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B. Murphy
Deakin University

Ciorstan J. Smark
University of Wollongong, csmark@uow.edu.au

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Keywords

Net-Generation, Reflective Learning, Interactive Learning, Personal Response Systems, Finance Students

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Using Personal Response Systems to Address the Net –Generation of University Students

BRIAN MURPHY
bmurphy@uow.edu.au (Corresponding Author)
University of Wollongong

DR. CIORSTAN SMARK
csmark@uow.edu.au
University of Wollongong

Abstract

Personal Response Systems are a technology similar to use to a television remote control or a mobile telephone for sending SMS messages. They enable almost instant communication between student and instructor in lecture situations.

This paper examines the claims made by Personal Response Systems and considers whether they may be especially appropriate to the preferences and expectations of Net-Generation students.

The Net-Generation (also known as N-Gens) is made up of students born between 1981 and 2001. They now make up the bulk of finance students in universities across our region. But have we really adapted our lecturing styles to meet their needs?

This paper explores how N-Gen students' learning behaviours and expectations are different from the generations preceding them and reflects on one possible way of adapting our teaching styles to better meet their learning needs.

Key words: Net-Generation; Reflective Learning; Interactive Learning; Personal Response Systems; Finance Students.

Introduction

This paper argues that a judicious use of Personal Response System (PRS or "clicker") technology could help to promote the intellectual engagement of our first year students in lectures. PRS can engage the "Net-Generation" or "Millennial" student through interactivity. The importance of interactivity to people as accustomed to the two way conversation of the internet (as opposed to the one-way broadcasting of knowledge in the traditional lecture format) is mentioned by several authors (Biggs, 2003; Tapscott, 1998; Mazur, 1997; Hake, 1998).

That there has been some shift in the outlook of commerce students coming into Universities today (Oblinger, 2003: 38) from the outlook of first year students ten years ago has been argued by many authors (for example, Tapscott, 1998; Friedlander, 2004; Davis, 2005). This shift in outlook has been argued by the above authors to be related to the fact that the bulk of first year students coming into university courses in 2006 are both familiar with technology and (in a related development) are reluctant to suffer passive learning environments silently.

A number of authors (for example Roberts, 2005; Oblinger, 2003; Frand, 2000) argue that the new generation of students now entering universities are more comfortable with computers and "constant connectivity" (Frand, 2000: 15) than previous cohorts of learners. This change in students has not always been reflected in changing learning environments. Indeed, Foreman (2003: 12) nominated large lectures as frontrunners for the "Most Worthy of Change" Award. This paper explores one possible avenue of adaptation for the lecture theatre into a more appropriate learning environment for Net- Generation learners.

The abovementioned shift in outlook has also been accompanied (at least in the field of commerce) by generally increasing student numbers (Freeman and Blayney, 2005) and a realization that the large lecture format of instruction is less draining of resources than smaller forums such as tutorials and seminars. The result is that, at a time when our students demand more interactivity, Australian Universities are anxious to provide a teaching environment (large lectures) which has traditionally allowed little interactivity (Draper and Brown, 2004: 81).

Introducing Personal Response Systems (PRS).

Personal response systems (PRS) are known under several names, "Clickers", "Audience Response Systems", "Group Response Systems", and "Classroom Performance Systems". All of these

are systems where the audience can respond to questions or give feedback to the presenter of a lecture or workshop whilst that presentation is taking place. PRS look very much like a typical television remote control. Students can indicate their preferences or responses to questions asked in lectures and get immediate feedback not only as to their own responses, but also to the responses of all those in the lecture theatre at the time.

Burton (2005: 2-3) mentioned additional benefits for PRS found in trials with Law and MBA students. In Burton's economics study, the lecturer found that PRS helped her to increase active learning in her students by varying the lecture experience with PRS. The PRS also helped her to gauge her students' understanding and tailor the pace of lecture to that understanding. In the trial with MBA students, the lecturer noted that he used PRS to overcome students' phobia of "death by PowerPoint" and gain students' attention and enthusiasm. Schackow et al. (2004: 502-503) tested a PRS on medical residents (postgraduate medical trainees) and found a significant, durable increase in factual retention of data transmitted in PRS enriched lectures compared to non-PRS enriched lectures.

In summary, then, the benefits claimed for PRS are threefold. First, that PRS promotes active learning rather than passive learning, which leads to better learning and retention. Particularly with "Net- Generation" or "Millennial" learners. Second, PRS facilitates different types of learning in lectures. Collaborative learning, or small group learning, seems to suit the "Net Generation" or "Millennial" students' style of learning and retention. Finally, educators' feedback (gained by looking at what students understood well and what they did not understand) can also be very helpful in understanding where lectures are missing the mark in terms of student learning.

Reflective learning Theory and PRS.

An integrated model of learning has been proposed by Cutts and Kennedy (2005) and their integrated learning model is described in Figure 1.

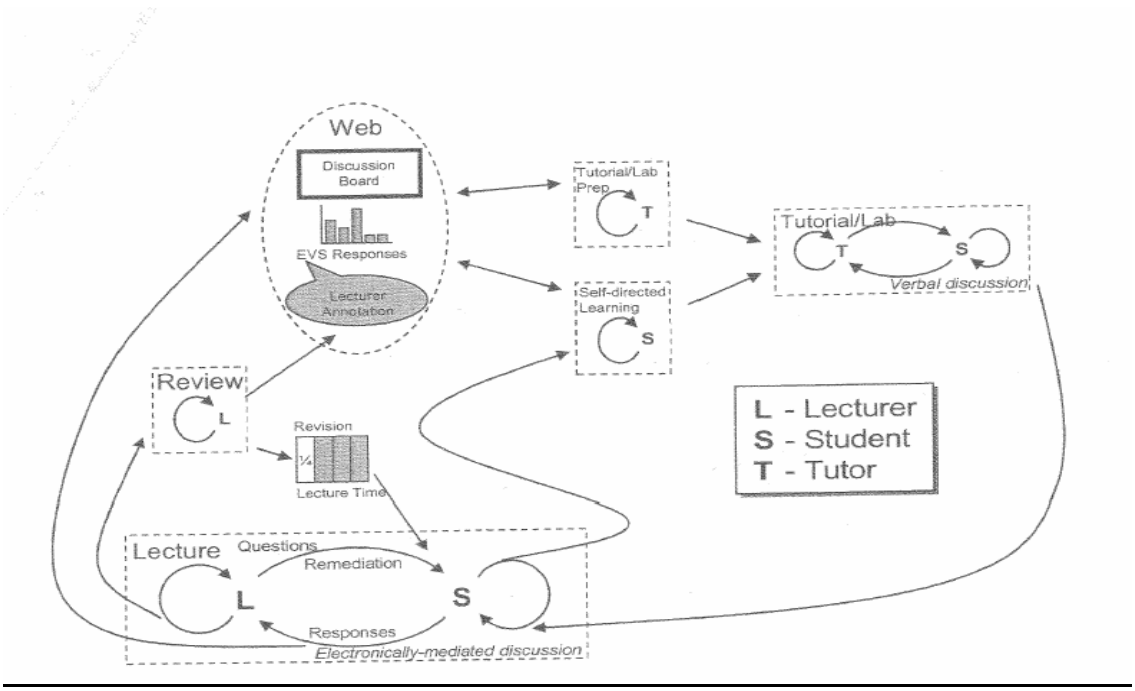

Figure 1 Cutts and Kennedy, 2005: 184.

This model addresses communication by ensuring that the dialogue between lecturer, student and tutor is a continuing process. The process in Figure 1 represents the following stages. The lecture is the starting point. The PRS is utilised to ask questions promoting active learning. The data is to be made available to staff and students by putting questions and responses on the web. Review of responses in following lectures and follow up in tutorials comprising smaller groups. Increased information allows remedial information to be conveyed to the students and therefore intervene before it is too late. Refinements of the system allow discussion board information to provide feedback to students and a self checking of progress and other student's thoughts on the topic.

Referring back to Figure 1 it will be seen that an integrated use of PRS technology allows an educator to, firstly, build knowledge through interconnections. Deep learning requires (Biggs, 2003: 76-77) "building on the known" and "using error constructively". A PRS system gives students (and educators) rapid feedback on where there knowledge stands and where it may be flawed.

With a careful use of rewards, one author (Duncan, 2005) suggests judicious use of extra credit points, students can track their knowledge and, where flaws are noted, this can be feedback to the learners' tutors for properly targeted extra work.

The PRS's ability to encourage and stimulate peer work (especially with quieter students) is also claimed to allow much greater interactivity in the lecture theatre and is very much tied in to the educators knowledge of the skills and needs of the "Millennial" or "Net-Geners" that he or she will have as the majority of first year students (Frand, 2000: 22).

Finally, PRS allow for self monitoring. For example, PRS technology allows students to keep a track of which areas they are responding to correctly (in lecture quizzes) and where they need additional work. The feedback is almost instant. This fast response time ties in with the aspirations and learning styles of the "Millennials" or "Net-Geners" that make up the bulk of our finance students (Oblinger, 2003: 42).

Why do N-Gens prefer a different learning approach?

Ruthven (2003: 24) offers an interesting observation on the Net generation in Table 1 below (he categorises the Net Generation as those born between 1981 and 2001) and the New Millennials (here categorised as born in or after 2002). They are "we" focussed instead of having the "me" focus of Baby Boomers and Generation X'ers. That is, as a group, they are group focussed and interactive:

Table 1.

Generations in Power. Rise and replacement of the style-setters				
SHARE OF POPULATION (per cent)				
GENERATION	**BIRTH YEARS**	**TYPE**	**2003[1]**	**Projected 2025[2]**
Federation	1901-24	Civics	3.4	0
Depression	1925-42	Adaptives	12.6	3.0
Baby boomers	1943-60	Idealists	23.6	14.6
Gen Xers	1961-80	Reactives	31.0	26.8
Net generation	1981-2001	Civics	26.9	25.9
New Millennials	2002-20	Adaptives	2.8	24.1

[1] Population 20 million [2] Projected Population 24.7 million
Adapted from Ibisworld as cited in Ruthven (2003: 24).

This approach to a more collective and interactive style of learning, especially coupled with the very rapid uptake of technology by students in the Australasian region (Cant, 2001: 6; Davis, 2005: 20) leaves the traditional one way finance lecture in trouble. Tapscott (1998: 22) argued that N-Gener's exposure to the internet in their formative years has led to this group being the antithesis of the couch-potato generation that preceded them. They are used to interactive, participatory, investigative enquiry. They have a very limited tolerance for knowledge transmission systems which require them to be passive observers (such as traditional lectures at university). Davis (2005: 20) points out that Millennials (characterised by Davis as those born after 1982) have a very impressive ability to 'take new technology such as peer-to-peer programs on the internet and use it to run conversations over vast networks of contacts'. As educators, we have the responsibility to grasp the optimism and skills of this new generation of first year students and harness it, rather than grumbling over "the good old days" when a lecture was still an old-fashioned lecture.

> The students like active learning, not passively listening to a teacher drone on. They absorb a variety of information from different multimedia. They want visual stimulation - pictures, movies, animation - and not reams of paper. (Doherty, 2005: 3).

It should be noted that all these advantages reported by educators who have used PRS are balanced by some disadvantages.

Challenges with PRS.

Palmer et al (2005) studied one hundred and two students aged between twenty – one and twenty – three years of age. These students were enrolled in an undergraduate medical program. A control group was compared with an experimental group who used PRS in their tutorials. Although the students were reported to enjoy using PRS and to find it stimulating (Palmer et al, 2005: 11) there was actually only a slight increase in knowledge retention in the experimental group compared to the control group. It is to be remembered, however, that this experiment introduced PRS into tutorials (presumably already a reasonably interactive learning environment) as opposed to traditionally non-interactive lectures. Other warnings against over enthusiasm for PRS technology have also been sounded.

Burton (2005: 2) mentioned the harsh reality that in order to harness this technology resources are needed. The hardware and software requirements – receptors and appropriate software are reasonably inexpensive. The keypads themselves can be quite expensive depending on the brand used. Although it is to be noted that a rebate from publishers or the chance to rent or resell keypads might be available. With issues of expense, of course, come issues of access and equity.

What might be more problematic is that there are set-up times for staff involved in learning the systems. Time is also a factor in the lecture presentation itself. Burton (2005: 3) noted findings that PRS did slow presentations. It should be noted, however, that this slowing was considered to be worthwhile given the educational advantages of PRS.

Duncan (2005: 21) noted that students may feel that the PRS is there to “spy” on them if the purpose of the system is not properly explained. Students can also feel anxious about new technology, especially when marks are attached (Duncan, 2005: 23). It must be noted that this technophobia is notably absent from most Net-Gen students (Cant, 2001: 6).

A PRS in Finance Pilot Study.

A pilot study on using PRS was run with the help and technology of Pearson Education on 6 September, 2005 in the subject FIN 226, Financial Institutions, at The University of Wollongong. This pilot study was limited both in only running for one lecture and also in that only 30 PRS handsets were available to share between students. Although this was a disadvantage, it did encourage (necessitate?) peer learning and discussion.

A further limitation of the study was in the authors' choice of reward mechanism. In several of the questions, the reward (a small packet of chocolates) was given to the first student group to lock in an answer (whether it was correct or not). This led to the unfortunate consequence of some students being so keen for the reward that they pressed the first letter that came into their heads regardless of the question so that they might achieve the reward! This was not discovered until three students were questioned in detail afterwards about their PRS experience, although the authors did wonder about the laughter when we awarded rewards to two early questions based on "first lock in".

Appendix 1 shows the sort of immediate graphical feedback the lecturer has access to and can share with the lecture hall immediately. In terms of Biggs and Moores' (1993) principles of good learning, this sort of instant feedback of students' responses in total (as shown in Appendix 1) would tend to help the lecturer gauge where the class was currently positioned in terms of knowledge base, and help the students to use interactivity in the context of arguing their selected answer with their neighbors who chose differently, and also comparing their opinions with those of the lecture theater at large. This enhances the "Self –monitoring" good learning principle (for students) as well as helping the lecturer glean the current stage of the students' knowledge base.

The interactivity of using peer discussion groups (both in terms of engaging the learners and also in terms of building useful peer-group learning relationships) appeared to be enhanced by allowing the students to have their initial thoughts recorded and then to discuss with their peers and change their answers where necessary.

Appendix 1 (questions seven, eight and nine) show the responses of our pilot study audience to questions specifically related to using PRS. It will be seen from the answers given to these questions that most students involved in our pilot study felt that they had received feedback on their understanding of the class material, felt more involved in the lecture because of using the PRS and would be interested in further use of PRS.

Conclusion.

Referring back to Figure 1 it will be seen that an integrated use of PRS technology allows an educator to, firstly, build knowledge through interconnections. Deep learning requires (Biggs, 2003: 76-77) "building on the known" and "using error constructively". A PRS system gives students (and educators) rapid feedback on where their knowledge stands and where it may be flawed. Table 1 clearly suggests why this approach to learning (given N-Gen students' predilections for both interactivity and peer learning) is desirable in today's lecture halls.

With a careful use of rewards (not chocolates for quick lock in of answers, as we discovered in our pilot study of this technology) students can track their knowledge and, where flaws are noted, this can be fedback to the learners' tutors for properly targeted extra work.

Foreman (2003: 14) encapsulates the problem well when he writes:

> In sum, what we know about good learning is almost wholly contrary to the structure and conditions of large lecture courses…Would we not prefer an approach (assuming we could afford it) that exploits the pedagogical promise of emerging interactive technologies..?

The ability of PRS to encourage and stimulate peer work (especially with quieter students) allows much greater interactivity in the lecture theatre and is very much tied to the educators knowledge of the skills and needs of the N-Gen students that now comprise the majority of students in Australasian finance courses.

Finally, PRS allow for fast feedback and self monitoring. For example, PRS technology allows students to keep a track of which areas they are responding to correctly (in lecture quizzes) and where they need additional work. This also ties in with the aspirations and learning styles of the "Millennials" or "Net-Geners" that we are privileged to have in our lecture halls.

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Appendix 1

TurningPoint Graphical Results by Question

Session Name: Ciorstan Smark Lecture ppt 08-30-05 01 14 51 PM.tpz
Created: 6/09/2005 9:14:06 AM

1.) Who was the most recent Liberal Party politician to resign?	**Responses**	
1. John Howard	5	17.86%
2. John Brogden	21	75.00%
3. Britney Spears	1	3.57%
4. Barry Hall	1	3.57%
Totals	**28**	**100.00%**

2.) Question 1: The existence of _____ allows large multinational corporations to take advantage of unregulated markets to invest and raise short-term funds in many countries, and to protect themselves from foreign exchange exposure.	**Responses**	
1. A: the World Bank	0	0.00%
2. B: a strong US dollar	3	11.54%
3. C: eurocurrency markets	23	88.46%
4. D: the International Monetary Fund	0	0.00%
Totals	**26**	**100.00%**

3.) Question 2: An important function of an underwriting bank for a euronote issuance facility (NIF) is to:	**Responses**	
1. A: provide the funding for the corporation	9	31.03%
2. B: approve the prospectus before distribut...	6	20.69%
3. C: dilute the corporation's equity	0	0.00%
4. D: buy the unsold notes and resell them to...	14	48.28%
Totals	**29**	**100.00%**

4.) Question 3: A euro floating rate note differs from regular eurobonds in that:	**Responses**	
1. A: they have longer maturity	7	25.00%
2. B: they differ substantially in default ri...	11	39.29%
3. C: they are not taxed	1	3.57%
4. D: they have coupons that are regularly re...	9	32.14%
Totals	**28**	**100.00%**

5.) Question 4: An American depository receipt is:

	Responses	
1. A: a security issued by a foreign company ...	3	10.00%
2. B: a security issued by a foreign company ...	4	13.33%
3. C: is a security issued by a US bank and i...	19	63.33%
4. D: is a foreign share that has a multiple ...	4	13.33%
Totals	**30**	**100.00%**

6.) Question 5: After a debt security is issued and its performance does not meet the expectations of the S&P rating agency, the debt rating may be placed initially on:

	Responses	
1. A: credit hold	9	34.62%
2. B: credit downgrade	5	19.23%
3. C: credit watch	7	26.92%
4. D: credit notice.	5	19.23%
Totals	**26**	**100.00%**

7.) Audience Response Systems: By using keypads in today's lecture, I got feedback on my understanding of class material.

	Responses	
1. Strongly Agree	9	32.14%
2. Agree	11	39.29%
3. Neither agree or disagree	3	10.71%
4. Disagree	3	10.71%
5. Strongly Disagree	2	7.14%
Totals	**28**	**100.00%**

8.) I felt more involved in today's lecture because I used a "keypad".

	Responses	
1. Strongly Agree	8	27.59%
2. Agree	14	48.28%
3. Neither agree or disagree	3	10.34%
4. Disagree	1	3.45%
5. Strongly Disagree	3	10.34%
Totals	**29**	**100.00%**

9.) I would be interested in using "keypads" in large lectures in future:	Responses	
1. Strongly Agree	7	28.00%
2. Agree	9	36.00%
3. Neither agree nor disagree	4	16.00%
4. Disagree	3	12.00%
5. Strongly Disagree	2	8.00%
Totals	**25**	**100.00%**