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Upcycling in university teaching - A field report on the didactic preparation of existing teaching videos from the Corona semesters

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Abstract

In the winter semester 2020/21, university teaching moved to the digital space due to the pandemic. The videos created during this time will remain unused after the return to regular operations. As part of the "BauingeniOER digital" project, selected materials from three participating chairs of the Faculty of Civil Engineering have now been didactically prepared, supplemented with interactive elements and upgraded to an attractive element of exam preparation. The resulting materials were then published as OER.

Im Wintersemester 2020/21 zieht die Hochschullehre pandemiebedingt in den digitalen Raum um. Die während dieser Zeit entstandenen Videos liegen nach der Rückkehr in den Regelbetrieb ungenutzt „in den Schiebern". Im Rahmen des Projektes „BauingeniOER digital" wurden nun ausgewählte Materialien dreier beteiligter Lehrstühle der Fakultät Bauingenieurwesen exemplarisch didaktisch aufbereitet, mit interaktiven Elementen ergänzt und zu einem attraktiven Element der Prüfungsvorbereitung aufgewertet. Die entstehenden Materialien wurden anschließend als OER veröffentlicht.

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1. Initial situation

Around 160 students (including around 30 distance learning students) take part in the "Existing Buildings" course run by the Institute of Building Construction of the Faculty of Civil Engineering, a compulsory module of the undergraduate diploma course and the Bachelor's course in Civil Engineering. Some teacher training students for vocational schools and students on the industrial engineering course also take part. The course concludes with a written examination, mainly with case studies that have to be explained or discussed.

From the lecturers' point of view, the solutions to the students' written assignments were not entirely satisfactory; they were often too verbose and vague, used too few technical terms or argued incorrectly. In addition, distance learning students in particular had difficulties dealing with the format (case studies) that was only introduced in winter semester 2020/21. The reason for this is that the majority of distance learning students are working. They were therefore unable to participate in the livestream exercises, or the recordings of the on-site discussions were also difficult to follow acoustically afterwards. For distance learning students, the tension between work, family and (distance) learning with the different expectations in each case is a constant balancing act anyway, which can severely affect study times and success [1].

Due to the suspension of face-to-face teaching in winter semester 2020/21 due to coronavirus, new digital teaching formats had to be tested at short notice. For this purpose, the lecturers of the course "Existing Buildings" recorded the entire lecture material in video form; on the one hand in the form of PPT slides with audio track and on the other hand the creation of sketches with the Visualizer and audio track recorded with OBS. The individual videos were between 20 and 40 minutes long so that they could be watched in smaller "chunks". Shorter instructional videos are recommended to keep students motivated; ideally with an alternation between knowledge presentation and interactive elements [2]. The content of the videos was tested in the subsequent exam using practical tasks or the students had to argue based on the theory covered in the videos.

2. Solution approach

After creating the digital teaching materials under great time pressure, numerous videos were available after returning to the classroom. The lecturers wanted to continue to make these available to the students and at the same time meet their own quality standards for good teaching. Students in particular expressed a desire for interactive or activating teaching material that can be used regardless of time and place. In addition to the clear advantage for distance learning students, on-campus students also predominantly want digital elements to be retained in teaching [3].

The idea for the "Existing buildings" course was to enhance the existing videos by creating interactive elements with Lumi[1] and inserting them into the existing videos. The resulting videos are intended to guide students towards a precisely formulated solution to the exam task on the one hand and to encourage active learning on the other. The videos are intended to serve as long-term exam preparation for the students and thus be didactically prepared in a targeted manner - upcycling in university teaching.

The "BauingeniOER digital" project - funded by the Fund for Digital Learning and Teaching (DLL) in the 2021/2022 funding period - provided the framework for the implementation of the project. The project was managed by the distance learning working group of the Faculty of Civil Engineering.

Fig. 1: Logo of the project

The Institute of Building Construction and two other chairs of the Faculty of Civil Engineering were involved. After an initial review of the available materials with the project coordina-

[1] Lumi is a free software for creating interactive content based on H5P; https://app.lumi.education/

tor, videos were selected that were particularly suitable for processing as part of the project. Each chair was asked to find one or two videos or script sections to work on during the project period. During the project, an E-Scout was available via the ZiLL to support all project participants for 5 hours per week, in particular for the technical implementation.

The main goal of the project was to didactically prepare existing materials from the "Corona semesters", add and edit interactive elements and finally publish the high-quality teaching materials as OER. This means that the materials will continue to be available beyond the crisis period and will be opened up to a wider audience.

As part of the project, with the support of the distance learning working group, practical peer workshops were held to review and select existing materials, revise them didactically, technically and in terms of media law, and finally publish them as OER.

The added value of this project can be seen at various user levels. On the one hand, there are the **distance learning students**. Far away from the additional private and professional burdens, distance learning students benefited from the pandemic-related "relocation" of all teaching to the virtual space and thus the possibility of even more individual and material-rich studies. "Distance learning" became the new normal and many lecturers and those responsible gained an impression for the first time of the challenges that distance learning students have always faced [1]. This wide-ranging offer, as well as the newly created awareness, now had to be not only maintained, but also expanded.

For the **Faculty of Civil Engineering**, international visibility within scientific communities is increasingly determined by the reputation of teaching. Student recruitment is also more and more based on examples of good teaching. In this sense, OER offerings are also instruments of public relations work that should be used more intensively in the future. This makes the performance of teachers more visible. The indexing and integration into the SLUB catalog enables broad reuse, for example by members of other universities, schools, independent educational institutions, citizens, etc. This in turn promotes the ability to meet the challenges and changes of the modern labor market within the framework of lifelong learning [4].

The **institutes** and teaching staff wanted to take the knowledge and achievements of the pandemic with them into the post-corona era. A lot of time and energy was invested in the materials - too good to disappear in a drawer. There was a lack of resources and the necessary overview to initiate reflection processes (What should be kept? What didn't work?) within or across teams. Thanks to interdisciplinary coordination and the active and didactically sound support of the "BauingeniOER digital" project, the hurdles were quickly overcome. The practical peer workshops not only met the need for collegial exchange, which had become very clear due to the pandemic situation, but also offered a low-threshold training opportunity for teachers on media didactics, technology and legal issues.

For **students**, OER generally opens up more flexible and individualized studies beyond the boundaries of individual educational institutions. The added value results not only from the low-threshold provision, but also from the availability of particularly high-quality materials - both technically and didactically. The development of digital skills is also an added value that should not be neglected through high-quality interactive teaching materials to prepare students for their entry into professional life [5].

3. The upcycling

Work steps:

Before interactive elements could be inserted with Lumi, the videos first had to be cut and the transitions to the slides that originally followed deleted so that a self-contained sequence was created. The intro and foreword had to be designed, coordinated with the content and layout and inserted. The task of the fictitious case study was inserted between the foreword and the actual video with the sketches. The outro ends the video with the CC-BY-SA license and an explanation of the license. For this purpose, the license conditions of all materials used, such as photos taken by the former chair holder, had to be clarified.

Once the video was completed, interactive elements were added using the Lumi program, which offers numerous options for this. For example, single-choice questions, selection questions or cloze texts were used for these videos. Additional explanatory information in the form of animations or photos (own or from external websites) of completed constructions can be called up via a button. Figures 2 to 4 show excerpts from the interactive video with the inserted interactive elements.

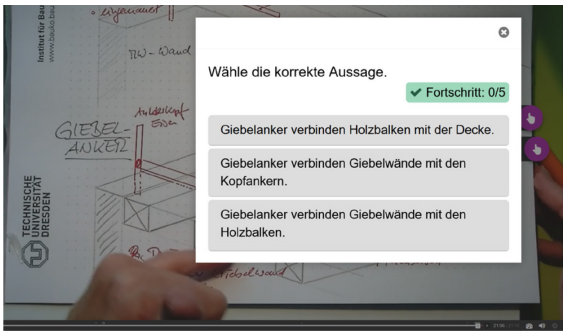

Fig. 2: Excerpt from the video with single-choice questions.

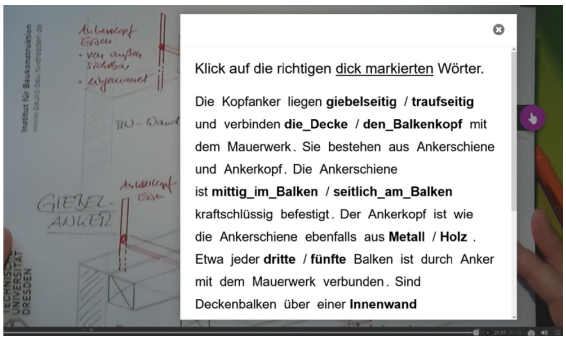

Fig. 3: Excerpt from the video with words to be marked.

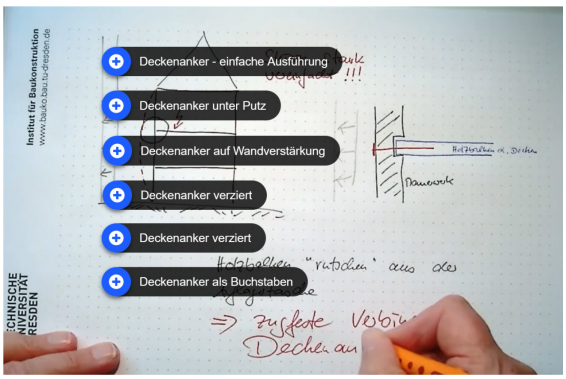

Fig. 4: Excerpt from the video with buttons with photos.

The editing time for the first video was longer than planned, as the basics had to be researched, the procedure discussed and the possibilities of Lumi (automatic continuation, allowing repetitions and skipping back, ...) considered from a didactic point of view.

Once the procedure and the possibilities were known, the second video was completed very quickly; the editing time was now around 30% compared to the first video. Further videos would probably be completed even faster. Even during the creation process, didactic improvement potentials were recognized, which could be directly implemented in the second video: At the beginning there is a quiz as a knowledge test before the theory is explained using the existing videos. For an intensive explanation and visualization of materials or components, such as stakes with clay wrapping, reed mats and rafter formwork, photos or links to explanatory websites are provided. Finally, the theory ends with a summary in the form of a quiz. This allows students to see their learning progress directly compared to the initial quiz.

Summary:

The existing videos from the Corona semesters were specifically enriched with interactive elements to encourage students to take active action. In contrast to the "classic" lecture, in which knowledge is conveyed passively, a reaction from the participant is now consciously demanded. This increases attention and what has been learned is remembered for longer [6]. Ideally, this learned knowledge is remembered for years to come.

It is also important that the learning process extends over a longer period of time, as the interactive videos are already accessible during the semester. The integrated questions and quizzes provide participants with an interim status of their knowledge and allow them to work specifically on their knowledge gaps during the lecture period. Thanks to the extensive preparation, they can start the examination phase with less stress.

These newly created opportunities generate a supportive learning environment. Students can work on and repeat the material individually, at their own pace, at flexible times and in a familiar environment. Nevertheless, they are guided and the subject matter is focused on

what is important. The integrated feedback gives them a continuous assessment of their level of knowledge. However, this is only visible to them and they can therefore manage their learning process independently. The two revised videos provide a good basis on which to enrich other existing videos with interactive elements in the future.

The interactive videos are licensed under CC-BY-SA. They can be accessed via the SLUB OER display: https://www.slub-dresden.de/veroeffentlichen/open-educational-resources/oer-display

Fig. 5: Outro with licensing

4. Feedback from students

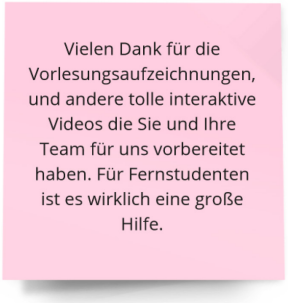

Fig. 6: Feedback of a distance learning student from summer semester 2023

These two interactive videos are available to both on-campus and distance learning students as additional material for exam preparation. After the project, the students were asked about their evaluation of the added value of the videos. It turned out that any additional learning material is particularly beneficial for distance learning students who have to acquire the lecture content through self-study. Interactive videos offer an appealing change from traditional learning materials such as lecture notes or lecture recordings, which usually have a duration of 60 to 90 minutes. Assistance such as these interactive videos, which provide targeted guidance on possible exam questions, is gladly accepted.

5. Lessons Learned

The preparatory work for the upcycling in particular was very lengthy - multiple consultations with the project partners were necessary and the methodological approach had to be clarified according to didactic requirements. As soon as the individual "components" (intro, outro, videos) were available, the integration of the interactive elements could be implemented quite quickly using Lumi. The tool itself is designed to be user-friendly and is easy to use after a short training period. This means that the video material available from the "Corona semesters" can be easily processed and used sustainably as additional learning material.

Interactive videos offer significant added value for both on-campus and distance learning students. The required interaction and active participation increase attention and what has been learned is remembered for longer. Immediate feedback within the videos allows students to assess their level of knowledge - before the actual exam. This gives them the opportunity to work on their knowledge deficits in a targeted and timely manner and start the exam with confidence.

Valuable expertise from interdisciplinary teams (ZiLL, SLUB, TDL BU) was utilized in the creation and implementation of the concept. These resources are available at TU Dresden and can be consulted if questions arise outside your own department.

The amount of work involved in editing the videos varied greatly. After establishing the basics of video editing, the legal framework for OER and familiarization with the Lumi tool, the learning curve was enormous. Editing the second video took around 70% less time than the first. It is assumed that the average editing time for a complete lecture series is reduced from video to video until a certain routine is established.

As part of the project, an E-Scout from the ZiLL provided support to all project partners for a total of 5 hours per week. This was very helpful

as the lecturers were able to concentrate on the subject-related work. The lecturers themselves worked on the project for a variable number of hours during the semester.

Acknowledgments

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In cooperation with the SLUB, individual training sessions were held with all participants on the basics and framework conditions for OER creation and publication. The Digital Teaching Team of the Building and Environment Departement (TDL BU) provided support in familiarizing participants with the free Lumi program, among other things.

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