

Evaluating students' perceptions of the usefulness of podcasts

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Abstract

Objectives: To compare pharmacy students' confidence in understanding course material before and after listening to course podcasts; (2) determine whether course content affects pharmacy students' perceptions on podcasts' usefulness; and (3) evaluate English First Language vs. English Second Language speakers' attitudes on podcasts.

Methods: First and second year pharmacy students (n=314) who attended a Clinical or Research Methods course in 2012 and 2013 completed pre- and post-test surveys to assess study objectives.

Results: Students had more confidence understanding course topics after listening to the podcasts ($p < 0.05$). Significant differences were observed in clinical vs. non-clinical courses. The majority of students across courses agreed or strongly agreed that podcasts were a useful learning tool (91.2% and 92.3% Research and Clinical course, respectively) and promoted understanding of course material (89.3% and 93.9%). There were no statistically significant differences in perceptions among English First Language and English Second Language speakers ($p > 0.05$).

Conclusion: Podcasts are beneficial to a majority of pharmacy students, despite language barriers.

Keywords: Podcasts, Clinical Pharmacy Course, Pharmacy Research Course, Language

Introduction

Podcasts are audio recordings of information available for others to access and download through the internet. These recordings can then be played on a computer or other portable media players (e.g. smartphones or MP3 players). This method of technology has been suggested to be the next tool used to revolutionise educating students (Clauson & Vidal, 2008; Pilarski *et al.*, 2008).

Students utilise this technology to help learn new material and review material that has already been presented. A 2008 study by Pilarski *et al.* (2008) revealed that as many as 92% of students utilised podcasts to review course material in preparation for an examination. Evidence suggests that students are not only accessing podcasts for exam preparation, but many students are using them to review unclear topics or to listen to a missed lecture. One study found that students who accessed podcasts, were only listening to them during designated study time and were listening to them at one and one-half or two times faster than normal speech (Allen & Katz, 2011).

The advantages of podcasts have been documented in the literature (Meade, Bowskill, & Lymn, 2001; Boulos *et al.*, 2006; Rainsbury & McDonnell, 2006; Nast *et al.*, 2009). Students have stated they like this learning format because it enabled them to stop, rewind, and review the information that is being presented (Pilarsky *et al.*, 2008; Shantikumar, 2008; Kardong-Edgren & Emerson, 2010).

Additionally, by having lecture recordings students reported that it helped them learn the course material and reduce the stress and anxiety of taking notes during lectures (Rainsbury & McDonnell, 2006). Several studies have also examined podcast use and course grades (McKinney & Page, 2009; Vogt *et al.*, 2010).

Various reports in the literature have shown either a positive or negative relationship between the use of podcasts and student course grades (Heilesen, 2010; Kardong-Edgren & Emerson, 2010; Abdous *et al.*, 2012). Schreiber *et al.* (2010) analysed the impact of podcasts on course grades by randomising 100 undergraduate medical students to listen to a live lecture versus a video podcast for one clinical topic (Schreiber *et al.*, 2010). The groups were then switched for a second clinical topic. The same faculty member presented the live lecture and recorded the podcast and the script for the video podcast was identical to the live lecture to reduce the chance of the topic being presented differently to the groups. A multiple-choice examination was given at the conclusion of each topic to determine knowledge retention. Researchers found that there was no statistically significant difference in the retention of knowledge between the two formats ($p > 0.05$). However, upon questioning, the students commented that they enjoyed having podcasts available in order to review the lecture material, but found it less engaging than the live lectures (Schreiber *et al.*, 2010).

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Although studies have been conducted with regard to medical students' use of video recorded lectures, currently, there is limited available literature on pharmacy students' perceptions of podcast use. Furthermore, the literature suggests that international students whose first language is not English may have more difficulties understanding course material compared to their home English speaking peers due to language barriers (Gil & Bardack, 2010). The evidence is lacking in regard to student podcast perceptions based on language. The objective of this study was to compare pharmacy students' confidence in understanding course material before and after listening to course podcasts; (2) determine whether course content, clinical vs. non-clinical, significantly affects students' perceptions on the usefulness of podcasts; and (3) evaluate English First Language vs. English Second Language speakers' attitudes on podcast usefulness.

Methods

This study utilised a pre-test/post-test study design to compare participant groups to examine usefulness of providing podcasts to enhance learning. Participants were first year pharmacy students who took the Research Design and Literature Evaluation course (n=157) and second year pharmacy students who took the Cardiovascular/Renal Disorders course (n=157) between Autumn 2012 and Spring 2013, respectively. Pre-test surveys were distributed and collected on the first day of the course while post-test surveys were distributed and collected on the final day of the course. This study was approved by the Mercer University Institutional Review Board.

Course information

Lectures from the Research Design and Literature Evaluation and Cardiovascular/Renal Disorders I courses were recorded using the Computer Response System (CRS) and Debut Video Capture software. Podcasts were made available shortly after the live lecture for both courses. Additional podcasts were recorded to reflect the assigned reading chapters for the Research Design and Literature Evaluation course. These podcasts were created and edited using the software 'Audacity' and were no longer than ten minutes each. All podcasts were uploaded onto Mercer University's integrated learning platform Moodle. Moodle is a tool that allows faculty to add resources for students to access online, such as slides, supplemental lecture materials and exams. Utilisation of the podcasts was tracked through Moodle. By clicking on a link on Moodle, students were able to stream podcasts directly or download them onto an MP3 player. The concept of podcasts and information on where to find the podcasts was explained to all students on the first day of the class. Listening to podcasts in each course was optional, but use was encouraged.

Survey instrument

The survey instrument included questions about participant demographics, language preferences, students' perception of podcast usefulness, and students' confidence of knowledge of course material before and after podcast use (1=not confident, 2=limited confidence, 3=confident, and 4=very confident). Podcast effectiveness was assessed using a 4-point Likert-type scale (1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree). The same survey instrument was administered to students in both courses with the exception of changes made in the list of course topics (Appendix A).

Data were analysed using descriptive statistics. An *a priori* level of $\alpha=0.05$ was used to determine statistical significance. Using SPSS 22.0 independent samples *t*-test and Mann Whitney were conducted as appropriate to determine whether there were statistically significant differences between the two groups.

Results

Student demographics

Of a total of 157 first year pharmacy students (Research Design and Literature Evaluation course) and 157 second year pharmacy students (Cardiovascular/Renal Diseases I course), response rates were 73% and 86%, respectively, for pre-course surveys. Post-course survey response rates were 76% and 52%. Overall, first and second year pharmacy students shared similar demographic characteristics. A majority of students (over 85%) were between age 20 and 30, 80% had a degree and more than half of the students worked in a pharmacy for 0-5 years. Sixty percent of each class population was female. Over one-third of the class was Caucasian, one-fourth Asian, and another one-fourth African American. Approximately one-fourth of each class identified themselves as English Second Language speakers and one-third of each class communicated primarily in Korean or Vietnamese at home. Over 90% of each class had spent more than five years in the United States (US) (See Table I)

Student confidence

Findings revealed that students' confidence increased at the end of the courses compared to at the beginning ($p<0.05$). While these findings may have resulted based on class attendance, in the Research Design and Literature Evaluation course, the mean score of student confidence in the topics taught ranged from 2.2 to 2.45 at the beginning of the classes (1=not confident, 2=limited confidence, 3=confident, and 4=very confident). However, the mean score of their confidence at the conclusion of the course ranged from 2.97 to 3.2 ($p<0.05$). In the Cardiovascular/Renal Disorders I course, pre-course mean scores ranged from 1.77 to 2.52, while post-course mean scores were between 3.18 and 3.58 ($p<0.05$).

Table I: Demographic pre course data for participating pharmacy students (n=249)

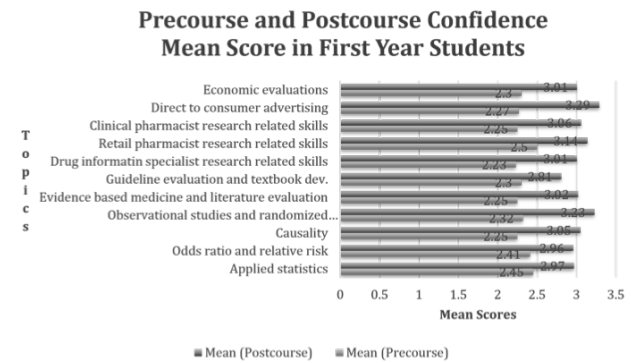
Characteristics	1 st Year	2 nd Year
	Pharmacy Students Research Course n=114 No. (%)	Pharmacy Students Cardiovascular Course n=135 No. (%)
Age		
20-30	106 (93%)	117 (87%)
Other	8 (7%)	18 (13%)
Gender		
Female	72 (63%)	88 (65%)
Male	42 (37%)	47 (35%)
Race		
Caucasian	45 (40%)	71 (53%)
Asian	36 (32%)	32 (24%)
African American	28 (25%)	19 (14%)
Other	4 (3%)	12 (9%)
Students with a prior Degree	91 (80%)	103 (77%)
Work experience in pharmacy		
Less than 5 years	101 (89%)	110 (82%)
Other	13 (11%)	25 (18%)
Prior experience with podcasts		
Yes	59 (52%)	98 (73%)
No	55 (48%)	37 (27%)
English as first language*		
Yes	86 (75%)	102 (76%)
No	28 (25%)	33 (24%)
Time living in the US		
More than 5 years	108 (95%)	127 (94%)
Less than 5 years	6 (5%)	8 (6%)
Language spoken at home		
English	75 (66%)	98 (73%)
Other than English	39 (34%)	37 (27%)

*Students who responded "yes" to English as a first language were considered "English First Language speakers;" those who responded "no" were considered "English Second Language speakers."

Clinical versus non-clinical courses

With regard to comparisons among clinical and non-clinical courses, changes in perceptions on students' understanding of course topics (see Figures 1 & 2), as well as changes in students' perceptions on podcast usefulness, were statistically significant. Specifically, students in the clinical course were more likely to agree that podcasts supplemented lectures, increased confidence with course material, helped prepare for exams, helped with missed concepts and that they did better on exams after using podcasts ($p<0.05$) (see Table II). Nevertheless, students from both courses shared the same opinion that podcasts were a useful learning tool, promoted understanding of course material, encouraged learning, and facilitated note-taking at their own pace ($p>0.05$). Students in both courses also reported that they used podcasts for exam preparation and would recommend podcasts to other students ($p>0.05$).

Figure 1: Students' Pre-course and Post-course Perceptions on their Understanding of Non-clinical Course Topics (n=202)



$p<0.05$ for ALL

Table II: Student Perceptions on Podcast Usefulness Based on Clinical vs. Non-Clinical Courses (n=202)

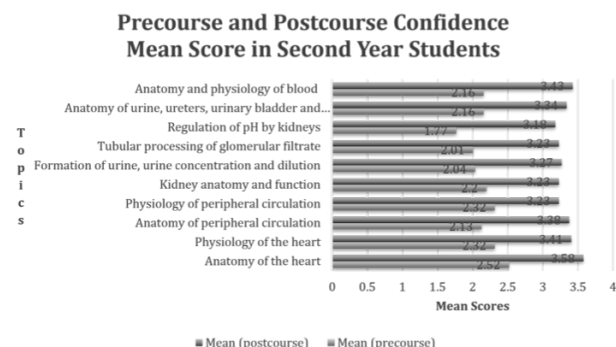
Questions on Student Perception of Podcast Usefulness	Post-course Mean Scores in Non-Clinical Course* (+/- SD)	Post-course Mean Score in Clinical Course* (+/- SD)	p-value
Podcasts supplement lectures	3.28 (+/- 0.686)	3.47 (+/- 0.661)	0.04
Podcasts increase confidence in my understanding of course material	3.33 (+/- 0.774)	3.54 (+/- 0.551)	0.03
Podcasts prepare for exams	3.31 (+/- 0.708)	3.61 (+/- 0.613)	0.003
Podcasts help with missed concepts during live lectures	3.34 (+/- 0.728)	3.62 (+/- 0.689)	0.002
The podcast topics were interesting and informative	2.97 (+/- 0.664)	3.23 (+/- 0.701)	0.012
I generally used podcasts when referring to lecture handouts	3.24 (+/- 0.794)	3.61 (+/- 0.569)	0.0002
I did better on exams by using podcasts than without using them	3.08 (+/- 0.747)	3.36 (+/- 0.806)	0.006

*The Non-clinical Course was identified as the Research Course and the Clinical Course was identified as the Cardiovascular and Renal Diseases Course.

English First Language vs. English Second Language speaking

Comparisons of English First Language vs. English Second Language speaking students' perception on podcast usefulness showed similar results. When evaluating students in the Research Design and Literature Evaluation course both English First Language and English Second Language speaking students agreed that podcasts were useful, and there was no statistically significant difference in their responses based on language ($p>0.05$) (see Table III and IV).

Figure 2: Students’ Pre-course vs Post-course Perceptions on their Understanding of Clinical course topics (n=202)



p<0.05 for ALL

Table III: Comparing English First Language vs. English Second Language Speakers Student Perception of Podcast Usefulness in a First Year Research Course (n=202)

Post-course Questions on Student Perception of Podcast Usefulness	Mean Scores for English First Language Speakers	Mean Scores for English Second Language Speakers	p-value
Podcasts encourage learning	3.11	3.33	0.916
Podcasts helped with missed concepts	3.46	3.48	0.913
Podcasts promoted understanding of course material	3.25	3.33	0.616
Podcasts were a useful learning tool	3.25	3.33	0.577
Podcasts helped prepare for exams	3.36	3.26	0.534

Table IV: Post Course Comparisons English First Language vs. English Second Language Speaking Student Perception of Podcast Usefulness in a Second Year Cardiovascular and Renal Diseases Course (n=202)

Post-course Questions on Student Perception of Podcast Usefulness	Mean Scores for English First Language Speakers	Mean Scores for English Second Language Speakers	p-value
Podcasts encourage learning	3.27	3.28	0.915
Podcasts helped with missed concepts	3.61	3.44	0.163
Podcasts promoted understanding of course material	3.42	3.28	0.360
Podcasts were a useful learning tool	3.37	3.31	0.690
Podcasts helped prepare for	3.45	3.28	0.187

Discussion

The use of podcasts in graduate education has been studied quite extensively recently due to increased popularity and primarily positive feedback from users (Chan & Lee, 2005; Miller & Piller, 2005; Baird & Fisher, 2006; Dale, 2007; Shantikumar, 2008; Vogt *et al.*, 2010). This study revealed results that were similar to the published literature based on students’ acknowledgement of podcasts usefulness in allowing flexibility in accessing course material, being able to re-listen to lectures, clarification of issues or questions, and ability to review for exams (Scutter *et al.*, 2010). Additionally, podcasts have been shown to be useful in other ways such as facilitating note taking at a student’s own pace, allowing students to get access to class lectures more than just once, and helping with missed concepts. These results align with several studies previously conducted, both within Doctor of Pharmacy curricula and in other disciplines (Cain & Fox 2009; Westrick *et al.*, 2009).

While this study concluded that students’ confidence in class material increased after using podcasts, it cannot be concluded that recorded lectures are the sole explanation for such increased confidence. In fact, in one previously published article, findings revealed that hybrid courses which offer both live and recorded lectures were most preferred by students (Rochestor & Pradel, 2008). It should be noted that both first and second year students in this study were exposed to live lectures as well as recorded files throughout the duration of the study. While literature to support the value of using podcasts exists, there is no empirical research exploring the use of podcasts within pharmacy programmes. Two posters were identified which highlighted the usefulness of podcasts in pharmacy education, but the findings were only presented and not published (Bonnarens *et al.*, 2007 DiVall *et al.*, 2008).

One of the unique characteristics of this study is that differences in student perception of podcast usefulness were explored between students who consider themselves as having English as their first language and those who do not. Results of this study revealed non-significant findings when comparing pharmacy students based on home language. On the other hand, all students including those who indicated English as a second language agreed that podcasts were a useful learning tool.

Recent studies conducted by Zhang *et al* and Cheng *et al.* mention that tape-recording lectures is one of the strategies employed by international students to increase lecture comprehension (Cheng *et al.*, 2004; Zhang *et al.*, 2006). Furthermore, faculty at the University of Calabria in Italy noted English fluency as a crucial requirement for student success (Felice & Sturino, 2002). Findings from this study reflect podcast usefulness, yet the reporting of non-significant findings based on language is inconsistent with the literature. The lack of differences based on language may be a result of the small sample size or perhaps the extent of language barriers. Approximately one fourth of the pharmacy class was represented by English Second Language speakers

(28/114 Research Course and 33/135 Cardiovascular Course). Furthermore, students who indicated English as a second language had lived in the US for at least three years.

Limitations

One limitation of this study is that an examination of the relationship between podcast use and course grades was not explored. A 2010 study by Vogt and colleagues found that students who used podcasts throughout a course reported lower examination grades with each consecutive examination (Vogt *et al.*, 2010). In this study, researchers examined the use of podcasts over a semester and the potential correlation with examination grades. Students from two different classes (the 2007 and 2008 graduating class), were presented with a clinical topic, one provided from a live lecture and the other provided through a podcast. Findings revealed that there were no statistically significant differences in exam responses between the two groups. However, students expressed a positive experience with the podcasts and were satisfied with the flexibility and portability of them ($p>0.05$) (Vogt *et al.*, 2010). While this study did not support a benefit of podcast use to course exam grades, several studies have shown that students consistently report positive interest and preference for podcast provision as a supplement to course lectures (Bollmeier *et al.*, 2010). Other limitations of this study include that it was conducted at a single school and for students in a single class year. There was no control group that did not have access to the podcasts. Students' answers to the survey could have been influenced by their familiarity with the class lecture content as well as podcasts. Lastly, students self-reported their perceptions of increased confidence and there is no objective measurement of improvement in knowledge or understanding.

Conclusions

Podcasts have the potential to be a valuable learning resource for students in clinical and non-clinical courses. Additionally, podcasts were perceived as beneficial to most students regardless of their language background. Although additional research is needed to determine if podcast use positively affects students' performance, pharmacy educators should consider the use of podcasts to supplement classroom lectures.

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Appendix A: Survey Instrument Evaluating Students' Perceptions of the Usefulness of Podcasts in a Second Year Cardiovascular and Renal Diseases Course

Part I.

1. Age (years)
 - <20
 - 20-25
 - 26-30
 - 31-35
 - 36-40
 - 41-45
 - 46-50
 - 51-55
 - 56-60
 - 60 or older
2. Gender
 - Female
 - Male
3. Marital Status
 - Single
 - Married
4. Ethnicity
 - African-American
 - Asian
 - Caucasian
 - Latino
 - Other
5. Do you have a degree?
 - Yes
 - No
6. If you answered yes to the previous question, please indicate the name of your degree(s) in the space below:
7. How many total years have you worked in a pharmacy environment?
 - 0-5 years
 - 6-10 years
 - 11-20 years
 - 20 years or more
8. Do you have access to a computer with Internet resources?
 - Yes
 - No
9. Do you own or have access to an MP3 player?
 - Yes
 - No
10. What percentage of your time is spent using technology (e.g. internet, smartphone, ipod)?
 - 0-20%
 - 21-40%
 - 41-60%
 - 61-80%
 - 80-100%

11. How do you manage your downloads?
 iTunes
 Zune
 Juice
 Micro
 Other
12. Do you have any prior experience with podcast use on this or any other site?
 Yes
 No
13. What is your preferred way to listen to podcasts? (Check all that apply)
 On my mp3 / mp4 player
 Home
 Work
 Commute
 While Exercising
 Other

Part II.

14. Is your first language English?
 Yes
 No
15. If you answered no to the last question, what is your first language?
16. How long have you been living in the United States?
 1-2 years
 3-5 years
 Greater than 5 years
17. Are you an international student with a foreign passport?
 Yes
 No
18. Are you a foreign born permanent resident?
 Yes
 No
19. Are you a foreign born American citizen?
 Yes
 No
20. Did you have to take the Test of English as a Foreign Language (TOEFL/IELTS, etc.) when applying to Mercer?
 Yes. If Yes, what test, and please list your score if remembered: _____
 No
21. What do you consider as your parents' first language?
 English
 Other

22. What language do you primarily communicate at home?
 English
 Other (please explain): _____
23. What English skills do you think you need the most practice in?
 Speaking
 Listening
 Writing
 Reading
 Please Explain
24. What English skills do you think are most important to succeed academically at Mercer?
 Speaking
 Listening
 Writing
 Reading
 Please Explain

Part III.

Please respond to the statements below by indicating whether you Strongly Agree, Agree, Disagree or Strongly Disagree with each statement.

	Strongly Agree	Agree	Disagree	Strongly Disagree
I am comfortable with using internet-based technology.				
I feel that podcasts are useful as a learning tool.				
I feel that podcasts should be used as a supplement to lecturing in the classroom.				
I feel that use of podcasts promotes understanding of course materials.				
I feel that listening to the course provided podcasts will encourage my responsibility for learning.				
I feel that listening to the course provided podcasts will increase my confidence in my understanding of lectures.				
I feel that listening to the course provided podcasts will help me to prepare for exams.				
I feel that listening to the course provided podcasts will facilitate note taking at my own pace.				
I feel that listening to the course provided podcasts will help me with concepts that I missed during live lectures.				
I feel that listening to the course provided podcasts will improve my class attendance.				

Please review the topics below and indicate your current confidence level in the mastery of each topic:

Topic	Very Confident	Confident	Limited Confidence	Not Confident
Anatomy of the heart				
Physiology of the heart				
Analogy of the peripheral circulation				
Physiology of the peripheral circulation				
Kidney anatomy and function				
Formation of urine; urine concentration and dilution				
Tubular processing of glomerulate filtrate				
Regulation of pH by the kidneys				
Anatomy of urine, ureters, urinary bladder and urethra				
Anatomy and physiology of blood				

25. Do you have any further feedback about the use of podcasts that has not been explored in this questionnaire?