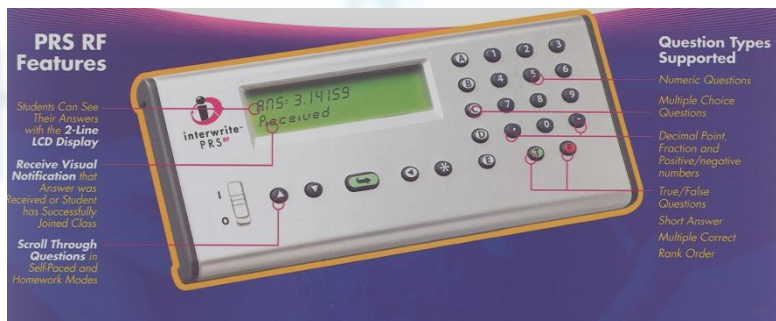


Personal response systems: Enhancing communication and feedback



Gan Niyadurupola

David Read

Background: who are we?

- The chemistry depts at Soton and Reading were both awarded money for projects under strand 3.1 of CFOF.
- Each department (wisely) matched the award to appoint full-time project officers (us).
- We have worked together, along with Gill Reid (Soton) and Elizabeth Page (Reading) to implement a range of new initiatives to support students in making 'the transition'.

Like everything in CFOF, it's about collaboration!

Some issues re: 'the transition'

Other issues:

- Much less independent than in the past (more spoon-feeding in schools)
- Demand of A-level exams is perhaps lower than in the past (misconceptions may be embedded)
- Embedded classes of 10-20.
- **How can we improve communication and feedback, particularly in the lecture format?**
- Used to 'structured lessons (in small chunks).
- **Students have been able to revise from an all encompassing revision guide.**

Overall: Students are not necessarily well prepared for the university environment.

What are they?



PRS RF Features

- Students Can See Their Answers with the 2-Line LCD Display
- Receive Visual Notification that Answer was Received or Student has Successfully Joined Class
- Scroll Through Questions in Self-Paced and Homework Modes

Question Types Supported

- Numeric Questions
- Multiple Choice Questions
- Decimal Point, Fraction and Positive/negative numbers
- True/False Questions
- Short Answer
- Multiple Correct
- Rank Order

- Using the systems employed in Reading and Southampton, questions are easily incorporated into PowerPoint slides
 - The student response is instantly displayed as a graph.
 - This allows instant feedback to students on understanding and misconceptions
 - Feedback to lecturers on their teaching
 - A wealth of data is collected by the software which can be processed in Excel or placed in a Blackboard gradebook.

- How confident do you feel with your understanding of the concepts of atomic structure and bonding?
 - A. Very confident. I completely understand these concepts
 - B. Quite confident. I think I understand these concepts well
 - C. Don't know. I need to do some more revision
 - D. I'm not confident at all
 - E. I have no idea what you're talking about



- If the principle quantum number of an orbital, $n = 3$, what are the possible values of l ?

A. 1, 2, 3

B. 0, 1, 2

C. 1, 0, -1



- If the principle quantum number of an orbital, $n = 3$, what are the possible values of ℓ ?

A. 1, 2, 3

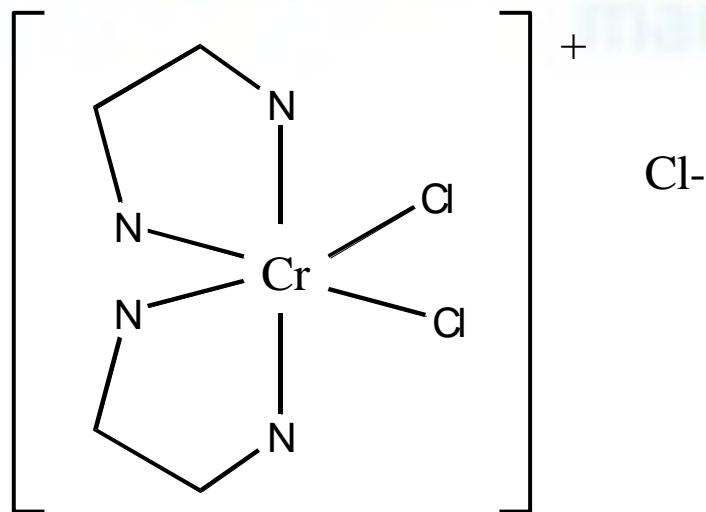
B. 0, 1, 2

C. 1, 0, -1

Explanation: ℓ has values between 0 and $(n - 1)$.

This tells us that for energy level 3, s, p and d orbitals are present

- What is the oxidation state of chromium in the compound *cis*-dichlorobis(ethylenediamine)chromium chloride, shown below?



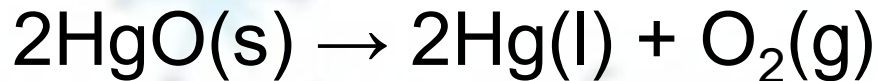
- Boron has a higher first ionisation energy than Beryllium
(consider the electronic configuration)

True (T)

False (F)



- Calculate ΔG_r° for the decomposition of mercury(II) oxide at 298 K, given the following data



$$\text{HgO}: \Delta H_f^\circ = -90.83 \text{ kJ mol}^{-1}$$

$$\Delta S_m^\circ = 70.29 \text{ J K}^{-1} \text{ mol}^{-1}$$

$$\text{Hg}: \Delta S_m^\circ = 76.02 \text{ J K}^{-1} \text{ mol}^{-1}$$

$$\text{O}_2: \Delta S_m^\circ = 205.14 \text{ J K}^{-1} \text{ mol}^{-1}$$

Give your answer to 1 decimal place in units of kJ mol^{-1}



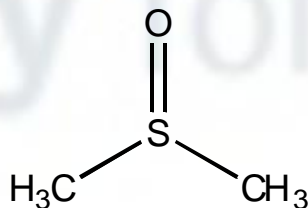
- For an S_N2 reaction, place the following solvents in order of their reactivity (from least reactive to most reactive).

A. Methanol

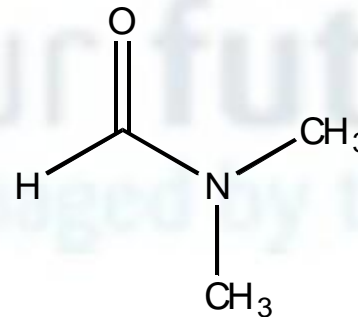
B. DMSO

C. Water

D. DMF



DMSO



DMF

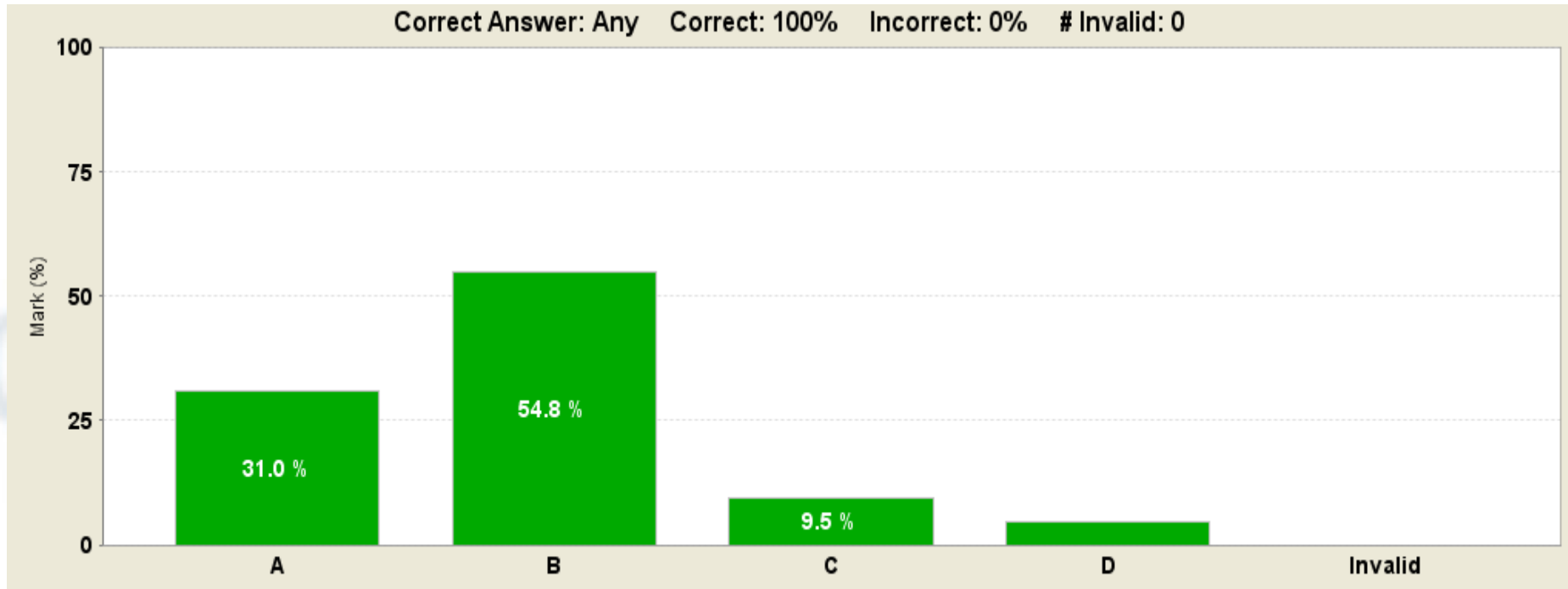


What do you think of these quiz sessions using the personal response systems?

- A. I like them and i think they help me to learn
- B. I like them and i think they're useful for finding out how much i know and what i need to work on
- C. I like them but i don't think they help me learn
- D. I don't like them



What do Reading Students think?



A. I like them and they help me to learn

B. I like them and i think they're useful for finding out how much i know and what i need to work on

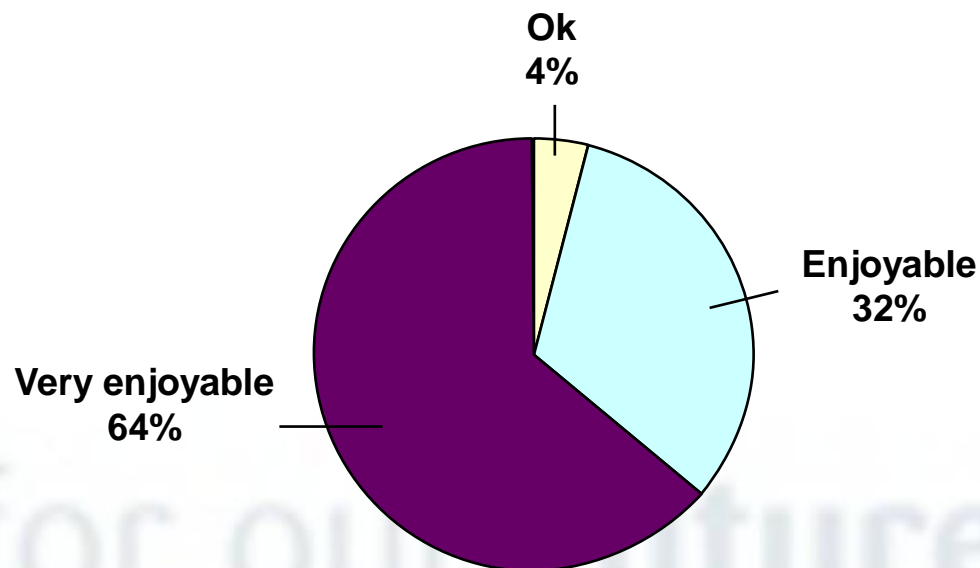
C. I like them but i don't think they help me to learn

D. I don't like them

Foundation course

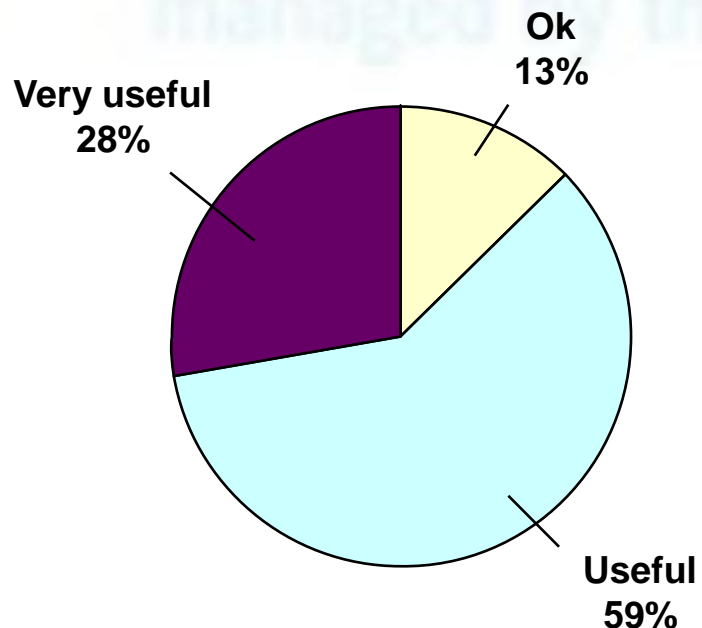
- Did you enjoy using the PRS in lectures?

(1 = not enjoyable at all,
5 = very enjoyable)



- How useful were the quizzes using PRS in helping you to learn?

(1 = not useful at all,
5 = very useful)



Exam results for Part 1 Inorganic section

(PRS and online tests)

- end of module test average mark up to 65% (2007/08) from 60% (2006/07)
- final exam average (compulsory questions)

2007/08	63%
2006/07	51%
2005/06	46%

Student comments

“I think they are brilliant – I really like using them.”

“I think the PRS is brilliant. The revision quiz was so useful for going over what we had learnt and I felt more confident afterwards.”

“Gives everyone a chance to interact and see how they are doing in relation to everyone else.”

“it was anonymous so you weren't embarrassed to answer”

“ you have to actively think rather than just listen”

“the explanation of the answer was a different way of being taught, and this was good”

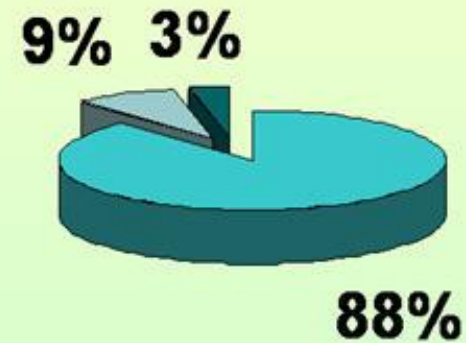
Other uses

- “Chemistry Week” debate for schools – “swingometer” to get winning team
- Freshers week fun quiz
- Surveys of student attitudes
- End of term tests, workshops (self paced?), easy to mark
- Monitoring attendance
- Integrated into lectures – stimulate discussion and peer interaction/assessment

What do Southampton
students think?

After a few goes, what's your view of the zappers?

- A. I like them – they genuinely help us to learn.
- B. I like them, but I don't think they help us to learn.
- C. I think they're a gimmick.



■ I like them – the... ■ I like them, but ... ■ I think they're a...

Enhancing feedback

- Students do in-class tests at the end of sequences of lectures (12 in the 1st year).
- Currently these are paper-based, marked by academics and result in generic feedback.
- We have trialled using zappers to collect students answers to in-class tests* with the following advantages:
 - **Automatic marking by the software**
 - **Generation of personalised feedback reports using mail merge (see examples)**

**They still do the test on paper first.*

Evaluating the trial

- Students were very positive, appreciating the personal nature of the feedback, and its timely delivery.
- Staff were very positive – the scripts were also marked by hand, showing <math><0.3\%</math> discrepancy between paper and zappers.
- Setting up the Excel spreadsheet and processing the mail merge is quite time consuming, but will be straightforward next year and beyond.
- We are implementing this for other Y1 in-class tests, and staff are keen on including it in Y2.

Conclusions

- The technology is simple to use and easy to manage in teaching environments.
- Students and staff alike are generally very positive.
- A majority of students *believe* that they help them to learn
- Initial observations show that students *do* learn more effectively when the technology is used effectively.
- Care must be taken – the technology can be over-used, or used inappropriately, to the detriment of learning.