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Convergence of Learning Experiences for First Year Tertiary Commerce Students – Are Personal Response Systems the Meeting Point?

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Abstract
This paper reflects on the need for interactivity in first year lectures. This need is suggested to arise from first year students' diminishing tolerance for impassivity and also from the increasing accessibility of Personal Response Systems (PRS) in terms of cost, user-friendliness and students' level of technological savvy. The ways in which PRS can enhance interactivity and the importance of increasing interactivity in first year students' learning outcomes is discussed in terms of factors supporting good learning and enhancing their overall learning experience.

Keywords
Net Generation, Personal Response Systems, Finance Education, Education Technology, Clickers, Lecture Theatre Technology

Disciplines
Business | Social and Behavioral Sciences

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Convergence of Learning Experiences for First Year Tertiary Commerce Students – Are Personal Response Systems the Meeting Point?

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ABSTRACT

This paper reflects on the need for interactivity in first year lectures. This need is suggested to arise from first year students' diminishing tolerance for impassivity and also from the increasing accessibility of Personal Response Systems (PRS) in terms of cost, user-friendliness and students' level of technological savvy.

The ways in which PRS can enhance interactivity and the importance of increasing interactivity in first year students' learning outcomes is discussed in terms of factors supporting good learning and enhancing their overall learning experience.

INTRODUCTION

A fundamental shift in the outlook of commerce students coming into Universities today 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 is related to the fact that the bulk of first year students coming into Australian university courses in 2006 are both familiar with technology and (in a related development) are reluctant to suffer impassive learning environments silently.

This shift in outlook has 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).

This paper argues that a judicious use of Personal Response System (PRS or "clicker") technology can 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).

How are "Net-Generation" or "Millennial" students different?

Tapscott (1998, 22) refers to those born between 1977 and 1997 as the Net Generation (or N-Geners) and argues that their 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).

> '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).

Friedlander (2004) observed similar phenomena:

> 'There are huge differences between Millennials and those preceding them and parents and schools are having to play catch-up. Fast. Microsoft recently released a study, Boomers, Gen-Xers, Millennial: Understanding the New Students, which describes the new generation in detail. Millennials are spending less time watching TV, more time doing homework via the internet…The digital generation also "do" information, rather than memorise it, due to the impossibility of keeping up...Australian research concurs with the Microsoft report. The number of Australians using the internet at home has steadily increased since 1998, rising from 13 per cent of adults to 43 per cent in 2002 according to the Australian Bureau of Statistics. Access to the internet and use of computers is highest in younger age groups. In 2002, 86 per cent of households with children under 15 had access to a mobile phone.' (Friedlander, 2004, 9)

Ruthven (2003, 24) offers another interesting observation on the Net generation (who he categorises as born between 1981 and 2001 and the New Millennials (here categorised as post 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 (%)				
GENERATION	**BIRTH YEARS**	**TYPE**	**2003***	**Projected 2025^**
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

* Population 20 million ^ Projected Population 24.7 million
Adapted from Ibisworld as cited in Ruthven (2003, 24).

The first year students coming into our lecture halls have a different skill set, a different mind-set and different expectations from the students of a decade ago. As educators, we ignore this change at our peril. 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.

Doherty (2005, 3) refers to the following typology of generations by T. Hawkes of King's School:

Table 2.
GENERATIONS

	MATURES 1900 – 1945	**BABY BOOMERS 1946 – 1964**	**GENERATION X 1965 – 1981**	**NET-GENERS AND MILLENNIALS 1982 –**
Influenced by:	War and recession	Postwar optimism	Workaholic parents	Technology
Typical Technology:	• Vacuum tube radio • Dial telephone • 78rpm records	• Transistor radios • Mainframe computers • 33/45rpm records	• CDs • Emails • Personal computers	• MP3s • Mobile phones • PDAs
Typical Characteristics:	• Conservative • Respect authority • Self sacrificing • Community minded	• Optimistic • High energy • Enjoy a challenge • Drive to succeed • Want to stay young	• Free and independent • Balanced in life • Sceptical of inherited values • Laid back	• Like technology • Optimistic • Connected • Experiential • Want immediate gratification
	Preferred Teaching and Learning Style • Emphasis on teaching by transmission • Students are passive recipients • Teachers are commanders and controllers	• Accent on memorisation and repetition • Individual learning	**Preferred Teaching and Learning Style** • Emphasis on learning • Students are active partners • Teachers are facilitators and mentors	• Accent on discovery learning • Collaborative learning

Source: Tim Hawkes (as cited in Doherty, 2005, 3).

This would place "Net-Geners" and "Millennials" as people born on or after January 1st, 1982 as opposed to Tapscott (1998) placing their birth year at 1977 and onwards. What both typologies agree on is that the bulk of new first year student facing academics in lecture halls in 2006 are technology savvy, familiar with active participation in learning and have very little tolerance for the passive, educational experiences.

Biggs (2005, p. 75) reflected on the four principles to support good learning developed in Biggs and Moore (1993) and noted that they still applied better than anything he had come across since. They were:

1. A well-structured knowledge base
    1. An appropriate motivational context
    2. Learner activity, including interactivity with others
    3. Self-monitoring

PRS has a potential role to play in each of these four principles. It is important to clearly state that merely adding PRS to your lectures will not automatically bring you enthusiastic, actively engaged learners in your lecture theatres. However, as will be suggested in the following sections of this paper, correctly and thoughtfully implemented, PRS can certainly add to the structure, motivation, interactivity and self-monitoring of first year students.

Cutts and Kennedy (2005, 1-3) noted that many theories of learning and cognition held that for effective learning, a dialogue between teacher and learner was necessary and that PRS aided that dialogue. Cutts and Kennedy (2005, 6) found that (with the necessary, reasonably low investment in time and technology) PRS had the potential to enhance the learning experience by strengthening the dialogue between teacher and learner.

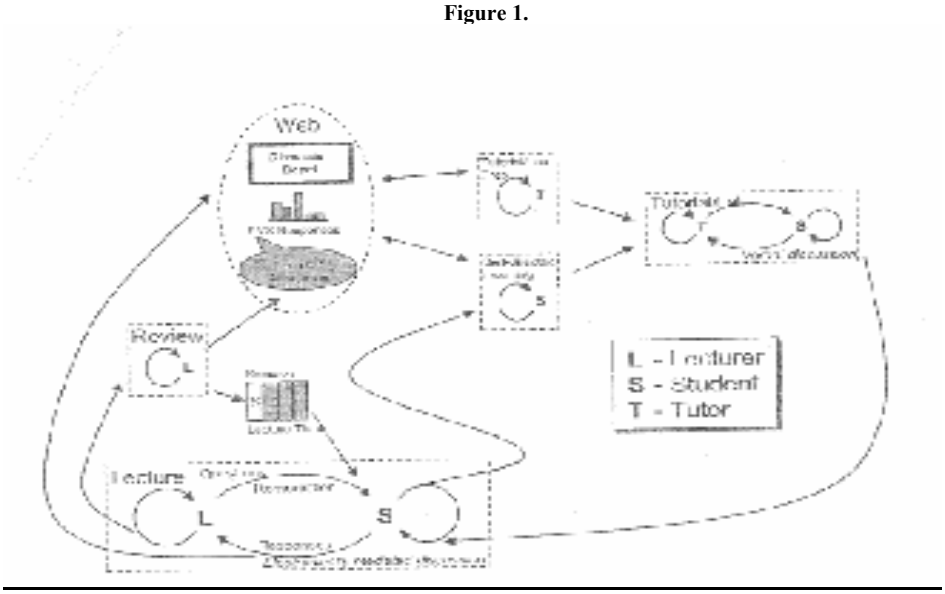
Cutts et al (2004, 1-3) discussed a number of feedback and reflection models emphasising the importance of the sort of feedback that PRS promotes in student learning. Dufresne et al (2000, 1) also emphasise the role that PRS could take in formative assessment tasks (Figure 1). Within this interactive model, PRS can play a valuable role. Cutts and Kennedy (2005, 185) proposed a solution to the problem of lack of dialogue in University learning environments especially in a large lecture theatres typical in the first year of studies at University.

An additional issue of feedback to students in a manner which is not threatening and also provides necessary feedback to enable remedial action to be taken before the first year student becomes disillusioned and may drop out of the subject and maybe the course.

In the use of audience response systems an integrated response is required to achieve the full benefits of the system. In particular there is a responsibility on the lecturer as well as the student to fully integrate the system into the learning pattern of the subject. In order for the system to work it is necessary to have the data collected and have it made available to staff and students.

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

Figure 1.



The model addresses the problems 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 lecture 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.

Personal Response Systems (PRS) – what are they?

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.

This allows for immediate, and (if wished) anonymous feedback to the presenter and to the class.

What are the advantages claimed for PRS?

Duncan (2005, 2) claimed the following amongst the benefits for judicious use of PRS:

- Increase student retention of what you teach
- Test students' understanding
- Increase class attendance
- Use as an analytical tool for student backgrounds, attitudes and opinions

The PRS achieves these things by improving student attention and involvement in lectures (Duncan, 2005, 7) this is also known as "fighting the fade" in students attention. 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 as follows:

- Firstly, PRS promotes active learning rather than passive learning, which leads to better learning and retention. Particularly with "Net- Generation" or "Millennial" learners.
- Secondly, 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.

Duncan suggested that increased class attendance could also be related to PRS when more enjoyment and "extra credit" for active participation was involved (Duncan, 2005, 27). However, this could also have a negative impact if those students who had previously stayed away from lectures now attended but brought dysfunctional attitudes with them. (Duncan, 2005, 28).

Similarly, Duncan (2005, 7) recommended that one of the best ways to enhance learning using PRS was to use it as a tool to turn lectures into peer discussion forums. Draper et al (2002, 163) also mentioned the PRS as being perhaps most useful in the way that it prompts students to initiate peer discussions and to build a "community" in the lecture theatre. Once again, this ties in well with the preferences of the "Net-Generation" or "Millennial" learner.

Advantages in the integrated approach when enhanced with PRS

- First year students feel part of a total system of instruction. The PRS provides the meeting point of all the processes
- Immediate feedback on progress and more importantly a continuation of the feedback
- Allows first year students to participate in a non threatening manner in an environment where they may find it difficult to volunteer answers
- Allows lecturers and tutors to receive immediate feedback as to the progress of individual students
- Introduction to familiar technology and comfort factor with the University
- University perspective proactive towards remedial action to students learning difficulties
- University perspective – documentation on student work effort and feedback to student

- Lecturer Administration- ability to have assessment tasks automated and reduce administrative time
- Introduction of student to Mazur's (1997) Peer Instruction which would be more difficult without PRS
- Utilise the ability of new technology to gather information which previously was not available. For example to gather all students marks for questions in lecture theatre.
- Addresses the characteristics of N generation
- Develops an awareness that it is the student's responsibility to be able to work with the new information (Hedberg and Harper, 1996)
- Automatic attendance check (Su, 2001)
- Encourage preparation before and after lecture (Su, 2001)

What disadvantages have been found in using PRS?

Burton (2005, 2) mentioned the harsh reality that in order to harness this technology resources are needed. Reasonably inexpensive are the hardware and software requirements – receptors and appropriate software. 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 P.R.S. 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 first year students, however.

Simpson and Oliver (2005, 18) provide the following table of benefits and problems found using PRS:

Table 3.

Benefits:	**Problems:**
Using handsets is fun and breaks up the lecture	Setting up and use of handsets takes up too much time in lectures
Makes lectures more interactive/ interesting and involves the whole class	Can distract from the learning point entirely
I like the ability to contribute opinion to the lecture and it lets me see what others think about it too	Sometimes it is not clear what I am supposed to be voting for
The anonymity allows students to answer without embarrassing themselves	Main focus of lecture seems to be on handset use and not on course content
Gives me an idea of how I am doing in relation to rest of class	The questions sometimes seem to be for the benefit of the lecturer and future students and not us
Checks whether you are understanding it as well as you think you are	Annoying students who persist in pressing their buttons and cause problems for people trying to make an initial vote
Allows problem areas to be identified	Not completely anonymous in some situations
Lecturers can change what they do depending on what students are finding difficult	Some students could vote randomly and mislead the lecturer
Gives a measure of how well the lecturer is putting the ideas across	Sometimes the lecturer seems to be asking questions just for the sake of it

Simpson and Oliver (2005, 18).

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, 2005, 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 (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) allows 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.

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. 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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