Community based digital teaching

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ABSTRACT: A common approach to digital teaching is to mimic the classical lecturing in a physical classroom. There are limits to how successful this approach might be in helping students to reach the learning outcomes. However, presenting information on digital platforms have been professionalized by youtubers interacting with internet communities. For two of our courses in electronics we have adapted techniques and methods commonly used by popular youtubers. This has resulted in extremely satisfied students. It is easier to see which learning outcomes are met. It has also increased the amount of communication compared to physical teaching, both between lecturer and students, and among the students themselves.

KEYWORDS: Community based, Digital teaching, Discord, YouTube

1   INTRODUCTION

In her book "Rethinking university teaching", Diana Laurillard asked "why aren't the lectures scrapped as teaching method" (Laurillard, 2002). The traditional lecture in a classroom is still common in universities, despite often being criticist for being a passive form of teaching (Pettersen, 2005).

According to Brown and Atkins, the lecture has three main intentions (Atkins & Brown, 2002): 1) Present information on the given topic. 2) Contribute to students understanding of the topic. 3) Motivate students and stimulate their interest in the given topic. Pettersen (2005) is questioning whether these three intentions are fulfilled in most lectures. Still, in lectures at campus, the lecturer can detect whether the students understand the material, it allows for interaction between students and teacher, and it makes it easier to adapt a course to the needs of the students.

Lecture as part of digital teaching, or distance teaching, has been known for a long time, and investigated by several. Mottet investigated the use of distance teaching via relationships between instructors' perceptions of students' nonverbal responsiveness and the influence of this on the teaching (Mottet, 2000). The study showed that teachers get insufficient non-verbal response, and that they are unable to interpret students' reactions adequately. When teachers were given the choice between distance teaching and traditional classroom, teachers indicated a significant preference for the traditional classroom. (Mottet, 2000).

However, during the early parts of the covid-19 lockdown, most university teachers had no choice. Little time to prepare for new circumstances led to many challenges. Most instructors did their best to transform their face-to-face teaching into a digital classroom. This proved to come with several challenges (Mseleku, 2020). Mottet (2000) wrote that "*Instructors need to understand that it may be impossible for them to replicate or control the responsiveness found in the traditional face-to-face classroom…*".

The two courses discussed in this paper were taught using the traditional lecture approach before the pandemic. The first course, Electric Circuits, is taught to approximately 200 students each fall in study programmes in electronics and mechanical engineering at OsloMet. The second course, Electronics, is taught to students from electronics study program in the spring semester. Both courses are quite mathematical in their nature. Thus, besides lectures there is a heavy focus on students working with exercises and mathematical problems.

2   OUR FIRST APPORACHES TO DIGITAL TEACHING

As most lecturers during the pandemic, we were faced with sudden need to change our teaching from one day to the next from campus teaching to digital platforms. The first few lectures were recorded in

front of a small whiteboard and uploaded to our LMS, Canvas. Canvas was also used for teacher-student communication in addition to email and direct text messages. As far as we can see, the only benefit in this approach was the possibility of editing videos before their release. The reaction from the students were mixed. They missed the interaction with the lecturer during the physical lectures. The lecturer being available via email, LMS etc was not a sufficient replacement.

This was soon replaced with Zoom lectures, with a pen display to replace the whiteboard. The first problem we encountered was to make students interact and respond on Zoom when the lecturer asked questions, and that most students did not turn the camera on. Thus, the lecturer lectured to a blank screen, as also reported by others, both colleagues and in literature (e.g., see (Stafford, 2020)). On this topic, Leung *et al.* (2021) wrote "*When cameras are off, teachers are deprived of the visual cues which ordinarily give an indication of students' attention and understanding*".

However, we were obviously not pleased with this teaching, and wanted to improve it. The lecturer therefore decided to find a better approach to digital teaching with the following requirements:

- Lectures must be live, and subsequently available online as recordings
- Improved communication during and between lectures, especially between students themselves.

As shown in previous work by us (Antonsen et al., 2022; Stenstrøm et al., 2021), we want to help students find their intrinsic motivation by giving them autonomy (self-determination), competence and belonging as described by Ryan and Deci (2017). We assumed that part of the problem with the early approaches was to make students feel belonging and safety in the class in a digital classroom. This is also described by Vaughan (Vaughan, 2019), who is in turn referring to Maslow (1943).

Also, feedback from students indicate that most of them are used to learning via the internet, and they have certain expectations from a university teacher when it comes to technical quality of the teaching material. As these early approaches were not pleasing the students' expectations, we decided to investigate what the internet communities have in common, and how they manage to make the members feel that they belong to the communities.

3   LEARNING FROM INTERNET COMMUNITIES

Presenting information on digital platforms have been professionalized by presenters of content on internet. We wanted to investigate youtubers, as students often tell us that they already use different YouTube-channels as supplement to the university teaching.

The success of a youtuber can be measured by number of followers, number of views on the content, but also on their ability to build an active internet community. These communities are often focused on a specific topic e.g., a software, a game, or a field such as programming or graphic design, history, music etc. Regardless of the topics, there are similarities between the successful communities that arise around a popular youtuber.

We have investigated several youtubers and their communities, e.g., History Matters, Codemy.com, Imphernzia, Grant Abbit, Daggerwin, in order to answer a set of questions: What software and presenting techniques are used to present information? How do the mediators interact with their community? How do the community interact with each other?

Imphernzia, a Swedish game and asset developer, and creator of the game Line War, is a great example we will use in this presentation His community consist of 260k followers on YouTube, and an active Discord community with more than 7000 active users. His success as a fast-growing youtuber, the highly technical content of his videos, and his online personality makes him a great example to learn from.

In the following sections we will present some of the common features found between the youtubers. The list is by no means complete, but contains the features that was adapted to our university teaching.

3.1   Content quality:

Making videos looking professional seems to be a major key in succeeding in digital content creation. This is not surprising, as there are tons of content online. Most popular youtubers have videos and streams of quite high quality in both audio and video. High quality video requires a good camera and good lighting. High quality audio requires high quality audio equipment.

3.2 Identity, catchphrases, and namedropping

Popular internet presenters also have a likeable and recognizable style. As they are often competing with tons of other youtubers, they often use catch phrases that people recognize easily.

"Namedropping" is a term used to describe how a youtuber can mention e.g., a very active member of the community in a video or live stream. Sharing popularity in such a way helps building stronger communities and increase user interaction. Using students' name is also known to make students more attentive during lectures, claims e.g., by Frymier (1994).

3.3 Communication platform

Youtubers commonly use Discord servers for their communities. Content that is usually shared with students on LMS platforms can be shared and stored directly on a Discord server. A discord server is organized with categories and channels. With free apps for desktop and mobile it is an extremely fast communication platform.

One of the keys to a successful community, seems to be communication. Persson is a good example as he is very visible to the community (both on YouTube and discord). After a suggestion from us, he made a video on drawing electric circuits in the 3D modelling tool Blender for one of his weekly premiers (see figure 1). This video also screened part of one of our lectures in Electric Circuits (Imphenzia, 2022).
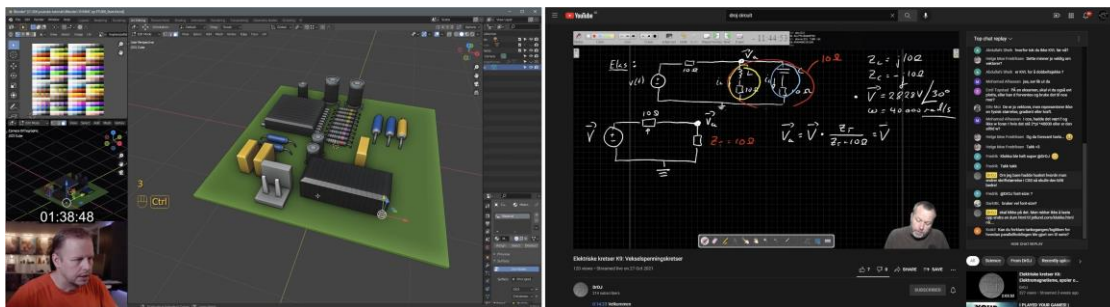

Figure 1. Screenshots from Imphenzias video on drawing an electric circuit. On the left: Imphenzia (Stefan Persson) during the tutorial part of the video. On the right: Screening of one of our lectures in electric circuits as part of the introductory part of the video.

3.4 Releasing lectures on YouTube

Releasing content on YouTube is free. The quality of audio and video with low latency is comparable to codecs used in production for television. Thus, YouTube has become the video platform of choice for most communities. There are three main methods of releasing content on YouTube:

1. Uploading videos. Viewers can comment on videos.
2. Premiering videos. A live chat is available next to video when it premiers.
3. Streaming live. In the live chat next to the video window the users can ask questions.

Especially the third, increases the possibilities of interaction between presenter and viewer. However, streaming live content requires some sort of streaming software.

YouTubers use streaming software such as Open Broadcaster Software (OBS) because it connects directly to YouTube streaming servers, the ability to set up multiple scenes, screen capturing, and because of the live video editing features. Videos and live streams can be set up using included media such as video and audio in a professional manner much like the production of a television news show.

4 A COMMUNITY BASED APPROACH FOR UNIVERSITY COURSES

4.1 Adapting lectures to YouTube

The final approach used to teach the two courses online ended up mimicking very much of tools and techniques employed by youtubers. The lecturer ended up building a small studio in his home with a PC for streaming, video camera, pen display, a strong lamp, and a PC-microphone. All software used

were free to download and use. Subsequently, the first lectures were streamed live on YouTube. All live streams were streamed publicly and made available to rewatch on YouTube.

The lack of interaction in the previous approaches was solved. Students can choose their own username on both Discord and YouTube. This reduced the mental threshold for engaging in discussions both in open channels and in the chat during the live streams. It also made it tremendously more inviting for the students to ask the lecturer questions directly. Since Discord is available on all platforms the lecturer reduced response time from hours (questions asked in email and on Canvas) to minutes (questions asked on Discord) and to seconds for questions asked during a live lecture.

It took only a few attempts to master the technical aspects of digital teaching and the students feedback continued to be solely positive. Such feedback was a boost to the lectures confidence and made for quite a comfortable teaching situation.

Albeit, now having a more active group of students than previously in physical lectures there was still a lack of information regarding the progress of the entire student group. It was therefore important to keep building a stronger community with the students.

4.2 Improvements

Video quality depends on the camera used, but also on good lighting using multiple light sources. Audio quality depends on the audio equipment and good placement of the microphone. Green screen recordings remove distracting items in the background and background noise in a video. Thus, the following improvements and additions were made:

- High quality microphone and a usb sound card
- Multiple light sources
- Green screen

The YouTube channel of the lectures in electric circuits and electronics and the community was eventually branded as DrOJ-Electronics with its own logo. Testing out community building techniques such as namedropping and using a catch phrase at the end of each lecture also got great feedback.

Making the extra effort to create professional looking video and audio for the students was highly appreciated. The students shared links to the videos and the YouTube channel to students at other universities. This increased the community from a handful of subscribers to several hundred on both YouTube and discord, while the courses themselves had approximately 200 students. More importantly than the growth, the community became increasingly active with members discussing and asking questions.

Post pandemic, the discord community is still very active. There are members from multiple study programmes, and universities. The lecturer still uses this platform to share lecture notes, solutions to exercises, and upon requests more details on specific topics. Hobby projects that include electronics are also often discussed on the server.

Since the server has been used for over three years there are both current and previous students, as well as alumni present that are active. The server is open for all and still growing in number of active members. Thus, it has become a digital community on electronics.

5   RESULTS FROM STUDENT EVALUATIONS AND FEEDBACK

Students were very positive, especially about the discord server and the communication during the lecture. One student said: "[I] like the interaction between the lecturer and the students." Another student said: "Digital teaching is good when it works. In this subject it has worked very well."

Evaluating the quality of teaching in a course quantitively is difficult. Feedback from students during a semester may of course improve quantitative metrics. Thus, results are impacted by how students and lecturer communicate. Student evaluation of the course, after the teaching has ended, is our only source of qualitative data. In the student evaluation, the students' satisfaction is graded on a scale from 1 to 5, the latter being most satisfied.
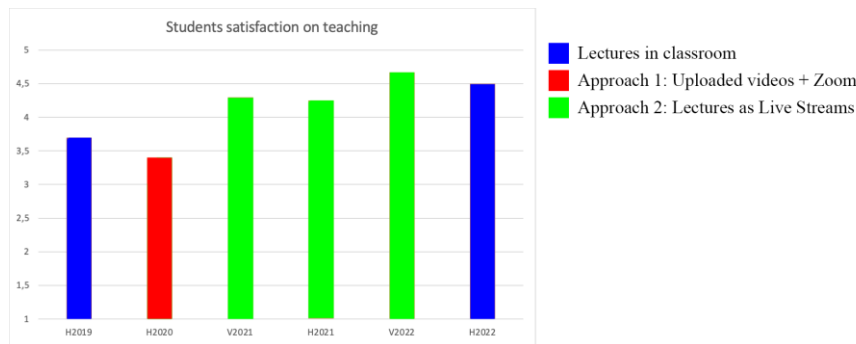
Figure 2. Student satisfaction based upon student evaluation forms. There is no data from spring 202 as none of the courses were taught.

The results from the last six years, shown in table 1, shows that the first attempt of doing digital teaching by uploading videos, and traditional lectures on Zoom reduced the students' satisfaction score. Lectures in classroom before the pandemic had an average overall score of 3.7 (blue column on the left) and the first attempt in digital teaching reduced this to 3.4 (red column). This result may be affected by the fact that it was difficult for the teacher to get feedback from the student group during the semester.

Employing the new approach with communication on Discord and Live Streaming lectures on YouTube resulted in a significant overall improvement of the score. After campus lectures were allowed in the fall semester of 2022, the score stayed higher than before the lockdowns. This might be caused by the continued use of Discord and community building, and by the fact that the previous years' lecture videos are still available.

6   CONCLUDING REMARKS

The first attempt of digital teaching attempted to do traditional teaching on digital platforms. Communication was slow. The learning environment suffered, as neither the lecturer nor the students were comfortable in the situation.

After learning from popular youtubers we adapted common techniques and tools. This immediately resulted in a good learning environment. In fact, from the results it seems that by this attempt the score is much higher than it was even before the pandemic.

We are now returning to traditional classroom lectures. It is evidently important to build on our experiences and the digital resources and techniques, such as supplementary videos, community building, and software solutions such as Discord, to continue improving the teaching in the future

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