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# The Use of Podcast as a Teaching Tool for a Pharmacy Compounding Pre-Laboratory Lecture: A Survey Based Study

Lara Kratochwill

*St. John Fisher College, lnk07541@students.sjfc.edu*

Elise Almagambetova

*St. John Fisher College, emb01556@students.sjfc.edu*

Anthony Corigliano

*St. John Fisher College, acorigliano@sjfc.edu*

Christine R. Birnie PhD

*St. John Fisher College, cbirnie@sjfc.edu*

Lipika Chablani

*St. John Fisher College, lchablani@sjfc.edu*

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**Methods:** Second year pharmacy students were asked to view a podcast prior to their laboratory section as a replacement to an in-class pre-laboratory lecture. A voluntary survey was administered to obtain student feedback regarding the usefulness of podcasts and preferences for its use in future.

**Results:** A total of 192 out of 232 students responded to the survey conducted during 2011, 2012 and 2013. Of these, 94% of respondents reported viewing entire/ parts of the podcast. Total of 44% viewed it multiple times. Of the students who watched the podcast, 91% reported it was an effective learning tool, and 47% suggested podcasts should be used as a replacement to traditional, in-class lectures.

**Conclusions:** Students responded positively and preferred the podcast as either a replacement or as a supplement to traditional in-class lecture.

## **Keywords**

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## **Disciplines**

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# The use of podcast as a teaching tool for a pharmacy compounding pre-laboratory lecture: A survey based study

LARA KRATOCHWILL, ELISE ALMAGAMBETOVA, ANTHONY CORIGLIANO, CHRISTINE BIRNIE & LIPIKA CHABLANI\*

St. John Fisher College, Wegmans School of Pharmacy, Rochester, New York 14618, USA

## Abstract

**Objective:** To determine the opinions of pharmacy students towards use of podcast as a replacement to a traditional pre-laboratory lecture for a compounding course.

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**Conclusions:** Students responded positively and preferred the podcast as either a replacement or as a supplement to traditional in-class lecture.

**Keywords:** e-Lecture, Pharmaceutical Compounding, Pre-Laboratory, Podcast, Teaching Tool

## Introduction

A podcast is an audio/visual electronic file that can be distributed through the internet and viewed on a computer or other portable media devices, such as a smart phone, iPod or MP3 player (Rainsbury & McDonnell, 2006; Jham *et al.*, 2008). Podcasts are versatile technology tools since they can allow their audience the flexibility of time, location, and mode of viewing (Jham *et al.*, 2008). Also, they can be downloaded and saved for future reference.

All these benefits make podcasts a useful teaching tool as they are now being incorporated into the educational setting. They can act as a tool to enhance learning from both auditory and visual perspectives and can be used as either a replacement to traditional lectures or as a supplement to concepts that are learned during face-to-face lectures (Matava *et al.*, 2013; Mostyn *et al.*, 2013). Students can watch podcasts for multiple reasons, including reviewing a lecture, preparing for an exam, or to make up for a missed lecture (Meade *et al.*, 2011). The podcast technology allows students to view lectures or seminars to enhance their existing knowledge or to build further comprehension of a new or complex concept (Meade *et al.*, 2011).

There are numerous advantages of incorporating podcasts into academic curriculum. The primary advantage is that their design allows students to watch them on demand, *i.e.* they can be viewed at a time and location that is

convenient for each student (Jham *et al.*, 2008). The design also gives the viewer the ability to control their learning by managing the pace of the podcasts and having the ability to stop and replay sections (Meade *et al.*, 2011). Also, podcasts have a relatively low production cost and are typically easy to use (Jham *et al.*, 2008; Matava *et al.*, 2013). They can be easily shared as a web link through the learning management systems such as Blackboard and Moodle™. This provides further flexibility to the instructor and the students, thus enhancing learning experience.

Along with several advantages, this technology has its own drawbacks. A major disadvantage to utilising podcasts as a learning tool is the lack of live interaction that usually occurs in a classroom setting. While viewing a podcast, students are unable to ask questions and receive immediate feedback from the professor or other students. This is a concern when podcasts are used as a replacement to traditional lectures as opposed to a supplement. There are also technical barriers to the use of a podcast (Jham *et al.*, 2008). Viewers may have difficulties accessing or locating the podcast through the internet (Jham *et al.*, 2008; Meade *et al.*, 2011). Such logistic issues may be experienced with the use of podcasts, but they can be resolved if addressed adequately and timely.

\*Correspondence: Dr. Lipika Chablani, Department of Pharmaceutical Sciences, Wegmans School of Pharmacy, St. John Fisher College, Rochester, New York 14618, USA. Tel: +1 585 8993714; Fax: +1 585 3855295. Email: lchablani@sjfc.edu

Reports of using podcasts in healthcare education have demonstrated positive results. Students believe podcasts have the ability to enhance their learning experience and are a useful learning tool (Boulos *et al.*, 2006; Santoro, 2007; Cain & Fox, 2009; Greenfield, 2011; Meade *et al.*, 2011; DiVall *et al.*, 2013; Mostyn *et al.*, 2013; Rivkin & Gim, 2013). Faculty members and administrators have also expressed their opinion that this technology has a positive impact on student learning. (DiVall *et al.*, 2013) This strengthens the drive towards use of such technology tools for improved learning outcomes.

Inspired by the use of podcast as a learning tool, this survey based study was designed to evaluate its use in pharmacy school. The study objective was to evaluate the use of podcast based on:

1. Duration and frequency of viewing
2. Impact on learning
3. Preferences for future use and incorporation into the course

The study also compares student opinions for three consecutive years regarding the use of podcasts as a replacement to traditional pre-laboratory lecture for the compounding laboratory course.

## Methods

A podcast was used as a replacement to an in-class pre-laboratory lecture for a second year pharmacy compounding course. Students were asked to view the podcast to prepare them for the compounding laboratory sessions. Students were surveyed to determine their opinions on the use of a podcast as a replacement to traditional pre-laboratory lectures. This exercise was performed for three consecutive years (2011, 2012 and 2013) by second year pharmacy students at Wegmans School of Pharmacy, St. John Fisher College, Rochester, New York. This study was reviewed and granted exempt status by the St. John Fisher College Institutional Review Board.

### Survey Design, Distribution and Collection

During the first year of this study, a paper survey was created and executed. In the second year, an electronic survey was created using the online survey tool, Qualtrics® (Qualtrics®, Provo, UT), at [www.qualtrics.com](http://www.qualtrics.com) by adapting questions used in the original paper survey. In an attempt to achieve a higher student response rate, a paper survey containing the same questions as the Qualtrics® survey was distributed for the third year of this study.

A total of eight survey questions were asked including seven Likert-like and one open ended question to provide students an opportunity to express their views or to address any concerns.

The sample size consisted of all second year pharmacy students at St. John Fisher College who were enrolled in the PHAR 4112 Applied Pharmaceutics Compounding

laboratory course, for the academic years of 2011, 2012, and 2013 (a total of 232 students). During 2011 and 2013, paper surveys were given to the students during their regular laboratory sessions. In 2012 Qualtrics® survey was sent as an email which contained the link to the survey. The survey was voluntary and students were strongly encouraged to participate. Lack of participation did not negatively impact their evaluation in the course. All survey responses were kept anonymous. Responses from the paper surveys and the Qualtrics® survey were compiled and were subjected to data analysis.

### Data Analysis

Student feedback was analysed regarding the usefulness of podcasts and their preferences for its use in the same course in the future. Data analysis was performed using Prism statistical software (GraphPad Software®, San Diego, CA). Three year data was compared using one-way Analysis of Variance (ANOVA). A post hoc Tukey test was performed to analyse the difference between the student responses each year. A *p*-value of less than 0.05 was considered statistically significant.

## Results

### Demographics

A total of 232 students were enrolled in the course for the years 2011, 2012 and 2013. In 2011, there were 78 students enrolled in the course, and 59 students completed the survey. In 2012, 79 students were enrolled, and 65 students completed the survey. Consequently in 2013, 75 students were enrolled and 68 students completed the survey. A total of 192 students participated in the survey over the three years the podcast was utilised (83% response rate).

### Podcast Use

Of the 192 students who participated in the survey, 94% watched all or part of the podcast (181/192) and 6% did not watch the podcast at all (11/192). Ninety-two percent (54/59) of students watched the podcast in 2011, 97% (63/65) watched the podcast in 2012, and 94% (64/68) watched the podcast in 2013. An average of 86% of the podcast was watched over the course of this study. The average amount of the podcast that was viewed was 79%, 86%, and 92% for 2011, 2012, and 2013, respectively. Approximately half of the respondents (54%) reported viewing the podcast only once. A total of 84 students over the three years reported watching all or parts of the podcast more than once: 9 students (17%) in 2011, 38 students (60%) in 2012, and 37 students (58%) in 2013.

### Perceptions of the podcast

The majority of students (91%) reported that the podcast was an effective learning tool for a compounding pre-laboratory lecture (ANOVA, *p* < 0.001). Fifty-four students (92%) in 2011, 62 students (95%) in 2012, and

64 students (85%) in 2013 all reported that they felt the podcast was an effective learning tool, as shown in Table I (ANOVA,  $p < 0.005$ ).

**Table I: Student responses to the survey question determining the efficacy of podcasts as learning tools (ANOVA, \* $p < 0.05$ )**

Q4. In your opinion, was the PODCAST an effective learning tool for this exercise?			
	2011 N=59 (%)	2012 N=65 (%)	2013 N=68 (%)
Yes*	54 (92)	62 (95)	64 (94)
No	1 (2)	3 (5)	4 (6)

Twenty-nine percent liked that they could watch the podcast when they wanted to, 8% reported that they could watch it as many times as they wanted, 4% reported that they could watch it where they wanted, and 55% liked all of the above. There was no statistical difference between the responses to what the students liked best about the podcast and between each year. Most of the respondents (47%) would prefer a podcast to be used as a replacement to a formal classroom lecture ( $p < 0.05$ ). Twenty-five percent preferred a podcast to be used as a supplement to an in class lecture and 11% responded that either would be fine. A small number of students (8/192) preferred a podcast not to be used at all in the classroom (Table II).

**Table II: Student responses to the survey question for preferred use of podcasts (ANOVA, \* $p < 0.05$ )**

Q7. Would you prefer a PODCAST to be used:			
	2011 N=59 (%)	2012 N=65 (%)	2013 N=65 (%)
As a replacement to formal classroom lecture*	38 (64)	28 (43)	25 (38)
As a supplement to in class lecture	11 (19)	19 (29)	18 (28)
Not at all	6 (10)	2 (3)	0 (0)
Either is fine with me	-	16 (25)	22 (34)

To determine the use of a podcast in the future for compounding pre-laboratory lectures, students were surveyed if they thought additional podcasts should be included in the course. A total of 144 students (75%) responded that additional podcasts should be used in the course and 38 students (20%) did not want additional podcasts to be used (ANOVA,  $p < 0.005$ ). The percent of students who would have preferred additional podcasts in the course were: 89% in 2011, 79% in 2012, and 72% in 2013. There was no statistical difference found between the years. A comprehensive summary of student responses for the survey is shown in Table III.

**Table III: Responses obtained for podcast survey administered to second year pharmacy students during years 2011, 2012 and 2013 (ANOVA, \* $p < 0.05$ ).**

PODCAST SURVEY QUESTIONS		Respondent N = 192 (%)
Q1. Did you watch the PODCAST?		
Yes	181 (94)	
No	11 (6)	
Q2. What approximate percentage of the PODCAST did you watch?		
		Average: 85.86%
Q3. Did you watch parts of all of the PODCAST more than once?		
Yes	84 (44)	
No	103 (54)	
Q4. In your opinion, was the PODCAST an effective learning tool for this exercise?		
Yes	174* (91)	
No	8 (4)	
Q5. Do you think additional PODCAST's should be included in this course?		
Yes	144* (75)	
No	38 (20)	
Q6. What did you like best about the PODCAST?		
I could watch it when I wanted to	55 (29)	
I could watch it as many times as I wanted to	16 (8)	
I could watch it where I wanted to	8 (4)	
All of the above	105 (55)	
None of the above	0 (0)	
Q7. Would you prefer a PODCAST to be used:		
As a replacement to formal classroom lecture	91* (47)	
As a supplement to in class lecture	48 (25)	
Not at all	8 (4)	
Either is fine with me	22 (11)	
Q8. Comments on the tool or experience:		
"It was quick and effective"		
"It was very helpful to see the work being done and can rewind"		
"If I was confused, I could pause it and rewatch it"		
"I like to have examples- but I don't like that I can't ask questions right away"		
"ECHO would not work on my computer"		

**Discussion**

The majority of students (91%) perceived the podcast to be an effective learning tool for a compounding pre-laboratory lecture. For each year that this study was conducted, students determined the podcast to be an effective learning tool with no statistically significant difference between the observations each year. Each year the podcast was performed by a different individual with new content. In 2011, the podcast was created by a professor and in 2012 and 2013; two Advanced Pharmacy Practice Experience (APPE) students prepared the podcasts respectively. In 2011, the podcast contained information on compounding suppositories and in 2012

and 2013 the podcast was about preservatives and the associated calculations of their usage in liquid dosage forms. Since there was no significant difference in response between the years of this study, it shows that students found the podcast to be an effective learning tool regardless of the content or instructor of the podcast. Students were able to write free text responses in a "Comments" section at the end of the survey. Most of the comments were positive, such as "Good" or "Liked it!". Other comments included information such as "podcast was quick and effective" and "it was easy to follow". On the other hand, a student wrote that they thought the podcast was "somewhat of an effective learning tool," however they did not give an explanation for their comment.

Students appreciated the flexibility of the podcast. It allowed them the opportunity to watch it at their convenience and as often as necessary to learn the material. Apart from the choice "all of the above," the most single selected answer in regards to what students liked the best about the podcast was "they could watch it when they wanted". In addition to that, students liked that they could watch it as many times as they wanted. One student wrote that they enjoyed the "24 hours accessibility" of the podcast. Another student wrote, "If I was confused, I could pause it and re-watch it". The podcast allowed students to be in control of their learning since it could be watched at pace that was conducive to each individual. Students felt the same way about the podcast each consecutive year the survey was conducted.

Podcasts are now being incorporated into the educational setting by serving as a teaching tool to supplement or replace a traditional, face-to-face lecture. When asked their preference on use of a podcast, 47% of students answered that they wanted podcasts to be used as a replacement to a formal lecture. One student even commented that the podcast was "much better than a classroom talk". This could be due to the flexibility and accessibility of the format of a podcast. On the other hand, 5% (8/174) of students who participated in the study did not like the podcast. Podcasts that are used as a replacement to traditional lectures do not allow students the opportunity to ask immediate questions. Four students (2%) commented that was the reason they did not like the podcast.

As stated above, a major disadvantage of podcasts is the lack of live interaction and the ability of students to ask questions. Another disadvantage of podcasts is the technological barrier that can occur. Some students may experience difficulty locating or accessing the podcast through the Internet. Only one student was unable to view the podcast due to reported technical difficulties. Other technical difficulties can include problems with recording and posting the podcast. Based on the location of the microphone or camera, students may have trouble watching the podcast if they cannot hear or see the faculty member teaching. In our study, a student in 2011 stated they could not hear the professor at certain points during the podcast and at times the recording echoed. Another barrier to podcast learning involves the student responsibility. If the students are not required to attend a

formal lecture and asked to view a podcast instead, then they will not learn the material if they do not watch the podcast. This was demonstrated over the course of our study with a total of eleven students did not watch the podcast. Additionally, one student reported that they forgot to view it.

There were some methodology limitations to our study. Over the course of our study, the survey format changed each year. The type of survey was either paper or electronic depending on the year. The reason the survey format returned to paper during the third year of the study was to improve the response rate. When the online survey was utilized, an email was sent out asking the students to complete the survey at their convenience. However, it is possible that students did not respond by the survey deadline. During the third year of the study, students were given the survey while they attended their laboratory section in order to give them time to complete the survey if they chose to participate. Changing the survey format improved the response rate from 82% (65/79) in 2012 to 91% (68/75) in 2013. Although the change in survey format improved the response rate, it may have added a confounding factor to our study. If paper surveys were used during each year of the study, our results may have differed. Also, this limitation could have created nonresponse bias since the answers to the survey that students did not complete could have altered the results.

## Conclusions

The study determined pharmacy student's opinions regarding the use of a podcast as a replacement to a traditional lecture. Overall, student opinions of the podcast were positive. Based on its content, students preferred the podcast to be used as either a replacement of a traditional lecture or as a supplement to information taught during an in-class lecture. Students were able to watch the podcast when it was convenient for them and were able to learn at their own pace. Some of the disadvantages of the podcast perceived by the students included inability to ask immediate questions and difficulties with the technology. However, these drawbacks can be addressed and the potential benefits of this technology can be augmented to use podcasts as a supplemental education tool for compounding laboratories.

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