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Instructional Videos in Classrooms – The Development and Validation of an Instrument to Assess Its Quality

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**Abstract** (300 words)

During the school closures in spring 2020 to contain the COVID 19-pandemic, instructional videos created by the teachers have shown to be most relevant for students' perceptions of their learning experiences (Jaekel et al., 2021). We aim to further pursue the question of what makes a good instructional video and what aspects of quality it must contain to be relevant for student learning. We present the development of an instrument to assess the quality of instructional videos which is based on well-known aspects of teaching quality (Klieme et al., 2001; 2019). We further present findings of our first study that aims to examine the validity of the coding instrument. We found that instructional videos which were self-created by teachers in the time of the school closures not only differ regarding observable aspects like their length or the visibility of the teacher, but also with respect to the quality dimensions of the coding instrument. Finally, we give an outlook on the further steps of the study.

**Extended summary** (1000 words, excluding reference list) Include introduction, theoretical background, methods, aims, preliminary findings/findings, results, theoretical and education significance, relevance to the QUINT ambition and the reference list.

## **Introduction**

The time of the school closures in spring 2020 was a very uncertain and difficult time for everyone involved. At the same time, this phase was also a period of tremendous changes: The digitalization of schools has been pushed immensely and new digital tools have quite naturally been used by teachers, parents' and students. One special finding on the relevance of different teaching methods used in this time is the importance of teachers' self-created instructional videos. Such videos have been found to be most consistently associated with students' perceptions of teaching quality and students' learning experiences (Jaekel et al., 2021).

Because the use of instructional videos can be a helpful and innovative method, for instance, with regard to differentiated teaching and learning, we aim to investigate quality aspects of instructional videos. Therefore, we present the development of a coding instrument which is based on well-known aspects of teaching quality (Baumert et al., 2010; Klieme et al., 2001; 2019) and findings on the validation of this coding instrument. Finally, we present the further steps in our study referring to the investigation of the instrument's predictive validity and the presentation of our findings to actors in educational practice.

## **Theoretical Background**

In spring 2020, the number of students engaged in distance learning increased rapidly within a short period of time: On March 24, 2020, UNESCO announced on its website that 1.37 billion children were learning at home due to COVID-19-related school closures (UNESCO, 2020). Within a few days, schools had to switch to distance education, for which they were often inadequately prepared in terms of technical equipment and students' and teachers' experience with distance education (Authors; Howard et al., 2021). Even though school closures came with many difficulties and challenges for teachers, students, and parents, the last two years were also a period of tremendous changes. For instance, our own research showed that teachers used in this time period a great variety of tools and methods such as emails, video meetings, open educational resources, collaborative tools or information platforms (Jaekel et al., 2021). With regard to the relevance of such teaching methods for students' learning experiences, it could be shown that methods enabling opportunities for communication and social interaction such as video meetings or students meeting in small groups with the teacher were most relevant (Hawkins et al., 2013; Jaekel et al., 2021; Kumi-Yeboah et al., 2017; Liu & Cavanaugh, 2012). Furthermore, the most consistent findings with teaching quality and students' learning experiences were found for teachers' self-generated instructional videos. In contrast, videos of external providers (e.g., Youtube, external

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instructional video platforms) showed no statistical significance with these outcomes (Jaekel et al., 2021). One fundamental aspect of such instructional videos seems therefore the presence of the own teacher.

The use of instructional videos is, however, not limited to distance education settings. For instance, in regular face-to-face settings, videos created by teachers can be used in terms of differentiated teaching and learning. This could support students to learn in their own pace or if they missed important learning content, which could also lead to a certain disentanglement of parental help. Instructional learning videos have therefore a high potential to support students' learning also in face-to-face settings. In order to exploit this potential, however, it is necessary to evaluate quality aspects in instructional videos on the basis of a valid and standardized instrument.

### **Methods**

For the coding instrument, we reviewed the literature on quality aspects of instructional videos in research of media education (e.g., Beheshti et al., 2018; Brame, 2015; Kelly, 2015). Additionally, we selected teaching-quality dimensions from a questionnaire to assess teaching quality in face-to-face teaching, which are based on the three basic domains of teaching quality (Baumert et al., 2010; Jaekel et al., 2020; Klieme et al., 2001; 2019). A large part of these quality dimensions was also used in the online study "Teaching and learning in distance education (CUNITAS)" (Jaekel et al., 2021). This study was carried out in summer 2020 and assessed the teaching quality in distance education. Afterwards, we adapted single items to refer to the video context. This coding instrument will be validated in two steps. Therefore, the coding instrument is in a first step applied on self-created instructional videos that teachers produced during the school closures. The instrument will then be revised and adapted, where necessary. In a second step, we apply the instrument on free accessible instructional videos.

### **Aims**

With this study, we pursue three goals:

Our first goal is to develop a coding instrument for instructional videos that not only covers essential quality aspects from the field of media education, but also builds on the well-known aspects of teaching quality from the context of face-to-face teaching.

Our second goal is to examine the *construct validity* of this coding instrument based on the data of different raters. Therefore, we use existing instructional videos produced by teachers during the time of the school closures. To get a first impression, we collected videos

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independent of the school track, subject, or grade level. These videos will be coded by different raters and these data will be used to determine the construct validity.

Our third goal is to investigate the *predictive validity* of the instrument. For this, we use instructional videos of publicly accessible video platforms. Based on the findings of our first study and to ensure a comparability of the videos, we narrowed these videos content wise (e.g., introduction of calculating with fractions). The ratings of these videos based on the coding instrument will then be associated with students' learning outcomes.

### **Preliminary findings**

We will first present the development of our coding instrument as well as findings of the first step of our study, which refers to the construct validity of the coding instrument. Preliminary findings showed that videos fundamentally differ regarding aspects like the visibility of the teacher, length of the video, pace of speaking or the use of additional digital tools (e.g., power point slides). Additionally, we found that with respect to the quality aspects the videos differed, for instance, in the presented structure of the learning content or the cognitive demanding of the students.

### **Theoretical and education significance**

We are convinced that the use of instructional videos in face-to-face teaching can be an innovative method to support students in their individual learning process. Although there are plenty instructional videos existing which might be designed even more professional, the findings in the study of Jaekel and colleagues (2021) have shown that one fundamental aspect in such videos seems to be the presence of the teacher. Therefore, we aim to extent research on teaching quality and identify additional quality criteria of instructional videos and a valid coding instrument which provides information about students' perception of instructional videos.

### **Relevance to the QUINT ambition**

This study is of high relevance for QUINT and fits especially with Theme 1 "Studying teaching quality across subjects and settings". The origin of our study is a large variety of teaching-quality dimensions which were assessed in face-to-face teaching. A large part of these quality dimensions has been shown to be also relevant for students' learning in distance education. Due to the great overlap with the research of the QUINT network, we think that we could receive a lot of helpful feedback especially from the perspective of video coding for the further conduction of our study.

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