

Benefits of using podcasts as supplementary teaching material

Reynir Smari Atlason

University of Southern Denmark, Denmark, resa@iti.sdu.dk

ABSTRACT

In a multidisciplinary class, it is difficult to avoid covering a topic a group of students have already encountered previously. To avoid this, supplementary material can be provided to students. By doing this, the teacher can engage directly into deeper theoretical or practical work and minimize amount of time covering introductory material. It was the intent of this study to develop teaching material for students which could be studied while riding bicycles. This was achieved by recording podcasts where pre-requisite material was covered in a popular manner, allowing students to listen to the recordings through mobile phones while riding bicycles. By doing so, students can avoid investing primary time into learning, but could use time that was already spent on activities. Four recordings were made, ranging in length between 10 to 18 minutes. The recordings are then made available to students through an online platform, accessible through mobile devices. It was found that students who did not have the most suitable background found their understanding of the material to increase if the Podcasts had been listened to.

Keywords – Podcasts; Flipped learning; E-learning

I INTRODUCTION

In a multidisciplinary class, it may prove difficult to avoid introduction of material trivial to some, or many participants. One method to address this is to provide relevant reading material to students who lack the relevant background. Doing so does however increase the workload of those students which becomes unproportioned with regards to other students. Another way is to provide the students with video material to be viewed in their free time. Videos do however require the student to dedicate equal amount of time to them as they are long. The ideal situation would allow the student to get acquainted with the missing material without feeling that the workload is increased. The same situation should avoid prime-time being invested in the process of learning the missing material. In order to continue with such discussion, a qualitative assessment of time is needed. We can state that Saturday evenings are valued highly by most, while Tuesday afternoons are perhaps valued less. One also needs to take into consideration what is being done during the time. If one is conversing with a leader of the free-world, the time is valued higher than the time used for cleaning ones apartment. We would therefore like to provide a platform for students to invest non-prime time to the learning. Podcasts can be seen as a suitable way to accomplish this. Podcasts are much like radio shows. The only difference is that they are accessible on the internet and are generally not broadcasted live. The listener can therefore choose when he listens to the show. One way to listen to Podcasts is when the listener is commuting. This allow the listener to invest a non-prime time into getting acquainted with the material at hand. This paper focuses on this feature, where introductory material was recorded in a Podcast format for commuting students to listen to.

The class under study consists mainly of engineers with two types of backgrounds, a) Environmental engineering, and b) Product development and Innovation (PDI). Environmental engineers do have a background in various environmental assessments, while product development engineers generally do not. Introductory material to environmental assessments therefore needs to be given to PDI engineers, material that can in some cases be trivial to environmental engineers. In this paper, the aim is to provide introductory material through alternative online means. The research question addressed in this study is therefore:

a) Are podcasts a suitable method for delivering introductory material in a multi-disciplinary class?

b) Do students find themselves gaining content understanding using non-traditional methods of educational content delivery?

Using conventional flipped learning methods, where videos are recorded require students to use primary time watching the computer screen (Hwang et al., 2015). Here, an experiment is done using podcasts, where secondary time can be used for learning, for example while bicycling.

Danish cities in boast good infrastructure and a culture of bicycling as means of commuting. The time people ride bicycles is generally not used to conduct practical matters, and conventionally not to conduct university studies. It was the intent of this study to develop teaching material for students which could be studied while riding bicycles. This was achieved by recording podcasts where pre-requisite material was covered in a popular manner, allowing students to listen to the recordings through mobile phones while riding bicycles. By doing so, students can avoid investing primary time into learning, but could use time that was already spent on activities (Moura, 2008).

II METHODS

Recordings were made using Audacity, a free audio recording platform (Audacity, 2013). In order to obtain good sound quality, an M-One USB condenser microphone was used. The podcasts then follow the following overall script. First, a light jazz intro is played followed by an introduction to the topic. The second half of the podcast was then devoted to interview a researcher in the field which the particular podcast episode covers. Four key topics were covered through podcast recordings. 1) Electronic waste with Keshav Parajuly 2) Circular Economy with Henrik Grüttner 3) Life Cycle Assessment with Hafþór Sigurjónsson and 4) Product development implementation where Tony Baho, a senior designer at Volvo was interviewed. Each episode was designed to be long enough to cover the essential core of the topic at hand but short enough to be listened to while commuting on a bicycle (Milakis et al., 2015). The duration of the shortest podcast was 10:18 and the longest 18:05. The recordings were then uploaded to <http://www.reyniratlason.com>, where the podcasts could only be accessed with a password. The password in this case was “sustainability”. By uploading the podcasts to a personal website, and restricting access, it was possible to monitor traffic through this particular part of the website.

Through traffic monitoring on <http://www.reyniratlason.com> it can be seen that traffic increases from

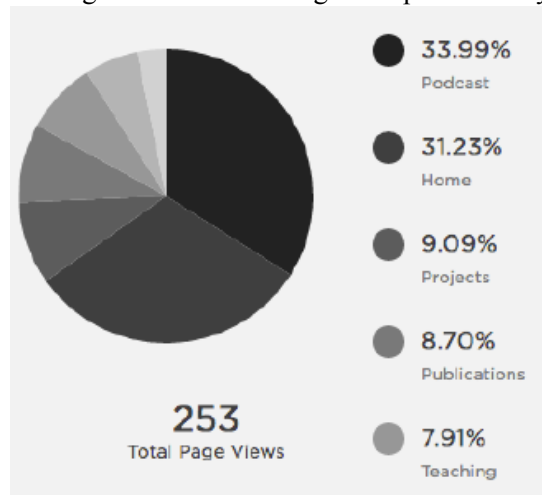


Figure 1. A pie chart indicating where visitors navigate within <http://www.reyniratlason.com>

August throughout October. In fact, it can be seen that 30% went to the Podcast part of the website. This number should however be added to the part which visited the

“Home” part of the website, as visitors are automatically navigated there before accessing the podcasts. As can be seen in Figure 1, one can estimate that roughly 65% of visitors went to the podcast part of the website. In

September, 30 individual visits from separate computers or mobile devices were made to the website, resulting in approximately 19 visits by different individuals to the podcast section. Using the same method, one can estimate that 17 individuals visited the podcast section in October.

The class consists of 40 students. This indicates that a little less than half of the class took the initiative to listen to the podcasts.

In order to visualize if students found the content, or its delivery method to be of value, an online questionnaire was distributed and analyzed. Students were asked to evaluate their understanding of certain topics which had already been covered in class. Some of those topics had been introduced through the podcasts, while others had only been covered in class. Students were asked to rate their perceived understanding of the material on

a scale from 1-4. A rating of one indicates no-understanding of the material while 4 indicates a large increase in perceived understanding. Students (n=17) were asked to indicate if they had listened to the podcast, and if so then which episodes. Finally, students were asked to indicate their engineering background. Results were statistically analyzed in order to visualize if the podcasts had an effect on students perceived understanding of the material at hand and if students found themselves understanding the material covered in the podcasts better than material only covered in class.

III RESULTS

Composing and recording a podcast is a more time consuming endeavor than initially assumed. It was found that each episode composed of approximately 5 hours of work. This included deciding the topic, creating a rough manuscript, locating a relevant person for an interview, conducting the interview and then finally editing the episode before uploading to the website. It was furthermore experienced that a certain level of stage fright became apparent from the author after uploading a podcast online. This was however shadowed by the positive response from the students, who indicated their liking of the material in class. More podcasts were even required by some students.

In Table 1, one can see averages on how students graded their perceived understanding of the topics covered by the podcasts. It should be noted that the sample of students participating in the survey was small, limiting the possible conclusions from this study. However, it can be seen that there seems to be no significance for students with environmental engineering background. This may be because of their previous education, and that they have very likely been exposed by the material previously. However, the PDI engineers, who were the target group, found themselves to understand the topics at hand better if they had in fact listened to the podcasts. The difference can be seen clearly when looking at the topic of E-waste, where those who did not listen to the podcast found themselves with a marginal increased understanding of the topic, scoring on average 2. Those who listened to the topic did however score on average 3.3, indicating a deeper understanding. In fact, PDI students found themselves understanding all topics better if they listened to the podcasts.

Table 1. Average rating of perceived understanding between students based on engineering background

	Did not listen (All)	Listened (All)	Did not listen (Env.)	Listened (Env.)	Did not listen (PDI)	Listened (PDI)
E Waste (Episode 1)	2.1	2.3	2.2	1.3	2.0	3.3
Circular Economy (Episode 2)	1.9	1.8	2.0	1.3	1.8	2.3
LCA (Episode 3)	2.3	2.0	1.8	1.0	2.7	3.0
Practical implementation (Episode 4)	2.9	3.5	2.6	3.3	3.2	3.7

VII CONCLUSIONS

In correlation with previous studies, podcasts were found to be a suitable method for delivering introductory material in a multi-disciplinary class (Kratochwill et al., 2016; Liao et al., 2013). It was found that approximately 50% of students used the opportunity and engaged with the material. This research however suffers from a small sample size of students evaluating the learning outcome from the podcasts, limiting the conclusions to be made from this study.

Students with a PDI engineering background, were found to gain a deeper understanding of the topic at hand if they had listened to the podcasts. It can therefore be assumed that podcasts are potentially a valuable tool to provide relevant background material some students may be lacking. Locating which material that may however be is another matter and a subject for a future study.

After the test semester had finished, several students reached out with ideas on the future developments of the podcast. The suggestions included topics, music themes and relevant people to interview.

It was found that podcasts allowed students to use secondary time to gain basic understanding of certain topics. There are therefore no hurdles in using the same method for other classes taught by the author. Another class, “Consumer product testing and optimisation”, partially taught by the author is also consisting of engineers from various backgrounds. The class may therefore be well suited for podcasts, where students gain deeper knowledge about certain aspects taught in class.

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BIOGRAPHICAL INFORMATION

Reynir Smari Atlason is an assistant professor at the University of Southern Denmark. He works in the Department of Technology and Innovation where he conducts research and teaching in product development.