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Class attendance and use of Echo360 in Australia: A comparison between undergraduate nursing and maritime disciplines

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Abstract

This interdisciplinary study investigated the transformative role of Echo360 lecture capture software on student learning behaviours within the disciplines of nursing, maritime management and engineering at an Australian university. The aim of this study was to examine how students used the system to enhance their learning. A comparison of class attendance and use of Echo360 generated materials revealed limited differences between different disciplines, even though the cohorts were quite diverse. The implications for learning and teaching show the need to be cognisant of generational difference and level of information communication technology skills when developing curriculum.

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Keywords: Lecture capture; generation; class attendance; Echo360; learning and teaching.

1. Introduction

Educational technology has led to a fundamental change in pedagogy and curriculum design (Loveless & Ellis 2013). More than 60 per cent of Australian universities have used Echo360 lecture capture software significantly in their lecture theatres and classrooms, many capturing over 1,000 hours of lectures each week (NetSpot 2011). Although there are many benefits associated with the use of Echo360 in learning and teaching (Brogan 2009; Davies & Hardman 2010; Shaw & Molnar 2011), its patronage among lecturers is quite limited due to concerns about its negative impact on student attendance and classroom interaction (Billings-Gagliardi & Mazor 2007; Devadoss & Foltz 1996; Kottasz 2005). This cross-sectional study investigated the impact of Echo360 lecture capture software on

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the student learning behaviour of class attendance within the disciplines of nursing, maritime management and engineering at an Australian university. The relationship between the demographic characteristics, class attendance and availability of Echo360 generated materials were investigated within these disciplines.

1.1. Background

Research on how educational technology influences class attendance of students is limited (Massingham & Herrington 2006). Realising the positive impact higher class attendance may have on student performance (Romer 1993), Moore, Armstrong and Pearson (2008) proposed the need to further investigate the impact of virtual learning solutions, supported by using the internet, on class attendance. Although emerging educational technologies have improved accessibility to course materials, this does not necessarily translate into better performance by students (Marburger 2006). Other moderating factors include age, learning discipline and level of motivation; which determines the extent to which a given student is engaged in the learning process (von Konsky, Ivins & Gribble 2009). It appears class attendance cannot be regarded alone for improved student performance.

There are other aspects such as accessibility offered by educational technology that could contribute to improved student performance (Cradler et al. 2002; Massingham & Herrington 2006). With access to resources external to the traditional classroom environment, students have increased flexibility to choose when to engage with the learning resources (Brogan 2009; Phillips et al. 2010). Increased flexibility meets the needs of students with family-related commitments (Muir 2009) but it can be abused (von Konsky, Ivins & Gribble 2009). Students may intend to listen to recorded lectures but may fail to do so. As a result, it becomes difficult for them to remain abreast with learning modules within a particular unit which may ultimately affect their performance in the long term (Bell et al. 2001).

Use of educational technology to improve access to course materials can be advantageous to students with part-time work commitments (Muir 2009). This is particularly relevant in Australia where recent studies (Applegate & Daly 2006; Manthei & Gilmore 2005; McInnis & Hartley 2002) suggested that over 72% of university students were engaged in part-time work and require learning schedules that suits these commitments. The drawback for this cohort of students was the limited interaction offered by the captured lecture videos. Accessibility may encourage truancy among students (Naber & Köhle 2004) as the alternative source of information has been linked to lower attendance rates (Friedman, Rodriguez & McComb 2001; Grabe, Christopherson & Douglas 2005). Other researchers (Billings-Gagliardi & Mazor 2007) share an opposing view. Massingham and Herrington (2006) asserted students characters had influence over absenteeism compared to the accessibility to learning materials. Given the drawbacks of improved accessibility, research to investigate the frequency with which an absentee student access learning materials online could provide an additional dimension for design of learning and teaching resources. Settle, Dettori and Davidson (2011) believed future educational technologies needs to be able to effectively monitor and report on these students.

Previous studies suggest that educational technology may impact positively or negatively on the attitudes and learning behaviours of students (Billings-Gagliardi & Mazor 2007; Massingham & Herrington 2006; von Konsky, Ivins & Gribble 2009). Principally, educational technology could influence student motivation, their class attendance (Fei et al. 2013) and learning outcomes (Billings-Gagliardi & Mazor 2007; Colby 2004). Massingham and Herrington (2006) concluded that educators should focus on how to harness existing technologies to improve the learning and teaching behaviours of stakeholders. Authors claim lecture capture systems such as Echo360 software impact on the learning behaviour of students when introduced into the teaching environment (Mark, Vogel & Wong 2010).

During 2011, this University began using Echo360 software. Early in 2012 there were 419 units using the software representing half of online units, but less than 10% of total units being offered. There were 232 units (55%) using the system in one or more of the 30 enabled venues, and 187 units (45%) used in non-enabled and personal capture venues. The level of usage varied significantly across schools in the university. The discipline of nursing had high usage, whereas other disciplines including maritime units used the system less. This study explored the effect of the availability of Echo360 generated materials on class attendance in nursing, maritime management and engineering.

2. Methodology

An invitation was sent to students enrolled in eight units across nursing, maritime engineering and management. Research Ethics for this study was approved (H13290). A digital survey (Survey Monkey) was developed for use in this cross-sectional study and consent to participate was by completion of the questionnaire (Buchanan & Hvizdak 2009; Marra & Bogue 2006). Five-point Likert scale and free text questions were used to elicit understanding of how students used materials generated from the Echo360 platform alongside traditional lectures. Questions in the web-based survey included how students used Echo360 generated materials and whether access influenced their learning behaviour. Two reminders were provided to students by posting news items within the online learning management system used by this University.

Statistical analysis was undertaken using SPSS Version 21 (IBM Corp. 2012). Descriptive and two-sided chi-squared analysis was undertaken to generate p-values to establish whether differences existed between maritime and nursing cohorts. Fisher's exact test was used where cell counts were less than five (Agresti 1992; Fisher 1922). All tests were conducted using a two-sided alpha level of 0.05.

3. Results

An invitation to participate was sent by email to 841 undergraduate students. The pooled cohort response was 43%. Of the valid responses, 218 were from nursing (n=298) and 50 were from the maritime disciplines (n=64). There were 268 valid responses from 362 participants as incomplete data sets were excluded from the Echo360 software question analysis.

Table 1. Demographic information of respondents by discipline

Item		Nursing	Maritime	All Respondents	p-value
Gender	Male	43 (52%)	39 (48%)	82	.000
	Female	174 (94%)	11 (6%)	185	
Age	Under 31	42 (58%)	30 (42%)	72	.000
	Over 31	176 (90%)	20 (10%)	196	
English as first language		144 (80%)	36 (20%)	180	.468

Gender, age and English as first language were different for the two cohorts of respondents. Of those who responded, there were more than twice as many females as males (Table 1). The age profile of both nursing and the maritime discipline was different where over 90% of respondents in nursing and only 10% in the maritime disciplines were over 31 years of age. In nursing, 80% of respondents indicated that English was their first language compared to 20% from the maritime disciplines (Table 1).

Table 2. List of items related to class attendance and relevance of support for use of Echo360 software

Item number	Item (description)
A1	Due to the availability of captured lecture sessions, I am not worried about missing classes
A2	I still rely on recorded videos of class sessions I might have attended physically
A3	I am not motivated to attend lectures due to the availability of recorded lecture sessions
A4	I use Echo360 for assisting revision during study week for examination
C1	Students need support from teaching staff on how to effectively use the Echo360 facility
C2	Lack of technical and student support services will have a negative impact on the Echo360's effectiveness

Table 3. Effect of availability of Echo360 on class attendance by discipline

Item	Nursing SD	D	N	A	SA	T	Maritime SD	D	N	A	SA	T	<i>p</i> value
A1	11 4.7%	58 24.6%	49 20.8%	80 33.9%	38 16.1%	236 100%	6 11.8%	14 27.5%	15 29.4%	10 19.6%	6 11.8%	51 100%*	.077
A2	10 4.3%	24 10.3%	42 17.9%	114 48.7%	44 18.8	234 100%	6 12.0%	8 16.0%	13 26.0%	13 26.0%	10 20.0%	50 100%	.014
A3	38 16.2%	101 43.0%	38 16.2%	41 17.4%	17 7.2%	235 100%	24 47.1%	8 15.7%	9 17.6%	5 9.8%	5 9.8%	51 100%	.000
A4	5 2.1%	10 4.3%	20 8.5%	97 41.5%	102 43.6%	234 100%	3 5.9%	6 11.8%	7 13.7%	18 35.3%	17 33.3%	51 100%	.054

SD: strongly disagree; D: disagree; N: neither agree or disagree; A: agree; SA: strongly agree; T: total

*May not equal 100%, due to rounding

Table 2 lists the survey items. Table 3 shows the effect of Echo360 availability on class attendance by discipline. There was no difference in nursing or maritime disciplines in their use of Echo360 with regard to missing lectures and using Echo360 software for revision during study week for examination. There was a difference in the cohorts in their reliance on recorded class sessions and motivation to attend lectures. Nursing students were more likely to agree (67.5%) than maritime students (46%) that they still rely on recorded videos of class sessions they might have attended physically. Maritime students strongly disagreed (47.1%) and nursing students disagreed (43%) that they were not motivated to attend lectures due to the availability of recorded lecture sessions.

Table 4. Relevance of support for use of Echo360 software by discipline

Item	Nursing VI	I	N	R	VR	T	Maritime VI	I	N	R	VR	T	<i>p</i> value
C1	1 0.5%	11 5.1%	48 22.4%	103 48.1%	51 23.8%	214 100.0%	4 8.0%	2 4.0%	14 28.0%	18 36.0%	12 24.0%	50 100.0%	.007
C2	2 0.9%	5 2.4%	53 25.0%	95 44.8%	57 26.9%	212 100.0%	2 4.0%	4 8.0%	21 42.0%	10 20.0%	13 26.0%	50 100.0%	.002

VI: very irrelevant; I: irrelevant; N: neither relevant or irrelevant; R: relevant; VR: very relevant; T: total

Support from teaching staff and lack of technical support between the cohorts were different (Table 4). Nursing students indicated that it was relevant or very relevant (71.9%) to have support from teaching staff on how to use Echo360 and that lack of support had a negative effect on learning (71.7%). Conversely the maritime discipline students were ambivalent about support from teaching staff (42%) or lack of technical support (42%) affecting their learning using Echo360 generated materials.

4. Discussion

The main findings of this study were gender, age and English as first language were different for nursing and maritime disciplines. Almost two-thirds of all respondents indicated they were motivated to attend class even though Echo360 generated materials were available which supports the findings of other studies (Billings-Gagliardi & Mazor 2007; Briggs 2007; Copley 2007). Of those who responded, more than twice as many females completed the survey than males (25%) (Table 1). Within the nursing cohort, the proportion was similar to workforce statistics

(HWA 2013) where males are underrepresented (Table 1). The age profile of both nursing and maritime disciplines were different, where over 90% of respondents in nursing and only 10% in the maritime disciplines were over 31 years of age. This study shows that the technological inclination of the current student cohort especially those in Generation Y born between 1978 -1994 and Generation X born between 1965 -1977 may not be technologically inclined and prefer other modes of lecture delivery. Davies and Hardman (2010) found that this category of students may not be able to take advantage of the accessibility and flexibility offered by lecture capture technologies. Unfamiliarity with technology must be considered by tertiary education providers when introducing learning and teaching technologies into the curriculum (Duderstadt 2000).

Support from teaching staff and lack of technical support between the cohorts were different. Nursing students indicated it was relevant to have support from teaching staff on how to use Echo360 and that lack of support impacted negatively on their learning. Conversely students from the maritime disciplines indicated teaching or technical support was less relevant to their learning using Echo360 generated materials than the nursing cohort. Educational learning solutions need to contribute to the technological competence of many students and prepare them for the current computer-oriented job market (Fahy 2008).

The age difference and relevance of support to use Echo360 software reported between the cohorts, shows there are implications for learning and teaching to ensure curriculum design and development is cognisant of generational difference and level of information communication technology skills. Clark (2001) argued that given the continuing dynamism within learning environments and an increasingly diversified student population, education providers needed to frequently revise course content, and methods of delivery to accommodate these changes. The varying learning needs of students needs to be directed towards teaching styles, delivery methods and curriculum design (Anderson 2006). Additionally, the need for information communication technology competency within health care environments has burgeoned and graduate nurses are expected to be work-ready, including digital literacy (Mather, Marlow & Cummings 2013; Mather 2012). This study showed that information communication technology competence remains unaddressed within the undergraduate nursing curriculum. Conversely the maritime cohorts were predominantly students who were born after 1984 and known as Millennials (Oblinger 2003), that reported educational and support services were not relevant to them.

In nursing 80% of respondents and in the maritime disciplines only 20% indicated that English was their first language (Table 1). These demographic differences did not alter student motivation for class attendance. Both cohorts were similar in the distribution of responses to the question regarding availability of Echo360 if they missed class. Students also indicated they used Echo360 generated materials for assisting revision during study week. These findings suggest that student behaviour is similar regardless of linguistic diversity (Ramburuth & McCormick 2001).

Although the cohorts were quite different Table 3 shows the effect of Echo360 on class attendance by discipline. There was a difference in the cohorts in their reliance on recorded class sessions. Both cohorts agreed they were motivated to attend class even though Echo360 generated materials were available. The cohorts were different in their level of disagreement with the statement about lack of motivation. The maritime students were more strident and strongly disagreed that they were less motivated to attend class, whereas the nursing students only disagreed.

4.1. Future directions

The majority of respondents indicated they were motivated to attend class and the continuation of recording classes for revision and review is recommended. Further exploration of factors that motivate class attendance by students may provide information that can also be embedded into online delivery. The use of Echo360 software has enhanced the learning opportunities for students in both the nursing and maritime disciplines. Future directions indicate that if Echo360 software is to be further integrated into the curriculum the learning institution needs to offer students opportunities to learn how to use the technology, so that their learning is not impeded. Previous studies suggested that lecture recordings encouraged medical students with Asian backgrounds to achieve improved grades due to the availability and frequent access to lecture recordings (Shaw & Molnar 2011). Thus, further investigation of the impact of availability and the use of Echo360 generated materials for students with diverse cultural and linguistic backgrounds is warranted. These students who may not have English as their first language may use Echo360 differently to students who are learning in their first language.

4.2. Limitations

This study had several limitations. The cohort sizes between disciplines were different. More than three-quarters of students invited to participate were from nursing (n=682) and the remainder were from the maritime disciplines (n=159). Additionally, respondents self-selected to complete the survey, which may have caused respondent bias and the findings may not be generalizable to other undergraduate courses.

5. Conclusion

In conclusion, this study showed that student behaviour towards class attendance is similar regardless of discipline, age or English as first language. It also showed that student motivation to attend class was high with maritime students being more strident in their opinion that the availability of Echo360 generated materials did not reduce their motivation to attend class. Nursing students indicated that teacher and technical support impacted on the use and effectiveness Echo360 software. Higher education institutions need to provide opportunities to support all students to become information communication technology competent. Opportunities will ensure they are able to access the learning resources required to successfully complete their studies and become work-ready.

References

- Agresti, A. 1992, 'A survey of exact inference for contingency tables', *Statistical Science*, vol. 7, no. 1, pp. 131-153.
- Anderson, M. J. 2006, 'Degree of fit: University students in paid employment, service delivery and technology', *Australasian Journal of Educational Technology*, vol. 22, no. 1, pp. 88 - 103.
- Applegate, C. & Daly, A. 2006, 'The impact of paid work on the academic performance of students: A case study from the University of Canberra', *Australian Journal of Education*, vol. 50, no. 2, pp. 155-166.
- Bell, T., Cockburn, A., McKenzie, B. & Vargo, J. 2001, *Flexible delivery damaging to learning? Lessons from the Canterbury Digital Lectures Project*, University of Canterbury, http://ir.canterbury.ac.nz/bitstream/10092/517/1/42637_edmedia.pdf, accessed 13th April, 2013.
- Billings-Gagliardi, S. & Mazor, K. M. 2007, 'Student decisions about lecture attendance: do electronic course materials matter?', *Academic Medicine*, vol. 82, no. 10, pp. 73-76.
- Briggs, L. L. 2007, *Can classroom capture boost retention rates?*, Coppin State University, <http://campustechnology.com/articles/2007/10/classroom-capture-boost-retention-rates.aspx>, accessed 9th August, 2013.
- Brogan, P. 2009, *Echo360: Lecture capture solutions for students with disabilities*, <http://www.automaticsync.com/captionsync/wp-content/uploads/AccessibleLectures-11.pdf>, accessed 8th May, 2013.
- Buchanan, E. A. & Hvizdak, E. E. 2009, 'Online survey tools: Ethical and methodological concerns of human research ethics committees', *Journal of Empirical Research on Human Research Ethics*, vol. 4, no. 2, pp. 37-48.
- Clark, B. 2001, 'The entrepreneurial university: New foundations for collegiality, autonomy, and achievement', *Higher Education Management*, vol. 13, no. 2, pp. 9-24.
- Colby, J. 2004, 'Attendance and attainment - A comparative study', *Proceedings of the 5th ICSLTSN Annual Conference*, 31st August - 2nd September, 2004, University of Ulster, Londonderry.
- Copley, J. 2007, 'Audio and video podcasts of lectures for campus based students: Production and evaluation of student use', *Innovations in Education and Teaching International*, vol. 44, no. 4, pp. 387-399.
- Cradler, J., McNabb, M., Freeman, M. & Burchett, R. 2002, 'How does technology influence student learning?', *Learning and Leading with Technology*, vol. 29, no. 8, pp. 46-49.
- Davies, J. & Hardman, C. 2010, *Me2U – Exploring the effective use of Echo360 personal capture*, University of Sussex, United Kingdom.
- Devadoss, S. & Foltz, J. 1996, 'Evaluation of factors influencing student class attendance and performance', *American Journal of Agricultural Economics*, vol. 78, no. 3, pp. 499-507.
- Duderstadt, J. J. 2000, 'The future of the research university in the digital age', *Proceedings of the The Glion III Conference*, 31st May, 2001, Glion, Switzerland.
- Fahy, P. J. 2008, 'Characteristics of interactive online learning media', in *The theory and practice of online learning*, ed. T. Anderson, Athabasca University Press, Edmonton, Canada, pp. 167-200.
- Fei, J., Mather, C., Elmer, S., Allan, C., Chin, C. & Chandler, L. 2013, 'Use of Echo360 generated materials and its impact on class attendance', *Electric Dreams - Proceedings of the 30th Annual Ascilite Conference*, 1-4 December 2013, Macquarie University, Australia, pp. 288-292.
- Fisher, R. A. 1922, 'On the interpretation of χ^2 from contingency tables, and the calculation of P', *Journal of the Royal Statistical Society*, vol. 85, no. 1, pp. 87-94.
- Friedman, P., Rodriguez, F. & McComb, J. 2001, 'Why students do and do not attend classes: Myths and realities', *College Teaching*, vol. 49, no. 4, pp. 124-133.
- Grabe, M., Christopherson, K. & Douglas, J. 2005, 'Providing introductory psychology students access to online lecture notes: The relationship of note use to performance and class attendance', *Journal of Educational Technology Systems*, vol. 33, no. 3, pp. 295-308.

- IBM Corp. 2012, *IBM SPSS Statistics for Windows, Version 21.0*, IBM Corp., Armonk, NY.
- Kottasz, R. 2005, 'Reasons for student non-attendance at lectures and tutorials: An analysis', *Investigations In University Teaching and Learning*, vol. 2, no. 2, pp. 5-21.
- Loveless, A. & Ellis, V. 2013, *ICT, pedagogy and the curriculum: Subject to change*, 2nd edn, RoutledgeFalmer, New York.
- Manthei, R. J. & Gilmore, A. 2005, 'The effect of paid employment on university students' lives', *Education+ Training*, vol. 47, no. 3, pp. 202-215.
- Marburger, D. R. 2006, 'Does mandatory attendance improve student performance?', *The Journal of Economic Education*, vol. 37, no. 2, pp. 148-155.
- Mark, K. P., Vogel, D. R. & Wong, E. Y. 2010, 'Developing learning system continuance with teachers and students: Case study of the Echo360 lecture capturing system', *Proceedings of the 2010 Pacific Asia Conference on Information Systems (PACIS)*, 9th - 12th July, 2010, Taipei - Taiwan.
- Marra, R. M. & Bogue, B. 2006, 'A critical assessment of online survey tools', *Proceedings of the Women in Engineering Programs and Advocates Network*, 11th - 14th June, 2006, Pittsburgh, Pennsylvania.
- Massingham, P. & Herrington, T. 2006, 'Does attendance matter? An examination of student attitudes, participation, performance and attendance', *Journal of University Teaching & Learning Practice*, vol. 3, no. 2, p. 3.
- Mather, C., Marlow, A. & Cummings, E. 2013, 'Digital communication to support clinical supervision: Considering the human factors', in *Context Sensitive Health Informatics: Human & Sociotechnical approaches*, eds. M.-C. Beuscart-Zéphi, M. Jaspers & C. E. Kuziemsky, IOS Press, Amsterdam, pp. 160-165.
- Mather, C. A. 2012, 'Case Study: An interdisciplinary evaluation of an e-portfolio: WIL at the University of Tasmania', in *Workready: E-Portfolios to Support Professional Placements in Nursing and Construction Management Degrees in Australia*, eds. C. Simmons, A. Williams, W. Sher & T. Levett-Jones, Print National, NSW, Australia, pp. 81-96.
- McInnis, C. & Hartley, R. 2002, *Managing study and work: The impact of full-time study and paid work on the undergraduate experience in Australian universities*, Department of Education, Science and Training, Canberra, Australia.
- Moore, S., Armstrong, C. & Pearson, J. 2008, 'Lecture absenteeism among students in higher education: A valuable route to understanding student motivation', *Journal of Higher Education Policy and Management*, vol. 30, no. 1, pp. 15-24.
- Muir, J. 2009, 'Student attendance: Is it important, and what do students think?', *CEBE Transactions*, vol. 6, no. 2, pp. 50-69.
- Naber, L. & Köhle, M. 2004, *If e-learning is the answer, what was the problem?*, Vienna University of Technology, Vienna.
- NetSpot 2011, *NetSpot and Echo360 team to reduce IT burden for Australian clients through premium hosting service*, Newsmaker, <http://www.newsmaker.com.au/news/9934/>, accessed 12th May, 2014.
- Oblinger, D. 2003, 'Boomers gen-xers millennials', *Educause Review*, vol. 500, no. 4, pp. 37-47.
- Phillips, R., Preston, G., Roberts, P., Cumming-Potvin, W., Herrington, J., Maor, D. & Gosper, M. 2010, 'Using academic analytic tools to investigate studying behaviours in technology-supported learning environments', *Proceedings of the 27th Australasian Society for Computers in Learning in Tertiary Education (ASCILITE) Annual Conference*, 5th - 8th December, 2010, Sydney.
- Ramburuth, P. & McCormick, J. 2001, 'Learning diversity in higher education: A comparative study of Asian international and Australian students', *Higher education*, vol. 42, no. 3, pp. 333-350.
- Romer, D. 1993, 'Do students go to class? Should they?', *The Journal of Economic Perspectives*, vol. 7, no. 3, pp. 167-174.
- Settle, A., Dettori, L. & Davidson, M. J. 2011, 'Does lecture capture make a difference for students in traditional classrooms', *Proceedings of the 16th Annual Joint Conference on Innovation and Technology in Computer Science Education*, 27th - 29th June, 2011, Darmstadt, Germany.
- Shaw, G. P. & Molnar, D. 2011, 'Non-native english language speakers benefit most from the use of lecture capture in medical school', *Biochemistry and Molecular Biology Education*, vol. 39, no. 6, pp. 416-420.
- von Konsky, B. R., Ivins, J. & Gribble, S. J. 2009, 'Lecture attendance and web based lecture technologies: A comparison of student perceptions and usage patterns', *Australasian Journal of Educational Technology*, vol. 25, no. 4, pp. 581-595.