

Podcast Contests in Undergraduate Materials Engineering

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Abstract

An ASM International sponsored podcast contest encourages student-submitted podcasts on materials topics. One of the objectives of the contest is to create an audio library for use in middle school science classes. The paper summarizes the podcast contest requirements and results. The contest can be incorporated into Materials Engineering courses, as an alternative to term paper and/or web page project assignments.

Key Words: Podcasts, Education, Materials

Introduction

Using podcasts in materials education has steadily evolved since its first use in 2001 [1]. One of the biggest recent developments was the rollout of a national podcast competition for collegiate Materials Advantage chapters, sponsored by ASM International. In the competition, collegiate chapters develop podcasts with the intent of providing materials instructional content for middle- and high-school.

The ASM podcast competition was developed by the K12 Subcommittee of the Education Committee. The committee is comprised of materials professionals, university educators and middle- and high-school science teachers. The subcommittee conceived the idea of developing and promoting a podcast competition to achieve the following goals:

1. to provide information on materials to students and the general public in a new media that has the attention of young people,
2. to provide additional tools for teachers to use either directly in their classes or to supplement homework in a form that will interest students.

Once the podcasts are created, Materials Radio would be offered on the internet. Materials Radio will consist of short news audio files (podcasts) published by ASM International to provide students, teachers and the public with an educational look into the world of materials. The radio program will feature both traditional anecdotes

that explain material properties and also new developments in the field that are easy for the students and general public to integrate into their respective global understanding and conversations.

Podcasting is an audio delivery system on the internet that allows a targeted audience to listen to and watch a program they want, where they want and when. The audience can either visit a website and download a specific program or subscribe to a podcast and have it automatically downloaded. Once an audio or video file is downloaded, the user can play the file on their computer, create a CD or DVD with the audio file or download it onto a personal audio player. This type of radio programming is distinct from other type of internet audio and video content delivery because it uses the RSS (really simple syndication) protocol. This protocol allows the audio publishers to syndicate their content on other websites and through software applications [2].

The initial development of podcasting was in August 2004. The former MTV VJ, Adam Curry, developed the first podcasting software and then published it for public use. This spurred Apple Corporation to introduce a software program that allowed individuals to subscribe to podcasts a year later. In the first two days, there were already one million people who subscribed to these podcasts. Over the past year, the popularity of these programs has grown tremendously. The widespread use of this technology was recognized by the New Oxford American Dictionary which selected the word 'podcast' to be named the word of the year in 2005 and the included in the dictionary in 2006 [2].

Results

ASM International has sponsored two podcast contests. The first contest was started in May 2007, and the second contest was started in November 2007. The rules of the podcast contest state that collegiate Material Advantage chapters may create an original podcast on a materials topic. To submit an entry into the contest, student teams generate an audio file that is between 1.5 and 3 minutes in length. A written transcript must accompany each audio file, along with an application form. The rules require that references be cited, either at the bottom of the written transcript or included in the audio script.

The submitted entries are reviewed by the K12 Subcommittee, which assigns one of three outcomes to the podcast. The three possibilities are: 1) podcast accepted without revisions, 2) podcast accepted, revisions required, or 3) podcast rejected. The two podcasts run to date have produced eighteen podcasts. The podcasts are available for downloading at: www.asminternational.org

Table 1 summarizes the podcasts which have been produced in the first two contests.

Table 1. Summary Data for ASM Podcast Contests

Podcast title	Material Advantage Student Chapter	Date	Authors
You're doing a fatigue test	Boise State University	Nov 2007	Cole Smith
Hot, cold or corrosive?	Boise State University	Nov 2007	Alex Miller
Its big and its broken	Boise State University	Nov 2007	Mike Hagler
Materials get moving	Boise State University	Nov 2007	Pat Andersen
Hard and sharp or soft and gooey?	Boise State University	Nov 2007	Pat Andersen, Sharla Hopkins
Jumping, spinning, biking – all require strong materials	Boise State University	Nov 2007	Pat Andersen
Small is beautiful and nano even better	Lehigh University	Nov 2007	Adam Kohn
Just one word for you: plastics	University of Washington	Nov 2007	Conor Keenan
Superconductors – the wave of the future	University of Washington	Nov 2007	Michael Spector,
Whats the arrangement of the atoms?	University of Puerto Rico – Mayaguez	Nov 2007	Carlos Benitez Monllor, Jose Gonzalez
What is materials engineering?	Drexel University	Nov 2007	William Rosebrook, Courtney Reidi, William Frazier
Cars can change color	Clemson University	Nov 2007	Andrea Dangelewicz
Metallurgy of swords	Worcester Polytechnic Institute	Nov 2007	Patrick Hogan, Justine Roberts, Amanda Young
Fireworks – bright, loud, colorful	Rose-Hulman Institute of Technology	Nov 2007	Ben Lauer, Jeremy Norris
Comfy crocs	Rose-Hulman Institute of Technology	Nov 2007	Megan Snellenberger, Sarah Graber
Why does metal get stronger when you bend it?	Washington State University	May 2007	Sarah Miller
Why do we heat treat metals?	Washington State University	May 2007	Sarah Miller
Peering into tiny worlds	Rensselaer Polytechnic Institute	May 2007	Tenicka Turnquest, Dan Krauss, Heather McGee

A questionnaire has been prepared that will be sent to the student authors of the podcasts. The data from the questionnaire will be used to make modifications to the contest. The proposed initial podcast questionnaire is shown in Table 2.

Table 2. Proposed Questionnaire for ASM Podcasters

Q1. How many college-level courses in Materials had you taken before you produced the podcast?

1. 0
2. <1 to 2
3. more than 2

The following questions use a numerical scale that runs from 1 to 5, where:

- 1=will not happen
- 2=not likely
- 3=neutral
- 4=possibly
- 5-definitely will

Q2. How likely are you to produce an engineering or educational podcast again?

Q3. How likely are you to refer your friends to listen to an ASM Materials Podcast?

Q4. How likely are you to stay involved with ASM or other professional societies after you graduate?

The following questions use a numerical scale that runs from 1 to 5, where:

- 1=none at all
- 2=not very much
- 3=neutral
- 4=some
- 5-a great amount

Q5. How much did your involvement in producing the materials podcast reinforce your understanding of materials?

Q6. How do you think that participating in the podcast project enriched your engineering education?

Q7. Using the numerical scale above, assign a rating to how well you think each of the following media or settings are in helping you learn a complex subject:

- a. reading the textbook
- b. making and/or listening to a podcast
- c. watching an internet video
- d. doing a research project involving internet searching
- e. listening to a good professor in a classroom
- f. listening to an average professor in a classroom
- f. small group discussion with other students and nearby instructor

Q8. What is the most important thing you learned from participating in this contest?

Incorporation of the contest into a Materials Engineering course

Materials Engineering at Rose-Hulman is a required course for students enrolled in the Mechanical Engineering curriculum. Grades for students are based on nine quizzes, one final exam and a project. The project consists of participation in a team in the investigation of a materials topic or materials selection problem. Grading in ME328 is based on the final exam (30%), quizzes (50%) and the project (20%).

The project is assigned at the beginning of the quarter, and students are encouraged to use the entire ten weeks to develop their project deliverable (e.g. website or podcast). The purpose of the project in the course is to reinforce topics that were covered in the lectures, as well as to allow students to study an area of personal interest. The project affords students an opportunity to participate in an open-ended materials selection problem.

Students are required to evaluate other projects. Students that create websites are required to evaluate other student-created websites, and students that create podcasts are required to listen to other podcasts. Some of the podcasts created in the course have been submitted to the ASM contest.

Table 3 summarizes the project podcasts that were submitted in the past three academic years.

Table 3. Podcast topics from Materials Engineering

AUTHOR	YEAR	TOPIC
S. Dick, L. Farr	AY0506	trabecular metal
T. Roberts, M. Shepard	AY0506	tire rubber and manufacturing
M. Boyer, M. Gough	AY0506	high performance turbochargers
S. Sawusch, N. Schmidt	AY0506	superalloys
M. Sharp, M. Richardson	AY0506	alloys in musical instruments
B. Couch, J. Rhoades	AY0506	stainless steel
K. Grubbs, S. Hollingsworth	AY0506	golf club heads
P. Meiser	AY0506	general interest
J. Jackson	AY0506	induction melting
T. Butler, F. Webber	AY0506	metallurgical processes in antiquity
D. DeVirgilio	AY0506	magnesium alloys
S. Graber, M. Snellenberger	AY0607	buckyballs
B. Lauer, S. Story	AY0607	exotic alloys
M. Morris, D. Weigel, H. Young	AY0607	aluminum processing
E. Clift, E. Volz	AY0607	solar energy
J. Kennedy	AY0607	coins
E. Rumley, C. Williams, S. Yoder	AY0607	D30
J. Magargee, J. Stanley	AY0708	beer bottles
K. Evert, R. Miller	AY0708	biodegradable screws
M. Nelis, J. Van Treuren, E. White	AY0708	superconductors
M. Boron, J. Zumburum	AY0708	snowboards
T. Buck, K. Cornelius, R. Maxwell	AY0708	running shoes

Podcast project requirements for ME328 are shown in Table 4.

Table 4. Podcast requirements for Materials Engineering students

<p><u>Objective:</u> The objective of the podcast project is to get students to study a materials-related issue of their own choosing, and to package their results in a creative format suitable for audio broadcast.</p>						
<p><u>Deliverable from students:</u></p> <ol style="list-style-type: none"> 1. CD with a minimum of 45 minutes of content, including at least two speaking segments that total to at least 10 minutes. The balance of the time on the CD may be comprised of music of the students choosing. 2. Playlist that indicates the content of the CD. 3. Written summary of the materials topic. The written summary should be two pages maximum. The format of the summary is not critical and a bulleted summary is ok. Dr. Ferro will probably use this information on live radio broadcasts, so please be generous with your info! Thanks. 4. You must listen to another student's or student team's CD project, or listen to the Metal Hour and complete a questionnaire. The questionnaire will ask questions about your experiences and about the other show you listened to. 						
<p><u>Guidelines:</u> Select a topic of interest and read about it. Use the web, use the library and talk to professors to get more info. Take copious notes and type them up. Use the notes for item (3) above.</p> <p>Record songs on a CD in any order, in the same general format as a typical radio show. After a few songs, break in and speak freely about your materials topic. Be upbeat and create interest. Play some more music and return to the topic, or start a new topic. Make sure the content of the CD is positive and interesting.</p> <p>It is ok to do this in project teams, with teams of not more than two students.</p> <p>The estimated amount of time spent on this project should be approximately six hours, of which approximately three hours should be spent researching the materials topic and taking good notes. Two hours should be spent preparing the CD. Another hour is allocated for listening to another CD or Metal Hour show. Please keep track of your actual hours spent working on the project, as you will be asked this question on the questionnaire at the end of the project.</p>						
<p><u>Grading:</u></p> <table border="0"> <tr> <td style="padding-right: 20px;">A</td> <td>Great topic, creatively expressed, all deliverables completed, professional</td> </tr> <tr> <td>B</td> <td>Great topic, all deliverables completed, lacking professional appearance</td> </tr> <tr> <td>C</td> <td>Some deliverables missing, and/or sloppy work</td> </tr> </table>	A	Great topic, creatively expressed, all deliverables completed, professional	B	Great topic, all deliverables completed, lacking professional appearance	C	Some deliverables missing, and/or sloppy work
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Conclusions

ASM International is sponsoring a podcast contest, to provide audio content for potential use in middle- and high-school science curricula. Podcasts can be used in college-level Materials Engineering courses to allow for

an alternative way to engage students. Students that participate in the production of materials podcasts benefit from creating podcasts as well as listening to other podcasts.

Acknowledgments

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References

1. P. Ferro, 'Audioblogging in Undergraduate Materials Education', NEW 2007 Conference Proceedings, Edmonds Community College, Lynnwood WA (2007).
2. <http://www.microbeworld.org/look/radio.aspx>