

# The Effects of Podcasting on College Student Achievement and Attitude

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## **Abstract**

In this mixed methods study, weekly podcasts written and recorded by course instructors to summarize college course content, were used to study the impact, if any, on student achievement and attitudes. Specifically, weekly summative podcasts were posted on an Internet website in Windows Media format and downloaded by college students. After 4 weeks of podcasts, students were assessed and evaluated as results were compared to similar classes that did not use podcasts. The podcast-viewing students completed a questionnaire and were interviewed to record their views, perceptions and attitudes. Teachers involved were also interviewed. Although not generalizable, the results of this study indicate that weekly podcast summaries were an effective teaching tool, which produced improved student outcomes and caused students to view optimistically their evaluation preparation and comprehension of course content.

The importance of student success is crucial in any educational endeavor and can be defined as the successful achievement of outcomes within a program of study. This inquiry was attempting to realize two critical goals, namely enhanced achievement in college courses and student satisfaction with the academic delivery of information as evidenced by student attitudes. We believed that students could experience more success if college teachers were able to personalize curricula and deliver content in a manner that was contemporary, accepted and gratifying. Therefore, we set out to use the mp3 player/iPod as a teaching enhancement tool within a college level program. We learned from a review of the literature that “video podcasting improves learner cognition . . . and improves learner efficiency . . .” (Mount and Chambers 2008, p. 56). Similarly, we hoped to enhance learner cognition and learner efficiency for college level courses while boosting achievement outcomes. We believed this was possible if “students believed strongly that the podcasts increased teaching effectiveness” (Lyles, Robertson, Mangino, & Cox 2007, p. 12). This “teaching effectiveness belief” held by students has been linked to educators who can personalize the learning environment which has been achieved by other researchers by permitting students to learn in a milieu of their choosing and comfort level (Lynch, Downward, & Edirisingha, 2007).

The notion that teacher effectiveness can be improved via technology usage was both intriguing and motivating herein. In a study conducted by Edirisingha, Rizzi, Nie, and Rothwell, (2007) regarding podcast use to improve student learning and study skills researchers demonstrated that “evidence from students who used podcasts clearly showed

that they benefited from podcasts”(p. 99). Our study was designed to realize similar outcomes by addressing the following key questions.

1. Will weekly podcast summaries increase mean scores when compared to previous classes taught using the same course content and teachers?
2. Will weekly podcast summaries improve student attitudes towards testing?
3. Will weekly podcast summaries be viewed by the students as a useful tool for test preparation?
4. Will weekly podcast summaries improve student attitudes towards their course of study?
5. Will students view weekly podcast summaries as a replacement for attending class or not?
6. Will teachers view weekly podcast summaries as being helpful to student success?
7. Will students find weekly podcast summaries useful in helping them comprehend the topics they study?
8. Will students want more classes to adopt weekly podcast summaries?
9. Do students will feel more comfortable going into tests when they use podcasts to prepare for the tests?

## **Theoretical Background**

Conceptually we suggested that playing video or listening to audio as a means to enhance course content comprehension and student achievement was worthy of examination and had been investigated in a similar manner by fellow researchers globally. Specifically, we theorized that podcast lesson summaries would be a useful tool to communicate content from a teacher (sender) to the student (receiver). Also, we speculated that college students might be more successful when teachers deliver course content in a manner that was both welcome and of interest to the students. This type of inquiry was not unique since the topic has been popular since the mp3 played first was introduced to the public.

For example, Mount and Chambers (2008) discovered that “video podcasting improves learner cognition through better integration of the visual and textual materials . . . [and it] improved learner efficiency through reduced information redundancy . . .” (p. 56). The authors also cautioned that, “podcasts should only be considered where clear evidence exists that students are equipped with the technology and hardware to benefit from them” (p. 56). Hence, ensuring students had access to computers on campus was key to the podcasting implementation within our inquiry.

Lyles, et al. (2007) experimented with podcasting entire lectures, providing archive copies of lecture notes online and having a teacher use a Tablet-PC during class to display key academic details to see how it affected student attitudes in a first-year University class where each lecture was recorded, converted to podcast format and posted for student access immediately after each class. Following course delivery in this manner, participants suggested,

the podcasts increased teaching effectiveness, agreed that lecture podcasts enhanced the usefulness of archived lecture notes, disagreed that podcast availability made them less likely to attend class, and strongly agreed that availability of podcasts and archived notes helped them stay current when they missed class for legitimate reasons. (p. 460)

Regarding the use of podcasts for enhanced academic delivery of course information, researchers Aliotta, Bates, Brunton and Stevens (2008) explained: “podcasts should be targeted to the relevant course material, structured in a logical and engaging way and possibly incorporate visuals to concretize the concepts being discussed” (p. 42). Based on these recommendations the podcasts in this current study were specific to the course materials and used visuals to help explain the topics in question. Downward, Livingstone, Lynch and Mount (2008) used podcasts to support fieldwork in the sciences to provide preparatory points and educational information during various stops in a field trip. Each podcast was no more than 5 minutes long and used an interactive ‘interview’ style as a means of keeping students engaged. Downward et al. (2008) further concluded that their “experience demonstrates the flexible and adaptive nature of podcasting as a communicating and integrating tool that can be readily developed by staff and students” (p. 69). Also, Smith, Schneider, Kontos, Kuzat, Janossy, Thurmond (2007), in their research into the ability of podcasts to enhance student learning, discovered that “of the 52 students responding . . . 36 felt that each podcast should be 5 minutes or less in duration . . .” (p. 110). Similarly this study kept the podcasts relatively short.

Fothergill (2008) included details related to the use of podcasting in support of upper-year (i.e., second-year or later) students taking courses using an online delivery model. As each week passed in the online course, the instructor recorded podcasts that included the latest news relating the course material to current events, announcements, and feedback to help the students stay on track including clarifications of hard-to-understand topics and a ‘fun part’ where a joke would be included that related to the course in some fashion. Fothergill found,

the podcasts produced for this course could equally have been published as text files on the announcement page of the course. However, as well as being more straightforward for the tutor to produce, it appears that the tailored audio track, reacting to the issues raised by the students and providing interesting background contextual information, is attractive to students through enlivening the course. (p. 91)

An additional and important observation from this study was that the students liked podcasts because they could be played repeatedly, they could be paused and rewound, and the student could jump to specific sections as needed. As a result of Fothergill’s work, rather than prerecording the podcasts we recorded at the end of each week so that the content was timely and reflected actual events in the classroom. It should be mentioned that Fothergill’s work was similar in many ways to our current investigation, but the demographic mix was different and the use of short, focussed weekly summary reviews in our study was a different approach from that of Fothergill. Other researchers such as Lee and Tynan (2008), Rosell-Aguilar (2007), Evans (2007), Sloan (2005) provided compelling evidence that informed this current inquiry. Further support for this mode of instruction can be found within the work of

researchers such as Copley, 2007; Kaplan-Leiserson, 2005; Pilarski, Alan Johnstone, Pettepher, and Osheroff, 2008, who have indicated that podcasting could be a valuable tool for learning that needs to be further scrutinized.

### **Research Design & Context**

Our college is a small, government-funded institution located centrally in the province of Ontario, Canada, and enrolls approximately 3,000 full time students in over 75 different diploma programs, with another 3,000 people attending part-time. Within this context, our mixed methods results illuminated the effects of weekly lesson summaries in podcast format for students in three different courses. Teachers in each program used a single class for this study, and the results were compared with students who took the same class in a previous year with the same teacher, content, and resources (e.g., textbooks) and evaluation instruments? For a period of 4 consecutive weeks in the winter 2009 semester, and at the end of each week, teachers recorded a podcast of roughly five minutes in duration that either highlighted a particularly difficult topic from the previous week of classes or summarized the salient points of the previous week's lessons. Students were given access to these podcasts via an Internet website. Podcasts could be run using any software that could play wmv (Windows Media format) files. This format was chosen because it was understood by current versions of the Microsoft Windows<sup>®</sup> operating systems family, which was universally available at our school and in most homes for little if any cost.

During, and at the end of the 4-week period, students were tested on the same course content (module) using the same evaluation techniques that were used in previous year. As well, once the 4-week period had passed, students were surveyed using a questionnaire. All participants, students and teachers, were asked on a voluntary basis to participate in an

interview about their podcasting experience. Conclusions were drawn based on the questionnaires regarding their opinions of the effectiveness of podcasting, the test results (2008 vs. 2009) and the interviews.

### **Procedures**

A Panasonic Digital Video Camcorder, model PV-GS150, which uses DV (Digital Video) tapes was used to record all podcasts that featured the teacher demonstrating a topic. A tripod was used to keep the camera steady and focused during classroom lecture simulations. When recording a podcast that demonstrated or explained a topic on a computer screen, the session was recorded using Microsoft Media Encoder 9, which recorded the actions on the computer as they happened.

In both cases, the resulting recordings were converted into a Windows Media Player-compatible movie (.wmv) format using Windows Moviemaker version 6. The resultant movie was copied to a web server at the College. The website could only be reached by typing the proper URL in a web browser as there were no shortcut links to this portion of the website so that, as much as possible, only the subjects of this research would be accessing the content, thus limiting any possible negative impact that might arise because there were too many people simultaneously accessing the website.

These recordings were made once a week for each of the 3 classes for a period of 4 weeks. The recordings outlined the salient points of each week's learning, which acted as a summary lesson for the key points of that week's lessons. Each recording required about 1 hour of effort, from recording the original summary with the teacher, to the conversion into a .wmv format, to posting it on the website. These podcasts remained on the website for the duration of our study.

All podcasts were made available for Internet download within 24 hours of being recorded. Each podcast could be played from home or at school on any computer that had Microsoft Windows Media Player© installed (or any other compatible media player). All video was stored in .wmv format, which is compatible with other media players such as Realplayer©. Students were provided with instructions and could ask for help to access the podcasts as needed. At the end of the 4-week study module, study participants were asked to fill out a questionnaire about their experiences with the podcasts. As well, all participants were asked if they were willing to be interviewed to gain greater insight into how the podcasts affected them.

Participants observed the podcast specific to their program each week. They may also have downloaded it to their own computer for repeated viewing with or without Internet connectivity, either on a computer or on a portable mp3 player. If they chose to use a portable mp3 player, the participant was responsible for conversion from the Windows Media format into a format compatible with their mp3 player.

At the end of the 4-week study period:

1. Following testing that was graded, participants completed a survey. No information was collected that identified an individual participant but demographic information, such as age range, gender, and program, was collected so we could compare and contrast the results in these groupings.
2. Participants were asked as part of their post study questionnaire if they would be willing to participate in an interview so we could discover more about their experience. Some participants were also approached in an attempt to create a

sample that included male and female participants, people from all the programs and a mix of ages.

3. Those participants involved in the interview process were asked a series of open-ended questions about their views on the use of podcasts in a weekly summary format and the impact these podcasts had on them. Their identifies were protected through the use of pseudonyms and by recording audio-only during the interview, then transcribing the interviews onto paper and destroying the original audio.
4. Teachers were also asked to participate in a teacher-specific interview, following the same procedures as the students (audio-only recording, no real names, transcribing the recordings to paper, destruction of the originals).
5. For comparison purposes, the grades achieved by the 2009 (podcast-assisted) classes achieved in any tests that were affected by the podcasts were compared against the marks of the 2008 (no podcasts) classes. The overall results of the two classes were compared in an attempt to isolate whether any difference was based on the different groups and their abilities or if the podcasts had any real effect.

Both the quantitative and qualitative data were analyzed to determine the effects of the weekly summary podcasts on all participants. Specifically, the data were analyzed to answer each of the nine research questions.

### **Research Questions**

The following questions were noted within our introduction and acted as a guide. We created this series of questions to provide a framework for the current investigation and all probes were influenced in some fashion by existing literature. By exposing students to

podcasts related to their individual programs and then posing questions about the effects the podcasts had on them, we addressed each query.

### Questions

Question 1: Will weekly podcast summaries will increase mean scores when compared to previous classes taught using the same course content and teachers?

Question 2: Will weekly podcast summaries improve student attitudes towards testing?

Question 3: Will weekly podcast summaries be seen by the students as a useful tool for test preparation?

Question 4: Will weekly podcast summaries improve student attitudes towards their course of study?

Question 5: Will students not view weekly podcast summaries as a replacement for attending class?

Question 6: Will teachers view weekly podcast summaries as being helpful to student success?

Question 7: Will students find weekly podcast summaries useful in helping them comprehend the topics they study?

Question 8: Will students want more classes to adopt weekly podcast summaries?

Question 9: Will students feel more comfortable going into tests when they use podcasts to prepare for the tests?

Although questions were examined, they were employed as a guide to keep the study within our theoretical framework. Data were examined to discover if there were answers for these question but no inferences were made to outside populations.

## **Method**

### **Participants**

There were two groups of heterogeneous participants, students and teachers in regularly scheduled classes, one group was introduced to the idea of podcasting and given instructions on how to retrieve content. All participation was voluntary but encouraged with the explanation of the value that previous research had highlighted. Five college teachers volunteered and after discussion of timelines and numbers of students we were left with three classes to stage this investigation.

This convenience sample was practical and three classes whose teachers volunteered to participate included:

1. A first-year class in the Computer Systems Technician/Technologist (CST) program. These students were taught by us but the class we used for the research was taught by a different teacher. Of 17 students in this class, 13 students initially volunteered to participate, all 13 actively participated in the study, all were male, 10 were age 20 or younger.
2. A first-year class in the Office Administration (OAD) program. These students had no connection to us, nor did the teacher have any connection to us. Of 23 students in this class, 13 students initially volunteered to participate, only 4 actively participated in the study, all were female, 3 were age 26 or older.
3. A first-year class in the Electrical Techniques (ET) program. These students had no connection to us, nor did the teacher have any connection to us. Of 34 students in this class, 26 students initially volunteered to participate, 12 actively participated in the study, all were male, 10 were age 25 or younger.

## **Instrumentation: Qualitative & Quantitative Measures**

Overall, the curricula, for instance the chapter 5 and chapter 6 tests, were the exact same tests delivered in the exact same fashion in both 2008 and 2009. These tests were administered from the official Cisco website using the same set of test questions with the same time limit using the same web interface. The only differences were the students, whose final grades were almost the same between the 2 years, so their respective capabilities were the same, and the use of podcasts, which only affected the 2009 class.

To collect quantitative data, we chose to use a questionnaire that opened with simple demographic questions (age range, gender, and program of study) in order to allow potential demographic comparisons. The questionnaire used a combination of questions to gather information about the participants and their use of the podcasts and affective questions using a fully anchored rating scale and a Likert scale to determine the attitudes of the participants towards the podcasts. The scale required participants to respond to a series of statements by indicating whether they strongly agree (SA), agree (A), are undecided (U), disagree (D) or strongly disagree (SD) with each statement. Each response is associated with a point value, and an individual's score was determined by summing the point values of each statement. For example, the following point values are typically assigned to positive statements: SA = 5, A = 4, U = 3, D = 2, SD = 1. Interviews were composed entirely of open-ended questions. As we chose a mixed-mode research model, the use of both types of questions were appropriate. Open questions were found in both the questionnaires and the interviews.

We also used semi structured, open-ended questions in the interview instruments.

Table 1 summarizes the questions in both the interviews and the questionnaires.

Table 1

*Relationship between question and Questionnaires /Interviews*

Question Number	Question Number from Student Questionnaire survey	Question Number from Student Interview	Question Number from Teacher Interview
Q2 – Improved attitude to tests	16, 17, 20, 23, 27, 28	4, 5, 6, 8, 12	
Q3 – useful for test prep	16, 17, 18, 19, 20, 23, 27, 28	4, 5, 6, 8, 12	
Q4 – improved attitude to course	16, 21, 22, 26, 28	4, 5, 6, 8, 12	
Q5 – podcasts not a replacement for class	10, 11, 28	6, 12	
Q6 – teachers see podcasts as helping students			3
Q7 –podcasts help with comprehension of	16, 18, 26, 28	4, 5, 6, 8, 12	

topics		
Q8 – students want more classes to use podcasts	18, 22, 26, 28	4, 6, 8, 10, 12
H9 – students will be more comfortable entering tests	16, 17, 20, 23, 26, 27, 28	4, 5, 6, 8, 12
Q1 Podcasts improve results	Uncovered through research with participating teachers	

The questionnaire allowed us to collect impressions of podcasting and gauge how participants felt podcasting affected their classes. This questionnaire was issued during the regularly scheduled class time in the first class after the last podcasts had been used and the last tests involving the podcast topics had been given. In this way, all testing was completed and all impressions towards podcasting were influenced both by the experience of using the podcasts and by the test results that may have been were affected by the podcasts.

We performed post study interviews of the participants. Participants were asked to volunteer for the interviews in order to collect personal impressions and feelings about the usefulness of podcasting as a study tool. These interviews were held after the last podcasts had been accessed and the last tests involving the podcast topics had been given. In this way, impressions towards podcasting were influenced both by the experience of using the podcasts

and by the experience of being tested on topics that were affected by the podcasts. The teachers were also interviewed as a means of collecting perspectives.

Both teachers and students were interviewed using semi structured, open-ended instruments. The use of interviews allowed us to collect information beyond what was provided by the questionnaires. In the interviews we used a template of prepared questions as the basis of the interview but allowed the interview to stray as questions led to new discoveries. All interviews were transcribed and examined to uncover perspectives.

Interviews occurred in a private room with interviews scheduled in such a way that each interviewee did not see any other interviewees, thus maintaining their anonymity. Interviews were voluntary, with each participant being invited as part of his/her required questionnaire.

### **Data Analysis: Methods**

We collected data from the questionnaires and from the interviews to address our nine research questions.

Once the data were collected it was summarized using Microsoft Excel 2003:

1. Number of participants by program, by gender, by age group.
2. Responses to each question using percentages of responses by question, frequency distributions, and standard deviation to measure the spread of the scores.
3. Responses to each question, broken down by course (OAD, ET, or CST). After we examined these data, we determined that such a comparison was not valid due to low participation rates in both the ET and OAD classes, invalidating any possible cross-program comparisons.

4. Responses to each question, broken down by gender. After we examined these data, we determined that such a comparison was not valid due to low participation rates by female students, invalidating any possible cross-gender comparisons.
5. Response to each question, divided by age (18 and younger, 19-20, 21-25, 26-30, 31-40, 41+, 25 and younger, 26 and older) Once we examined these data, we determined that performing this comparison by age was of no value, as these groupings had too few participants.
6. Mortality rate of participants (those who initially volunteered and those who actually used the podcasts) using raw numbers of participants.
7. Likert scale questions were used to collect impressions of podcasts using an 'agree-disagree' scale. We included a neutral choice (neither agree nor disagree) because "if the neutral choice is not included and that is the way the respondent actually feels, then the respondent is forced either to make a choice that is incorrect or not to respond at all" (McMillan and Schumacher, 2001, p. 263). Using these questions allowed us to calculate what percentage of students either agreed or disagreed with various components of the podcast experience.
8. Comparison of average marks on tests influenced by podcasts vs. average marks on same tests without podcasts (previous course delivery, same teacher, same content but different students), separated by program (ET, OAD, and CST). After we examined the data, we determined that such a comparison was not possible for the ET and OAD classes due to low participation rates in these classes, so we restricted this comparison to the CST students only.

We also collected and transcribed data from the interviews. In our context, the purpose was threefold: (1) We used the interviews to see if they supported or refuted the findings of the questionnaires, (2) We searched the interviews to find common themes related to the usefulness of weekly podcast summaries, and (3) We examined the interviews as a source of new insights into podcasting in my specific college environment.

For our purposes, the data from each interview were transcribed completely so we did not lose any ‘nuggets of information’ that lay therein. We also organized the data into groups. Cohen et al. (2007) explained that these groups could be data-driven; “present all the data that are relevant to a particular issue”, (p. 467); issue-driven “organizing the analysis by research question” (p. 468), or people-driven “organized by their membership of different strata in a stratified sample”, p. 467. In our study, we organized the quantitative data along gender lines, along course of study lines (ET, OAD, and CST), along student/teacher lines, and along age lines, all of which were driven by the people in the study. We also grouped both the quantitative and qualitative data by Question, so as we found information in an interview related to a specific Question, we recorded it there—an issue-driven approach. We also organized the qualitative data by issue in order to discover any new themes.

As we examined the interview data and compared the themes we uncovered against the conclusions drawn from the questionnaires and against the question. We also looked for any unexpected themes to emerge. Those that neither supported nor refuted the conclusions of the questionnaires or which had no relation to the question were gathered separately to help uncover new perspectives on podcasting and education.

The interview data were examined in more than one pass and as new themes arose from the data, classifications that may not have been identified yet were added. As we made

subsequent passes through the interview transcripts, we continually examined the data with an eye not just to my existing question but also to the new themes that emerged on previous passes.

To identify the themes, we used a coding method when examining the interview transcripts. For us, this involved the use of printed copies of the transcripts, upon which we entered handwritten notes on the margins that explained the significance of each passage with respect to our questions or other themes that emerged during data examination. As new themes emerged, the data were examined again to ensure that all transcripts were viewed in light of the new themes.

Once the data were fully coded, we followed a process of enumeration (where feasible) to determine how frequent certain themes occurred in order to quantify some of our interview data. Some themes that emerged may not have answered questions. The negative case and discrepant data methods described by Gay and Airasian (2000) as “the search for data that are negative or discrepant from the main data collected in a study” (p. 243) was also used. As important as it was to find support for answer to the question, it was equally important to remember that research is an attempt to find new meanings or uncover new ideas and “the search for negative and discrepant data provides an important counterbalance to the researcher’s tendency to stick with first impressions or hunches” (Gay and Airasian, 2000, p. 243).

In an attempt to find support for the findings within questionnaires, we utilized a method that Gay and Airasian (2000) referred to as triangulation. Thus, data collected by the questionnaires and the data collected through the interviews were examined together to find

common themes that either supported or refuted the Question. With a small sample size, tentative conclusions were drawn that were only applicable to the study population.

### Findings

There were 3 teachers and 29 students who actually used the podcasts, although 17 others also filled out post-podcast feedback questionnaires. Student participants were distributed as table 2 indicates.

Table 2

*Distribution of Participants by Program and by Gender, Including Mortality Rates*

	OVERALL	CST	OAD	ET	Female	Male
Number of Participants - Filled Pre-Study Questionnaires (see Appendix A)	52	13	13	26	13	39
Number of Participants - Filled Post-Study Questionnaires (see Appendix B)	46	13	13	20	12	34
%ge Lost from pre-study	11.5%	0.0%	0.0%	23.1%	7.7%	12.8%
Number of Participants - Actually Used Podcasts	29	13	4	12	4	25
%ge Lost from pre-study	44.2%	0.0%	69.2%	53.8%	69.2%	35.9%

According to Fraenkel and Wallen (2009), “for experimental and causal-comparative studies, we recommend a minimum of 30 individuals per group” (p. 102). Using this as a guide, the number of females who participated was too small to allow gender-specific conclusions and the number of participants (i.e., those who used the podcasts) from the OAD and ET programs was also too small to support program-specific conclusions. The total number of participants who used the podcasts was 29, which was too few to allow generalizations to be made beyond the population in this study. Yet, as a mixed-methods research study, the qualitative and quantitative data collected did enable conclusions to be drawn specific to the study population, and this is the basis of the findings stated herein.

The first 9 items related to demographic information therefore we begin our data report at item 10 as question 10 asked: Do you think that the availability of podcasts in all your classes could affect your classroom attendance? Data indicated that 12 students (41.4%) chose ‘Yes’ and 12 students (41.4%) chose ‘No’, with the remaining 5 respondents (17.2%) choosing ‘Not Sure.’ There was a very clear division in opinion on this question, with half of those who expressed an opinion believing that their attendance could be affected if podcasts were available in all classes, while the other half expressed the opinion that their classroom attendance habits would not change.

Question 11 asked: Do you think that watching the podcasts could be a substitute for attending class? Data indicated 5 students (17.2%) chose ‘Yes’ and 21 students (72.4%) chose ‘No’, with the remaining 3 respondents (10.3%) choosing ‘Not Sure.’ This contradicted the split in

Question 10, where half of the students indicated that their attendance could be affected by the presence of podcasts in all their classes. In question 11, 72.4% of the students

stated that podcasts were not a substitute for attending class and only 17.2% felt that the podcasts were a substitute for attending class.

When we examined the results for question 11, I found that 5 students (17.2%) chose 'Yes' and 21 students (72.4%) chose 'No', with the remaining 3 respondents (10.3%) choosing 'Not Sure.' This contradicted the split in Question 10, where half of the students indicated that their attendance could be affected by the presence of podcasts in all their classes. In question 11, 72.4% of the students stated that podcasts were not a substitute for attending class and only 17.2% felt that the podcasts were a substitute for attending class. Questions 12, 13, 14 and 15 were similar to other items covered hence they were omitted herein.

Question 16 asked: Do podcasts help students learn better: Breakdown of responses?

Data signaled that 20 students chose 'Agree' and 3 students chose 'Strongly Agree.' The remaining 6 respondents chose 'Neither agree nor disagree.' Out of all respondents, 79.3 % either agreed or strongly agreed with the statement in question 16, while none disagreed or strongly disagreed.

Question 17 asked: Do podcasts help students study better? Data indicated that 21 students chose 'Agree' and 4 students chose 'Strongly Agree' while the only other statement chosen was 'Neither agree nor disagree' (4 responses). Out of all respondents, 86.2% either agreed or strongly agreed with the statement in question 17.

Question 18 asked: Do students believe marks will improve when podcasts are present? 18 students chose 'Agree' and 9 students chose 'Strongly Agree' while the only other statement chosen was 'Neither agree nor disagree' (2 responses). Out of all respondents, 93.1% either agreed or strongly agreed with the statement.

Question 19 asked: Are podcasts better than textbooks for study purposes? 7 students chose 'Agree' and 4 students chose 'Strongly Agree.' Two students chose 'Strongly disagree' while 1 chose 'Disagree.' All other respondents (15) chose 'Neither agree nor disagree.' Only 37.9% of respondents either agreed or strongly agreed with the statement in question 19, while 10.3% either disagreed or strongly disagreed.

Question 20: Are podcasts useful when preparing for tests? 19 students chose 'Agree' and 7 students chose 'Strongly Agree.' Two students chose 'Disagree.' The single remaining respondent chose 'Neither agree nor disagree.' Out of all respondents, 89.6% either agreed or strongly agreed with the statement in question 20, while only 6.9% either disagreed or strongly disagreed.

Question 21: Do podcasts improve attitudes towards class? 12 students chose 'Agree' and 4 students chose 'Strongly Agree.' Three students chose 'Disagree.' The remaining 10 respondents chose 'Neither agree nor disagree.' Out of all respondents, 55.2 % either agreed or strongly agreed with the statement in question 21, while only 3 disagreed and none strongly disagreed.

Question 22: Would students be happier in other classes if they all had podcasts? 16 students chose 'Agree' and 8 students chose 'Strongly Agree.' The remaining 5 respondents chose 'Neither agree nor disagree.' Out of all respondents, 82.8 % either agreed or strongly agreed with the statement in question 22, while nobody disagreed or strongly disagreed.

Question 23 asked: Does studying with podcasts reduce test anxiety? Seven students disagreed with the statement "Studying using the podcasts made me feel less anxious or nervous going into my tests", while 11 agreed, 2 strongly agreed, and 9 neither agreed nor

disagreed. Out of all respondents, 44.8% either agreed or strongly agreed with the statement in question 23, while 24.1% either disagreed or strongly disagreed.

Question 24 asked: Are semester-end podcasts preferred over weekly podcasts? Nine students strongly disagreed, 6 students disagreed, while 2 students agreed and 4 students strongly agreed with the statement “Instead of having weekly summaries, it would be better to have one large podcast at the end of the semester that summarized all important points for the semester.” Out of all respondents, 20.7% either agreed or strongly agreed with the statement in question 23 while 51.7% either disagreed or strongly disagreed.

Question 25 asked: Semester-long podcast comparison with weekly podcasts? Data indicated a stronger level of support for weekly summaries as 11 students strongly disagreed, 11 students disagreed, 4 students neither agreed nor disagreed while 3 students strongly agreed with the statement in question 25. Out of all respondents, 75.8% either disagreed or strongly disagreed with the statement in question 25 while 10.3% strongly agreed.

Question 26 asked: If there were 2 sections of the same class and one section offered weekly podcasts while the other offered in-class review sessions with my teacher, I would prefer to be in the class with the podcasts? Seven students chose ‘Agree’ and 5 students chose ‘Strongly Agree.’ Nine students chose ‘Disagree’ and 1 student chose ‘Strongly Disagree.’ While 41.3 % of respondents either agreed or strongly agreed with the statement in question 26, there was also a group of 34.4% who either disagreed or strongly disagreed. The remaining 7 respondents chose ‘Neither agree nor disagree.’

Question 27 suggested, I felt better prepared for my tests because I used the weekly podcasts. When examined the results for question 27, we found that 16 students chose

‘Agree’ and 4 students chose ‘Strongly Agree.’ Two students chose ‘Disagree’. The remaining 7 respondents chose ‘Neither agree nor disagree.’ Of all respondents, 69 % either agreed or strongly agreed with the statement in question 27, while only 6.9% either disagreed or strongly disagreed.

### Achievement

In the following Table we summarized the performance of the 2008 and 2009 CST classes, specific to the class affected by the podcasts.

Table 3

*CST Marks Comparison 2008 (No Podcasts) vs. 2009 (Using Podcasts)*

Computer Systems Technician/Technologist (CST) Comparison of Marks							
	Final Grade		Ch 5 test		Ch 6 test		
	2008	2009	2008	2009	2008	2009	
Averages	73.5%	70.2%	64.6%	74.4%	61.4%	76.2%	
Difference in Marks	-3.4%		9.7%		14.8%		

In terms of final grade in the class, the 2008 class had a class average of 73.5% while the 2009 class had a class average of 70.2%, which shows the 2008 class with a slightly higher final grade average, although the difference is so small as to likely not be meaningful.

The class average on the chapter 5 test was 64.6% in 2008, while in 2009; the class average grade was 74.4%, an average that was 9.7% higher than the 2008 class. This strongly

suggests that the podcasts had a positive effect on the 2009 class and their test results, as the podcasts were the only real difference in terms of classroom delivery.

The class average on the chapter 6 test was 61.4% in 2008, while in 2009; the class average grade was 76.2%, an average that was 14.8% higher than the 2008 class. This strongly suggests that the podcasts had a positive effect on the 2009 class and their test results, as the podcasts were the only real difference in terms of classroom delivery.

Using the CST class as an indicator, we concluded that weekly podcast summaries may increase mean scores when compared against previous classes taught using the same course content and same teachers. Question H1 is plausible based on the results that were produced but unproven due to the small number of participants in this study.

### **Discussion, Implications and Conclusions**

Our research essentially asked: Are podcasts designed to summarize the salient points from a week of learning useful in improving fact retention, topic comprehension, and attitude towards learning amongst students at this College? Using a combination of questionnaires to gather quantitative data and interviews to gather personal perspectives, we collected data to find out how both teachers and students felt about the use of weekly summary podcasts as a review tool. The interviews followed a script but, as answers lead to more questions, there were times where the interviews were less rigid, open-ended and free flowing as the participants took the interview to new places outside the interview script. This was the plan from the start—a semi structured interview allowed for the collection of more and different data than a survey instrument and the flexibility enabled the interviewer to explore ideas that may not otherwise have been examined.

The excitement noted and observed indicated that students and teachers strongly supported the use of these podcasts as an effective learning tool at the college level. In support of this statement, this study unearthed a number of interesting discoveries.

The students in our study found benefits in the use of weekly summary podcasts, both in terms of their impressions of the values of the podcasts and in terms of their grades. While the 'weaker' students whose final grades were lower, showed the greatest improvement in their marks on the podcast-affected tests, all students voiced the opinion that the podcasts were useful and helped them in their studies. Based on interview feedback, this improvement was likely due to the ability to repeatedly play back lesson materials. Also this process may have assisted visually oriented learners or students with learning difficulties, such as dyslexia, or who experience other problems using written materials such as books and text-based websites.

Students in the study found the weekly podcast summaries useful when preparing for tests. A number of students specifically mentioned that the podcasts supported their personal learning styles, which explains why they found them helpful in test preparation. As well, the ability to play them where and when they liked helped them study at a time and location of their choosing, when they were most ready to study.

Additionally, students in our study wanted more classes to incorporate weekly podcast summaries in the course delivery. This finding is a side effect of the other findings; since the students found podcasts useful in the classes from the study; they obviously wanted them in their other classes also.

Teachers in the study believed the weekly podcast summaries helped the students improve their comprehension and achieve better marks. The marks in the two podcast-

affected tests were evidence that helped the teachers reach this conclusion. They also found the students were looking forward to the podcasts and were disappointed when the study ended.

Surprisingly, teachers also found that preparing for the podcasts helped them prepare for classroom delivery and the dollar cost to do this was minimal. Although the study was originally designed to examine how the podcasts would affect the students, it was interesting to see that the teachers also found that they derived benefits in preparing their podcasts each week. They believed the podcasts helped them be more organized in their approach to these lessons and helped them create better lessons.

Interestingly, but not unexpectedly, this study also provided support for earlier studies. For instance, the students in this study enjoyed the flexibility that podcasts provided in terms of the 'when, where, and how' of student access, which supported the work of Lee and Tynan (2008), whose students "perceived listening as a learning task best performed within a designated study location, usually at home" (p. 97). Lyles et al. (2007) added that students found "podcasts made it easier for me to tackle the material after class" (p. 460).

As well, the students in this study did not really find mp3 players handy, as opposed to downloading the podcasts on their home computers, which supported the earlier findings of Lee and Tynan (2008), who stated; students "found it cumbersome to transfer the podcasts to portable players" (p. 97). Having said that, if we made a pronounced effort to publish the podcasts through a subscription service (e.g., iTunes, RSS), more students may have used their mp3 players, as one of my students indicated this may have been of interest. This is an area for future research.

Additionally, some of the interviews for this study showed that the podcasts supported students with different learning styles. This supported previous findings by Rosell-Aguilar (2007), who stated how “hearing has a number of advantages, which include being instinctual... gets around issues such as illiteracy and dyslexia... and listening and learning go hand in hand” (p. 480). Sloan (2005) suggested podcasting helps “students with reading and/or learning disabilities” and assists “remediation of slower learners” (slide 12). Students enjoyed the ability to play the podcasts repeatedly, to pause them and to rewind them for review purposes, which supported the work of Fothergill (2008) who found that his subjects enjoyed being able to play parts repeatedly, pause, rewind, and jump to specific sections as needed. The students interviewed by Lyles et al. (2007) also stated: “Podcasts also allowed me to stop and replay any sections I found particularly difficult” (p. 460).

Participants in the study found that the podcasts improved both their results and their feelings (attitudes) about their learning. This supported the work of Mount and Chambers (2008) who found that “podcasting improves learner cognition” (p. 56). Lyles et al. (2007) also had students who said things such as “the availability of the audio podcasts and lecture notes fit my personal learning style” (p. 461) and “I was able to process the information without feeling rushed like I would have if I was in the classroom” (p. 460). These comments were very similar to comments received from the students in this inquiry.

Students felt better prepared for tests when they used the podcasts and the podcasts helped the students be more focused on their review for tests. This supported the findings of Lee and Tynan (2008), who had one student that said: “I used to spend more time reading and wasting time figuring out the key areas of the subjects when I really needed someone to give me an overview top put all the reading in context” (p. 100). The fact that the podcasts

were focused on the most important points from a week of learning certainly helped the students focus their study efforts on these critical points.

There were also a number of new ideas expressed by the participants, many of which could be good ideas for future research. One student proposed that we should use the podcasts for classroom reminders/announcements (e.g., when the next test will be, explain how tests will be evaluated, what format a future test will use, etc.). This could be used in support of classroom notes being given, as some students are 'not good note-takers.' Another new idea for research came from the student who indicated that he would like to use the podcasts in a similar fashion for class assignments, where the answers could be demonstrated in podcast format instead of just handing back a paper with a mark on it. Some of the students also suggested that we should provide more detailed review podcasts that covered more material. There has been some research into this model already but perhaps a hybrid model of weekly short summaries and longer midterm or final exam summaries could be explored.

For our young, technologically savvy students podcasts may have improved attitudes towards their studies and the use of podcasts may have helped the students ease into tests when they used podcasts to prepare for the tests, but the data in these cases were inconclusive. As well, the teachers in the study viewed weekly podcast summaries as being helpful to student success, but a new study involving more teachers is needed for this conclusion to be generalizable. Also, it remained unclear post-study if the students viewed weekly podcasts as a replacement for attending regular classes, as there was a split in opinion on this topic amongst the participants. These are all areas where more research is needed.

There were some limitations and problems. Mortality, especially amongst female students, played a large role in limiting our ability to draw conclusions that could apply to a wider audience. Future studies will need to attend to the four themes that emerged from students who dropped out: (a) I Forgot, (b) Skills Shortage, (c) Lack of Time, and (d) Saw No Need. It is important, especially in the early stages of the research, that the research team puts in additional effort to ensure the students know how to use the podcasts and that the students recognize and understand the values they can gain from using the podcasts. A friendly reminder each week when the podcasts are available would be useful. It is also important to remind participants that the time outlay is minimal and the potential value of the podcasts on their achievement is important.

It also would have been interesting to draw conclusions/correlations about any differences between 'Trades' students and non-Trades students, older and younger students, and to draw conclusions about gender differences. A small study population prevented any conclusive (quantitative) discoveries in this regard; therefore we recommend that future research target these populations via significantly large samples.

Although all the teachers in the study were supporters of podcasting once they had the experience of using the podcasts for their classes, they all saw the value for their students, and they discovered unexpected benefits in their teaching, there was also an underlying concern expressed about the possible workload the podcasts could cause for teachers in their course development. A larger study is needed in order to more fully engage teachers and uncover how the use of weekly podcasts could affect their work.

One of the questions not answered to our satisfaction was the question of whether students would view weekly podcast summaries as a replacement for attending class. This is

a question that could have great importance on student results in the future and will impact the instructional prompts given to students at beginning of the study regarding that nature and purpose of the podcasts. Our experience as educators suggests that there is a direct link between classroom attendance and achievement. If the podcasts were used as a classroom replacement it could lead to lower student achievement therefore we recommend more research into this question.

With respect to the implications for teaching, we believe firmly that we need to get more tools, like podcasts, into our curriculum, specifically as it relates to adult learners. As the student populations in our schools change and evolve, our methods must also evolve to suit the change. Students in this study appreciated technology in their everyday lives and their immediate adoption of the podcasts as a useful tool in their learning demonstrated one way in which we can use technology to help college students learn. The time cost for the teachers was minimal and the benefits to the students, both real and perceived, were valued by the students and helped them achieve better outcomes (scores) on their tests while changing attitudes.

The following conclusions can be drawn concerning weekly podcast summaries as they affected the participants in this study.

1. Students found weekly podcast summaries improved their comprehension of the topics covered by the podcasts.
2. Students found the weekly podcast summaries useful when preparing for tests.
3. Students wanted more classes to incorporate weekly podcast summaries in the course delivery.

4. Students enjoyed the flexibility of 'anytime/anyplace' access to the podcasts, so they could study at a time and location of their choosing.
5. Students liked being able to rewind/replay podcasts as many times as necessary, so they could take notes at their own pace and learn at their own pace.
6. Teachers believed the weekly podcast summaries helped students improve their comprehension and achieve better marks (test scores).
7. Students believed the podcast summaries improved their score (achievement).
8. Teachers found that preparing for the podcasts helped them prepare for classroom instruction.

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