. Assessed by speedy accurate reproduction.
2. Understanding – professional competence. Assessed by justification of novel application.
3. Attitudes – professional values. Assessed by demonstration.

Note: Critical thinking is promoted by teaching and assessment of professional competence (no right/wrong answers, only justifications assessed)



## 5 minute feedback form:

### Course Assessment - Skills, Understanding and Attitudes

Estimate, for you personally, how much this course emphasises, and should emphasise (i) Skills, (ii) Understanding and (iii) Attitudes? Do this for both how the course **is now**, and for how the course **should be** - write a number in each box.

	As it is now on this course		As it should be on this course	
(i) Emphasis on Skills <i>(getting it right)</i>	<input type="text"/> Your estimate out of 100		<input type="text"/> Your estimate out of 100	<i>Write a Number in each box</i>
	As it is now on this course		As it should be on this course	
(ii) Emphasis on Understanding <i>(knowing why)</i>	<input type="text"/> Your estimate out of 100		<input type="text"/> Your estimate out of 100	<i>Write a Number in each box</i>
	As it is now on this course		As it should be on this course	
(iii) Emphasis on Attitudes <i>(relevance to your life)</i>	<input type="text"/> Your estimate out of 100		<input type="text"/> Your estimate out of 100	<i>Write a Number in each box</i>

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How much so far have **you enjoyed your experience** of the teaching on this course?  Your estimate out of 100

*Write a Number in each box*

Before you started this course, how much did you expect that you would **enjoy your experience** of the teaching on this course?

Your estimate out of 100



# Calculating alignments of Scope

$$\text{Change} = \frac{\text{Should be} - \text{as is}}{\text{as is}}$$

$$\text{Alignment} = \text{Student's change} - \text{Lecturer's change}$$

#12 Scope	LECTURER'S RATINGS (L)			STUDENT'S RATINGS (S)			ALIGNMENT	
	IS NOW	SHOULD BE	CHANGE	IS NOW	SHOULD BE	CHANGE	S-L	ABSOL
SKILLS	30	60	100%	50	50	0%	-100%	100
UNDERSTANDING	40	45	13%	95	98	3%	-9%	9%
ATTITUDE	60	50	-17%	90	95	6%	22%	22%
							TOTAL ALIGNMENT	132

Total alignment for a student is the sum of his/her absolute alignments



## **Indicators and Criteria Quality Teaching: Separation and validation**

Indicators of Quality Teaching (formative measures during course)

- Alignment of Scope (changes in absolute quantity)
- Alignment of Proportions (changes in relative quantity)

Criteria of Quality Teaching (summative measures at end of course)

- Academic standards
- Enjoyment of learning

Validation is available for each course

- Alignment of Scope correlates with Academic standards
- Alignment of Proportions correlates with Enjoyment of learning

# Data Input and Calculations of Alignment

For the Lecturer		Course	ED40C	Date	15/11/00	Name		Variables of I					
Skills		Understanding		Attitudes		Enjoyment	Sex	Age	Program				
is now	should be	is now	should be	is now	should be								
Start	30	60	40	45	60	50				50			
<b>3AF COURSE ASSESSMENT - DATA SHEET ALIGNMENT</b>													
For the Students		# in class		# present	20								
#	Skills		Understanding		Attitudes					Enjoyment			
	is now	should be	is now	should be	is now	should be							
12	50	50	95	98	90	95				95	2	30	
25	35	70	60	80	80	88				55	2	25	
35	80	40	20	60	40	50				30	2	25	
30	40	80	70	90	70	90	75	2	21				

Summary Results		Lecturer's changes					Indicators
		Scope			Proportion		
	Skills	Underst	Attitudes	Skills	Underst	Attitudes	Alignment
Start	100%	13%	-17%	16%	-2%	-14%	1.499

	Option	2	History				Alignment
Start	100%	13%	-17%	16%	-2%	-14%	1.861

	Option	4	Modern Languages				Alignment
Start	100%	13%	-17%	16%	-2%	-14%	1.200

# Validation of alignment theory

<b>For the Lecturer</b>		Course	ED40C	Date	15/11/00	Name				
	Skills		Understanding		Attitudes		Enjoyment	Variables of Interest		
	is now	should be	is now	should be	is now	should be				
Start	30	60	40	45	60	50	50			

## 3AF COURSE ASSESSMENT - DATA SHEET VALIDATIONS

<b>For the Students</b>		# in class	# present		20					
	Skills		Understanding		Attitudes		Enjoyment	Sex	Age	Program
#	is now	should be	is now	should be	is now	should be				
12	50	50	95	98	90	95	95	2	30	3
25	35	70	60	80	80	88	55	2	25	3
35	80	40	20	60	40	50	30	2	25	3
30	40	80	70	90	70	90	75	2	21	3

<b>Summary Results</b>		Lecturer's changes					Indicators	<b>Validation</b>		
	Scope			Proportion				Correlations with Acad		
	Skills	Underst	Attitudes	Skills	Underst	Attitudes	Alignment	Scope	Prop	
Start	100%	13%	-17%	16%	-2%	-14%	1.499	-0.265	-0.22	

	Option	2	History				Alignment	Prop	Enjoy	AResults
Start	100%	13%	-17%	16%	-2%	-14%	1.861	0.46	60.00	52.2%

	Option	4	Modern Languages				Alignment	Prop	Enjoy	AResults
Start	100%	13%	-17%	16%	-2%	-14%	1.200	0.29	76.50	60.8%



# Validation examples

## Alignment of Scope correlates with Academic standards

#35 Scope	LECTURER'S RATINGS (L)			STUDENT'S RATINGS (S)			ALIGNMENT	
	IS NOW	SHOULD BE	CHANGE	IS NOW	SHOULD BE	CHANGE	S-L	ABSOLUTE
SKILLS	30	60	100%	80	40	-50%	-150%	150%
UNDERSTANDING	40	45	13%	20	60	200%	188%	188%
ATTITUDE	60	50	-17%	40	50	25%	42%	42%
							TOTAL ALIGNMENT	379%

#35  
Academic  
standard  
43%

#30 Scope	LECTURER'S RATINGS (L)			STUDENT'S RATINGS (S)			ALIGNMENT	
	IS NOW	SHOULD BE	CHANGE	IS NOW	SHOULD BE	CHANGE	S-L	ABSOLUTE
SKILLS	30	60	100%	40	80	100%	0%	0%
UNDERSTANDING	40	45	13%	70	90	29%	16%	16%
ATTITUDE	60	50	-17%	70	90	29%	45%	45%
							TOTAL ALIGNMENT	61%

#30  
Academic  
standard  
71%

# Using student feedback to improve the quality of teaching and learning - Optimization

What would have happened if the students' and lecturer's changes had been more aligned?

For the Lecturer		Course	ED40C	Date	15/11/00	Name		Variables of Interest		
Skills		Understanding		Attitudes		Enjoyment	Sex	Age	Program	
is now	should be	is now	should be	is now	should be					
Start	30	60	40	45	60	50				
<b>Best</b>	<b>30</b>	<b>30</b>	<b>40</b>	<b>44</b>	<b>60</b>	<b>71</b>				
<b>3AF COURSE ASSESSMENT - DATA SHEET OPTIMISATION OF TEACHING</b>										
For the Students		# in class		# present	20					
#	Skills		Understanding		Attitudes		Enjoyment	Sex	Age	Program
	is now	should be	is now	should be	is now	should be				
12	50	50	95	98	90	95	95	2	30	3
25	35	70	60	80	80	88	55	2	25	3
35	80	40	20	60	40	50	30	2	25	3
30	40	80	70	90	70	90	75	2	21	3

Summary Results			Lecturer's changes				Indicators	Validation	
Scope		Proportion				Correlations with Acad			
Skills	Underst	Attitudes	Skills	Underst	Attitudes	Alignment	Scope	Prop	
Start	100%	13%	-17%	16%	-2%	-14%	1.499	-0.265	-0.22
<b>Best</b>	<b>0%</b>	<b>10%</b>	<b>19%</b>	<b>-3%</b>	<b>0%</b>	<b>3%</b>	<b>0.674</b>	<b>-0.307</b>	<b>-0.59</b>

	Option	2	History				Alignment	Prop	Enjoy	AResults
Start	100%	13%	-17%	16%	-2%	-14%	1.861	0.46	60.00	52.2%
<b>Best</b>	<b>0%</b>	<b>33%</b>	<b>10%</b>	<b>-4%</b>	<b>5%</b>	<b>-1%</b>	<b>1.221</b>	<b>0.30</b>		

	Option	4	Modern Languages				Alignment	Prop	Enjoy	AResults
Start	100%	13%	-17%	16%	-2%	-14%	1.200	0.29	76.50	60.8%
<b>Best</b>	<b>13%</b>	<b>3%</b>	<b>10%</b>	<b>1%</b>	<b>-2%</b>	<b>0%</b>	<b>0.223</b>	<b>0.07</b>		

Sensitivity analysis proves that more aligned changes produce higher academic standards.



## Sensitivity Analysis (SA)

- Formative SA gives optimum in-course teaching strategies
- Summative SA protects lecturers from student intransigence

	Alignment scores			Academic Attainment
	Mean Score	Best Score	QT Score	
Whole Class	1.499	0.674	0.825	63.0%
Sub-Groups				
Option 2	1.861	1.221	0.640 high	52.2%
Option 4	1.200	0.223	0.977 low	72.5%

- SA used as a research tool  
e.g. shows higher quality teaching experienced by lower performing groups



## Conclusion

We don't have to wait until the course is over. We can do a sensitivity analysis during the course to find the ideal changes to produce the best alignment (for the whole class, for any subgroup or any single student).

By implementing these changes during the course we will improve the quality of teaching on the course (resulting in **improved academic standards** and course enjoyment). This result can be verified for each course.

The method can be used as a new **research tool**.

In addition, the end-of-course alignment score is a **single decision point indicator of quality teaching** for administrative purposes comparable across the institution.