Instructional Podcasting in Higher Education: Rockingham Community

College Pilot Study

Michael Preuss

Rockingham Community College

April 7, 2008

Executive Summary

A modified quasi-experimental approach was employed at Rockingham Community College (RCC) for an investigation of instructional podcasting. This investigation is one of the first of its kind. The following statements can be made regarding the results:

1. Approximately 12% of full time faculty chose to employ podcasting in the fall of 2007.

2. Three different patterns of use were found, all or nearly all lectures podcasted, selected material podcasted and only review sessions podcasted.

3. Students use instructional podcasts but that use varies.

4. Results suggest that instructional podcasting does not increase absenteeism rather, it decreases it. While limited data regarding attendance was available, in five of six courses absenteeism was lower in sections employing podcasts than in the control group sections. Two of these positive relationships were statistically significant at alpha = 0.02 level of significance or higher.

5. Results indicate that instructional podcasting may reduce withdrawal rates. Eleven of 18 courses had lower withdrawal rates in the experimental (podcasting) sections. Two of these were statistically significant decreases at the alpha = 0.02 level of significance.

6. Results suggest that the relationship of instructional podcasting and cumulative course GPA is complex and may be influenced by multiple factors yet ten of 18 courses taught by seven different instructors exhibited improvements in cumulative course GPA.

7. Instructional podcasting may impact instructor classroom practice in such a way that there is an associated improvement in withdrawal rate and cumulative GPA.

Description

This investigation was undertaken in an effort to understand the usage patterns in instructional podcasting and the impact of instructional podcasting on students and their performance in a community college setting. In the spring of 2006, an instructional podcasting initiative was begun at RCC which included the development of open source podcasting software. The initial software was piloted by a small group of faculty. In response to feedback from this faculty group, the software was revised and updated. The revised software was made available to all full time faculty at the college through professional development sessions and approximately 50% of the full time faculty were trained in the use of the software. This pilot study considers both usage patterns and outcome measures. The utilization results described are for faculty and students. The outcomes considered are course attendance, student withdrawal rates and cumulative grade point averages (GPA). The courses included in the pilot study were taught in the fall of 2007.

Literature

The literature regarding instructional podcasting in higher education is scant and very few studies have been reported which address student outcomes. French noted this in his 2006 article in the *Journal of College Science Teaching.* To the best of this author's knowledge, McCloskey (2007) published the only data regarding student performance in higher education courses utilizing instructional podcasts. In his report of the classroom based quasi-experimental research completed by Jim Foley in computer courses at Georgia Tech a 10% increase in grades for students in the experimental group (podcasting) is noted. The remainder of the literature about instructional podcasting in higher education summarizes student and faculty self reports of activity and scholarly opinion regarding podcasting.

The publications which describe student reports of their experience with instructional podcasting consider usage patterns, attendance and preferences. Lee and Chan (2007) reported that 83% of students listened to 77% of the podcasts made available by their instructors. Lane (2006) found that 86% of student respondents stated they coupled audio only podcasts with other course material by listening to the audio content and reviewing course materials simultaneously. 87% of these users listened to the

podcast using a computer (Lane, 2006). These reported patterns could be described as strong student use of audio podcasts. The literature also indicates that 79% of students reported instructional podcasting had no impact on their class attendance (Lane, 2006), that 80% of students believed instructional podcasting added to their learning experience (Glogoff, 2007; Lee & Chan, 2007), that students recommend instructional podcasting in higher education after experience with it (Lee & Chan, 2007) and that students requested that full lecture content be made available as podcasts (Lee & Chan, 2007).

The literature regarding instructional podcasting in higher education provides limited information regarding student outcomes. The literature which communicates student perspectives indicates interest in and appreciation of instructional podcasting.

Method

A modified quasi-experimental method was employed in the RCC pilot study. Following general training in the spring and summer of 2007, faculty were allowed to determine if they would employ podcasting and the extent to which they would employ it in their classes for the fall semester of 2007. The software package developed included administrative functions. These were employed to monitor the level of activity. As the semester progressed, it was found that 10 faculty members were consistent in their use of podcasting. The courses in which these faculty employed podcasts were designated as the experimental groups in the study. To gather control data, student withdrawal and GPA data was accessed from the college record system for sections of the same course taught by the same instructor in prior semesters. The control group data for withdrawal rate and cumulative course GPA was limited to course sections taught within the calendar year prior to fall 2007. Following the fall 2007 semester, the college record system was accessed for each course and section in which podcasting was used consistently and withdrawal and GPA data was gathered for the experimental groups. Attendance information was gathered from the instructors who maintained this type of record. Constructing adequate control data for attendance required inclusion of courses taught in the two calendar years prior to fall, 2007. Attendance was frequency data. The total possible attendance, the number of students multiplied by the number of days attendance was taken, was compared with the actual of count of students attending each day.

Students who dropped or withdrew from a course were not included in the attendance calculations.

All data was compiled in an Excel workbook. Descriptive statistics, chi-square measures of independence, p-value calculations and t test of independent means were performed, as appropriate, with the data. Statistical comparisons were not completed when a control group was not a reasonable approximation of the experimental group in respect to schedule or length of the semester (i.e. evening classes were not compared to daytime classes; summer session sections were not compared to fall semester sections).

Result

Twenty-five RCC courses employed podcasting in the fall of 2007 (Table 1). These were in a wide variety of academic disciplines. For 18 of the 25 courses data from a previous section of the same course taught by the same faculty person on a similar schedule within the calendar year prior to fall of 2007 was available. These 18 courses were taught by eight faculty from three different instructional divisions of the college. Statistical analysis was performed for cumulative course GPA and withdrawal rate for each of the 18 courses comparing historic control groups and fall of 2007 experimental groups. Control and experimental group attendance data was available for two instructors in six different courses. In addition, three faculty usage patterns emerged.

Use by Faculty

Three basic patterns were employed by faculty in instructional use of podcasting. Faculty podcasted all or nearly all of their lectures. This was the most common pattern of use by faculty persons. Faculty podcasted selected presentations and lectures. Faculty podcasted review materials. No faculty person active in podcasting in fall of 2007 elected to create unique content to supplement classroom or lab instruction. Few faculty chose to use a pattern of podcasting other than posting all or nearly all classroom presentations. Those who did utilize a different pattern showed no meaningful variation in results when compared with those who did.

Access by Students

The data gathered in respect to students accessing instructional podcasts is summarized on Table 2. The patterns of student use do not exhibit uniform patterns beyond low, moderate and high use. However, several other general observations can be

made. First, no podcast posted by a faculty person went unused. Second, many podcasts in a wide variety of courses were accessed in frequencies equal to or exceeding one access for every two students in the course.

The software package developed did not include a break down of accesses by each user. As a result, one should consider that many potential influences on access data exist within and outside the institution. An example of an influence within the institution would be faculty instructions regarding and emphasis on the podcasts. At least one faculty person neglected to tell students how to access the material potentially depressing student use of the podcasts. An example of an influence external to the institution is access by persons who were not students in the course as many of the faculty did not password protect their podcasts.

Attendance

Three of the faculty members who employed podcasts maintained student attendance records. However, sufficient data to reconstruct student attendance for multiple sections in prior semesters was available from only two of these persons. These faculty members employed podcasting in six courses in the fall of 2007. The results related to attendance data are displayed on Table 3.

While the attendance data set was limited to courses taught by two faculty persons, it included six distinct courses. In five of these courses, the fall 2007 section, the experimental (podcasting) section, had lower absenteeism than the control sections. These frequency data were analyzed using chi square of independence and p-value calculations. In two courses, CJC 141 and SOC 210, the improvement in absenteeism was statistically significant at the 0.02 level of confidence of higher. The a p-value for the CJC 141 result was 0.013 and that for the SOC 210 result was 0.000. None of the other comparisons of the observed attendance to the expected attendance were statistically significant. The one course with an increase in absenteeism had a 1.5% increase in absences which was 30.5% likely to have occurred at random.

Withdrawal Rate

Eleven of 18 courses had improvements in withdrawal rates. Seven instructors in seven different academic disciplines were associated with these improvements. The data

gathered is presented in cross-tabulation comparison on Table 4. The withdrawal data, frequencies, allowed chi-square and p-value calculations.

Two courses had statistically significant differences between the observed withdrawal rate and the expected withdrawal rate at a 0.05 level of significance. Both of these represented reductions in withdrawals. The statistically significant improvements in withdrawal rates occurred in BIO 110 with a p-value of 0.0158 and CIS 110 with a p-value of 0.0136. Two other comparisons approached significance. One was associated with lower than expected withdrawals and the other with a higher than expected withdrawal rate. These occurred, respectively, in CJC 214 with a p-value of 0.0656 and in CJC 141 with a p-value of 0.06.

Cumulative Grade Point Average

GPA results are presented in cross-tabulation comparison on Table 5. The statistical analysis of these data was completed utilizing a t test of independent means. Ten of the 18 courses showed an improvement in cumulative GPA from the control group to the experimental group. These courses were taught by seven different instructors. One instructor, MOA – 1, had increases in GPA in all four courses in which he/she utilized podcasting. One of these relationships was statistically significant at the 0.05 level for higher than expected cumulative course GPA in the experimental (podcasting) group. The probability for chance occurrence of this result in OST 248 was 2.9% (Dretzke, 2005, p. 180). A second course taught by another instructor, CIS 110, approached a statistically significant improvement in cumulative GPA for students but was did not meet the standard of a 0.05 level of significance (p-value = 0.059). One statistically significant result was found for lower than expected cumulative GPA at the 0.05 level of significance. This was in ENG 114 with the probability of chance occurrence at 1% (Dretzke, 2005, p. 180).

<div align="center">Discussion</div>

The patterns of use by faculty indicate a preference for ease and simplicity. While three patterns were observed, none of these patterns required creation of material outside of regularly scheduled class, lab or review sessions.

Students made use of the material podcasted by faculty members but little can be concluded beyond this as the access data in this study can not be viewed as exclusively

representing student use of the podcasts or patterns of use without interference. A number of circumstances combined which made this the case.

First, many of the faculty did not password protect their podcasts. As a result, the material was available for access by any curious party. Even the podcasts which were password protected could be accessed by persons outside the class if students shared the password. The access data and unsolicited e-mails received from students of other institutions support the conclusion that persons other than students accessed the podcasts. Some courses had over 300 registered accesses per podcast (Table 2). In one instance, this many accesses occurred with a class size of 12 students (Table 2). That every student would have, on average, utilized each podcast 25 times or more is highly unlikely. Further, several instructors received e-mails from students attending different institutions thanking them for the podcasts created at RCC. These students found the RCC podcasts and utilized them to prepare for courses at their own institutions. Some of the access data was inflated by these circumstances.

In addition, at least one circumstance arose which interfered with student access to the podcasts. One faculty person was unable to direct students to the internet site from which they could access the podcasted class presentations. This was discovered through student requests for assistance. This situation or others like would have depressed access data for courses. Yet, even these students, or other persons, ultimately found the podcasts as no posted instructional podcast went without use.

In the course that employed the password protection, BIO 111, each podcast was visited frequently enough to average more than two visits per student (Table 2). This is the most reliable of the access data. However, as noted above, it may also have been influenced through outside accesses made by non-students if the password was shared.

The most that can be said from the present study is that it appears students accessed the podcasted material in every course and that every podcast created was accessed. Unsolicited anecdotal information from students supports the importance of access to this material.

Students approached faculty members and thanked them for podcasting or shared their perspective of the impact the podcasted material had on their studies. Four basic themes occurred in these comments. First, students appreciated the opportunity to review

material which was new to them, which they perceived as complex, material they were unable to follow to their satisfaction during the classroom presentation and material that was denoted as of particular importance by the faculty person. Second, students credited podcasted material with helping them be successful. Third, students were able to make up missed classes through podcasted material. Finally, several students with health issues had the opportunity to stay abreast of course work while recuperating from illnesses. Instructional podcasts were utilized by students to meet a variety of purposes and were positively perceived by students.

In the limited data available, instructional podcasts were more likely to impact student attendance in a positive manner rather than a negative manner. Five of the six courses in which data was available showed nominal to statistically significant improvements in attendance during the semester in which podcasts were deployed (Table 3). For CJC 141 and SOC 210 these results were significant at $\alpha = 0.02$ and higher (Table 3). One section showed an increase in absenteeism but this result was a 1.5% difference between the control and experimental groups with a 38% likelihood of occurring at random (Table 3).

Eleven of 18 courses showed decreases in withdrawal rates (Table 4). Seven instructors in seven different academic disciplines were associated with these results. Both of the statistically significant results, BIO 110 and CIS 110, were with lower than expected withdrawal rates (Table 4). This data shows a trend toward the association of podcasting and decreased withdrawal rates as 11 courses in eight academic disciplines taught by seven faculty persons exhibited a decrease in withdrawals and two of these relationships were statistically significant at the $\alpha = 0.05$ level or higher.

Ten courses showed increases in cumulative GPA when comparing control data with experimental outcomes (Table 5). The result for OST 248 was statistically significant in respect to an increase in cumulative GPA. The second statistically significant result was for lower than expected student success in ENG 114. These results should be understood in relation to the results for withdrawal rates.

The students most likely to withdraw from a course are those who are not performing well. If withdrawal rates decrease, it follows that a larger number of lower performing students remain in the course. Given this line of reasoning and all else being

equal, a decrease in withdrawals should result in a decrease in cumulative GPA and an increase in withdrawals should result in an increase in cumulative GPA. However, this was not the case in the pilot study. Only four of the 18 courses followed the decreased withdrawals equals decreased GPA pattern. Four additional courses followed the increased withdrawals equals increased GPA pattern. Two course, BIO 110 and CIS 110, had statistically significant decreases in withdrawal rates and simultaneous increases in cumulative GPA. The increase in GPA in the CIS 110 sections which demonstrated a statistically significant reduction in withdrawals was approaching statistical significance with the likelihood of the observed result having occurred at chance being 5.9%. Five other courses had both observed decreases in withdrawal rate and increases in cumulative GPA. These results indicate that the relationship between podcasting, student withdrawals, and cumulative course GPA is complex and that instructional podcasting may have simultaneous positive associations with withdrawal rates and cumulative course GPA in some instructional settings.

The final pattern worthy of discussion is the impact of instructional podcasting on the faculty person. Some anecdotal evidence suggested that faculty who employed this modality both communicated their interest in its potential to their students and had an increased consciousness of their classroom presentation content and style as a result of the material being "broadcasted." While the pilot study was not planned to gather data related to these ideas, the case of the instructor CIS – 1 can be interpreted to support this pattern. In CIS – 110, instructor CIS – 1 podcasted all lectures. This action was associated with a statistically significant decrease in withdrawals and a nearly statistically significant increase in GPA for an experimental group of 120 students when compared to 123 students in the control group (Table 4, 5). Yet, these results occurred in a setting in which podcast access data indicates that only one in one hundred students was listening to the podcasts (Table 2). It is highly improbable that such limited student use would be associated with a 14% reduction in withdrawals and an improvement in cumulative GPA that equaled 0.20 for 120 students. However, the enthusiasm of the instructor and the attention paid to consistent quality in classroom presentation could account for changes like this. This case and the testimony of faculty active in podcasting suggest that

instructional podcasting may have a strong impact on the instructor and classroom practice.

Recommendations

In light of the results of this pilot study, the following recommendations are made:

1. It is recommended that instructional podcasting be continued and expanded at the college.

2. It is recommended that instructional podcasts be password protected to improve the accuracy of the user information available.

3. It is recommended that research regarding instructional podcasting be continued to verify or disaffirm the results of this pilot and to extend the understanding of the relationships of faculty use, student access, student attendance, student withdrawals and cumulative course GPA in classes employing podcasts.

4. It is recommended that instructional podcasts be piloted in targeted courses in which withdrawal rates are high and success rates for students are low.

References:

French, D. P. (2006). iPods: Informative or invasive? *Journal of College Science Teaching, 35*(5), 58-59.

Dretzke, B. J. (2005). *Statistics with Microsoft Excel* (3rd edition)*.* Upper Saddle River, NJ: Pearson/Prentice Hall.

Glogoff, S. J. (2007). *Campus casting call: Engaging faculty and students with podcasting.* Retrieved October 3, 2007 from the Learning Technologies Center, University of Arizona site: www.ltc.arizona.edu

Lane, C. (2006). *UW podcasting: Evaluation of year one*. Retrieved August 22, 2007 from the Catalyst Office of Learning Technologies, University of Washington site: http://catalyst.washington.edu

Lee, M. J. & Chan, A. (2007). Reducing the effects of isolation and promoting inclusivity for distance learners through podcasting. *Turkish Online Journal of Distance Education*, *8*(1), 85-104. Retrieved August 22, 2007 from http://tojde.anadolu.edu.tr/tojde25/pdf/article_7.pdf

McCloskey**,** P. (2007). GT prof: Students learn better via iPod versus lecture*. Campus Technology*, Retrieved from http://www.campustechnology.com/article.aspx?aid=45383

Table 1

Courses and instructors consistently employing podcasting in fall of 2007

Course	Instructor(s)	Course	Instructor(s)
ACC 120	ACC – 1	MED 121	MOA – 1
ACC 220	ACC – 1	NOS 230	CIS – 2
BIO 110	BIO – 1	OST 148	MOA – 1
BIO 111	BIO – 2	OST 149	MOA – 1
BUS 110	CIS – 2	OST 248	MOA – 1
BUS 121	ACC – 1	REL 110	SOC – 1
CIS 110	CIS – 1/CIS – 2	SOC 210	SOC – 1
CIS 115	CIS – 2	SOC 213	SOC – 1
CJC 111	CJC – 1		
CJC 112	CJC – 1		
CJC 141	CJC – 1		
CJC 211	CJC – 1		
CJC 214	CJC – 1		
ENG 090	ENG – 2		
ENG 111	ENG – 1		
ENG 113	ENG – 2		
ENG 114	ENG – 2		

ACC = Accounting; BIO = Biology; CIS = Computer Information Systems; CJC = Criminal Justice; ENG = English; MED = Medical Assisting; NOS = Network Operating System; OST = Office Systems Technology; REL = Religion; SOC = Sociology

Table 2

Podcast accesses by students

Course	Instructor	N		Accesses		
		Students	Podcasts	Range per pdcst	Per podcast	Per podcast each student
ACC 120	ACC – 1	33	32	1 – 28	4.44	0.13
ACC 220	ACC – 1	9	21	2 – 568	202.38	22.49
BIO 110	BIO – 1	68	6	57 – 190	84.00	1.24
BIO 111	BIO – 2	34	31	8 – 145	72.55	2.13
BUS 110	CIS – 2	21	14	2 – 42	15.71	0.75
BUS 121	ACC – 1	29	12	1 – 4	0.72	0.02
CIS 110	CIS – 1	120	32	2 – 38	1.58	0.01
CIS 115	CIS – 2	6	44	2 – 124	14.05	2.34
CJC 111	CJC – 1	12	33	1 – 618	314.97	26.25
CJC 112	CJC – 1	38	17	1 – 707	334.53	8.80
CJC 141	CJC – 1	7	8	1 – 13	7.38	1.05
CJC 211	CJC – 1	11	5	1 – 17	6.80	0.62
CJC 214	CJC – 1	36	12	2 – 82	19.67	0.55
ENG 090	ENG – 2	25	20	1 – 31	6.40	0.26
ENG 111	ENG – 1	79	48	1 – 53	9.42	0.12
ENG 113	ENG – 2	31	26	1 – 18	4.12	0.13
ENG 114	ENG – 2	26	23	1 – 19	5.09	0.20
MED 121	MOA – 1	36	19	2 – 33	7.63	0.21
NOS 230	CIS – 2	3	2	2 – 9	5.50	1.83
OST 148	MOA – 1	35	21	1 – 100	9.67	0.28

Table 2 – continued

Podcast accesses by students

Course	Instructor	N		Accesses		
		Students	Podcasts	Range per pdcst	Per podcast	Per podcast each student
OST 149	MOA – 1	11	27	1 – 25	5.18	0.47
OST 248	MOA – 1	20	24	1 – 17	4.88	0.24
REL 110	SOC – 1	33	22	1 – 26	7.23	0.22
SOC 210	SOC – 1	72	59	1 – 68	28.24	0.39
SOC 213	SOC – 1	19	21	1 – 56	20.43	1.08

ACC = Accounting; BIO = Biology; CIS = Computer Information Systems; CJC = Criminal Justice; ENG = English; MED = Medical Assisting; NOS = Network Operating System; OST = Office Systems Technology; SOC = Sociology

Table 3

Attendance: Control (pre-podcasting) versus podcasting

Course	Instructor	N		Absenteeism	
		Control	Podcast	Control	Podcast
CJC 111	CJC – 1	2 semesters 29 students	1 semester 12 students	7.22%	4.93%
CJC 112	CJC – 1	2 semesters 43 students	1 semester 35 students	7.64%	7.53%
CJC 141	CJC – 1	3 semesters 53 students	1 semester 5 students	12.89%	2.86%**
CJC 211	CJC – 1	2 semesters 46 students	1 semester 9 students	7.64%	7.53%
CJC 214	CJC – 1	2 semesters 46 students	1 semester 31 students	6.31%	7.80%
SOC 210	SOC – 1	1 semester 58 students	1 semester 71 students	15.10%	8.20%**

CJC = Criminal Justice; ** = Statistically significant at $\alpha = 0.05$

Table 4

Comparison of withdrawal rates: Control (pre-podcasting) versus podcasting

		N		Withdrawal %	
Course	Instructor	Control	Podcast	Control	Podcast
BIO 110	BIO – 1	110	68	21.00%	7.35%**
BIO 111	BIO – 2	35	34	20.00%	26.47%
CIS 110	CIS – 1	123	120	30.10%	16.70%**
CIS 115	CIS – 2	11	6	18.18%	0.00%
CJC 111	CJC – 1	26	12	18.75%	9.10%
CJC 112	CJC – 1	25	38	20.00%	11.00%
CJC 141	CJC – 1	11	7	0.00%	29.00%
CJC 211	CJC – 1	30	11	13.00%	18.00%
CJC 214	CJC – 1	10	36	40.00%	14.00%
ENG 111	ENG – 1	42	79	16.00%	26.60%
ENG 113	ENG – 2	25	31	24.00%	26.00%
ENG 114	ENG – 2	27	26	7.00%	4.00%
MED 121	MOA – 1	35	36	43.00%	33.00%
OST 148	MOA – 1	37	35	27.00%	26.00%
OST 149	MOA – 1	20	11	10.00%	27.00%
OST 248	MOA – 1	17	20	12.00%	10.00%
SOC 210	SOC – 1	136	72	13.33%	6.94%
SOC 213	SOC – 1	26	19	11.36%	16.00%

ACC = Accounting; BIO = Biology; CIS = Computer Information Systems; CJC = Criminal Justice; ENG = English; MED = Medical Assisting; NOS = Network Operating System; OST = Office Systems Technology; SOC = Sociology; ** = Statistically significant at $\alpha = 0.05$

Table 5

Comparison of class cumulative GPA: Control (pre-podcasting) versus podcasting

Course	Instructor	N		GPA	
		Control	Podcast	Control	Podcast
BIO 110	BIO – 1	110	68	2.73	2.86
BIO 111	BIO – 2	35	34	2.71	2.88
CIS 110	CIS – 1	123	120	2.95	3.15
CIS 115	CIS – 2	11	6	3.22	2.86
CJC 111	CJC – 1	26	12	2.63	3.18
CJC 112	CJC – 1	25	38	3.35	3.24
CJC 141	CJC – 1	11	7	3.82	3.80
CJC 211	CJC – 1	30	11	3.54	3.11
CJC 214	CJC – 1	10	36	3.83	3.16
ENG 111	ENG – 1	42	79	2.24	2.55
ENG 113	ENG – 2	25	31	2.47	2.70
ENG 114	ENG – 2	27	26	3.46	3.04**
MED 121	MOA – 1	35	36	2.60	2.74
OST 148	MOA – 1	37	35	2.44	2.65
OST 149	MOA – 1	20	11	1.78	2.13
OST 248	MOA – 1	17	20	1.67	2.33**
SOC 210	SOC – 1	136	72	2.63	2.61
SOC 213	SOC – 1	26	19	2.81	2.69

ACC = Accounting; BIO = Biology; CIS = Computer Information Systems; CJC = Criminal Justice; ENG = English; MED = Medical Assisting; NOS = Network Operating System; OST = Office Systems Technology; SOC = Sociology; ** = Statistically significant at $\alpha = 0.05$