

# **Effectiveness of Flipped Classroom Instruction in Secondary Education**

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Vorgelegt von  
Marlene Wagner

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Erstgutachter: Prof. Dr. Detlef Urhahne

Zweitgutachter: Prof. Dr. Andreas Gegenfurtner

## ZUSAMMENFASSUNG

Die Forschung zum Unterrichtskonzept „Flipped Classroom“ hat in den letzten zehn Jahren erhebliche Fortschritte gemacht. Flipped Classroom steht für einen Unterrichtsansatz, bei dem sich Schülerinnen und Schüler zuhause mithilfe von Erklärvideos neue Lerninhalte aneignen und im Unterricht anschließend dazu passende Aufgaben bearbeiten. Da immer mehr Lehrkräfte diesen Unterrichtsansatz in der Praxis anwenden möchten, sind weitere Forschungsarbeiten—insbesondere im Bereich der Sekundarstufe—notwendig. Die beiden in dieser Arbeit vorgestellten Studien zielten darauf ab, die Wirksamkeit des Unterrichtskonzepts „Flipped Classroom“ im Sekundarbereich zu untersuchen, indem eine meta-analytische Synthese früherer Studien und eine Interventionsstudie mit einem methodisch neuen Ansatz durchgeführt wurden. In den Studien wurde insbesondere untersucht, ob und unter welchen Bedingungen sich der Flipped-Classroom-Ansatz positiv auf die Lernleistungen von Schülerinnen und Schülern auswirkt und welche Lernenden am meisten vom videobasierten Unterricht profitieren.

In der ersten Studie wurden meta-analytische Methoden verwendet, um zu untersuchen, ob der Flipped-Classroom-Ansatz, nachdem eine Kontrolle des Stichprobenfehlers vorgenommen wurde, die Lernleistung von Schülerinnen und Schülern positiv beeinflusst. Die Effektstärken wurden für die Forschungsdesigns Vor-Test-Nach-Test („Zeit“), „nur Nach-Test“ und Vor-Test-Nach-Test mit Kontrollgruppe („Treatment“) berechnet. Darüber hinaus wurde der Einfluss von vier Moderatorvariablen als Randbedingungen für die Effektivität des Flipped-Classroom-Konzepts geschätzt: disziplinäres Feld, Dauer der Intervention, Verwendung eines Quiz und Verwendung eines Lernmanagementsystems. Die meta-analytischen Ergebnisse für die Effektstärke „Treatment“ bestätigten die Wirksamkeit des Flipped-Classroom-Konzepts auf die Lernleistung der Schülerinnen und Schüler im Vergleich zum traditionellen Unterricht (Cohen's  $d = 0.42$ ). Moderatoranalysen der Effektstärken „Zeit“ zeigten stärkere Effekte für Fächer im MINT-Bereich (Mathematik, Informatik, Naturwissenschaften, Technik) als für

fremdsprachliche und geisteswissenschaftliche Fächer. Die Effektstärken waren zudem bei kürzeren Interventionsstudien höher als bei längeren und wenn auf ein Lernquiz zuhause verzichtet wurde. Moderatoranalysen der Effektstärken „Nur Nachtest“ und „Treatment“ haben verdeutlicht, dass die Effektstärken höher ausfallen, wenn kein Lernmanagementsystem verwendet wird.

Die zweite Studie zielte darauf ab, das Flipped-Classroom-Konzept mit anderen Formen des videobasierten Unterrichts zu vergleichen und festzustellen, welche Schülertypen am meisten vom videobasierten Unterricht profitieren. 38 Schulklassen mit 848 Schülerinnen und Schülern der neunten Klasse nahmen über einen Zeitraum von vier Wochen an einer quasi-experimentellen Interventionsstudie mit Vor- und Nach-Test teil. Zwei unabhängige Variablen wurden vollständig gekreuzt, was zu vier experimentellen Bedingungen führte: Video (zu Hause vs. im Unterricht) und Unterrichtsmethode (schülerzentriert vs. lehrerzentriert). Mehrebenenanalysen ergaben, dass alle vier experimentellen Bedingungen die Lerngewinne der Schülerinnen und Schüler gleichermaßen effektiv förderten. Risikoschülerinnen und Risikoschüler sowie durchschnittliche und ausgezeichnete Schülerinnen und Schüler profitierten am wenigsten vom videobasierten Unterricht. Selbstbewusste und selbstständige Schülerinnen und Schüler hatten die höchsten Lerngewinne von Vor- zu Nach-Test. Die Studie stellt einen ersten Schritt in Richtung einer umfassenderen Bewertung des Flipped-Classroom-Konzepts unter Verwendung eines besser kontrollierten Forschungsdesigns dar und könnte zu einer objektiveren Diskussion über die positiven Auswirkungen des Flipped-Classroom-Konzepts beitragen.

## ABSTRACT

Research on flipped classroom instruction has substantially advanced in the past ten years. Flipped classroom refers to an instructional approach in which students study educational videos at home and do homework assignments in class. Since an increasing number of teachers wants to adopt the flipped classroom approach in their practice, further research—particularly in the context of secondary education—is clearly required. The two presented studies in this thesis aimed at examining the effectiveness of flipped classroom instruction in secondary education by conducting a meta-analytic synthesis of prior studies and an intervention study with a methodologically new approach. Specifically, the studies investigated whether and under which conditions the flipped classroom approach has a positive impact on student achievement and which learners benefit most from a flipped or video-based classroom.

In the first study, meta-analytic methods were used to examine whether the flipped classroom approach, after controlling for sampling error, positively effects student achievement in secondary education. Effect sizes were calculated for the research designs pre-test-post-test (Time), post-test only (PostOnly) and pre-test-post-test with control group (Treatment). Moreover, the impact of four moderator variables as boundary conditions of flipped classroom effectiveness was estimated: disciplinary field, length of the intervention, use of a quiz and use of a learning management system. The meta-analytical findings for the effect size Treatment confirmed the effectiveness of flipped classroom on student achievement in comparison to traditional instruction (Cohen's  $d = 0.42$ ). Moderator analyses on the effect size Time showed stronger effects for subjects in the STEM area (science, technology, engineering, mathematics) than for foreign languages and humanities. The effect sizes were also higher for shorter intervention studies than for longer ones and if quiz at home had been left out. Moderator analyses on the effect sizes PostOnly and Treatment made clear that the effect sizes for intervention studies without a learning management system were higher than with a learning management system.

The second study aimed to compare flipped classroom with other forms of video-based instruction and determine which types of students benefit most from video-based instruction. Thirty-eight school classes with 848 ninth-grade students took part in a quasi-experimental pre-post-test intervention study over the course of four weeks. Two independent variables were completely crossed resulting in four experimental conditions: video (at home vs. in class) and instructional method (student-centred vs. teacher-centred). Multilevel analyses revealed that all four experimental conditions were equally effective in promoting students' learning gains. At-risk, average and excellent students profited least from video-based instruction. Confident and independent students had the highest learning gains from pre- to post-test. The study constitutes a first step towards a comprehensive evaluation of flipped classroom by using a better-controlled research design and may contribute to a more objective discussion about the positive effects of flipped classroom.

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## **CHAPTER 1: GENERAL INTRODUCTION**

## 1.1. Introduction

Within the past decades, the nature of society has changed from an industrial to an information and knowledge society, which represents a significant challenge for the education system. The increasing digitalisation and rapid information growth have resulted in a “knowledge explosion” (Zumbach, 2010). A life without information and communication technologies (ICT) is hardly imaginable for us. Education—as part of the society—has to deal with these changes and adapt to them accordingly. Students have to acquire skills and develop attitudes, which enable them to cope with the constant changes of a digitalised world in an open and flexible way, to competently evaluate innovations and information, to critically question them and to use them profitably. These days, a competent use of ICT is considered to be a fourth cultural technique next to reading, writing and arithmetic (KMK, 2016).

Along with this societal and technological change, a decisive paradigm shift has taken place in recent years due to the introduction of new curricula (e.g. LehrplanPLUS in Bavaria) and competency standards. The primary goal of competency-based education is the application of knowledge and skills in a large variety of contexts and responsible actions on the part of the students. The focus on competencies implies that students should be enabled to work independently and assume responsibility for their learning process (ISB, 2015).

One instructional approach, which emerged out of these developments, is the flipped classroom approach. Jonathan Bergmann and Aaron Sams (2012), two Chemistry teachers from Colorado, are considered to be the pioneers of this approach. In the year 2007, they started recording their lessons so that absent students could catch up on what they had missed. Then, students who were actually in class began to re-watch the videos too, for instance when preparing for exams. As the videos were posted online, students from all over the world started watching them and used them for learning. One day, Aaron Sams made a simple observation:

The time when students really need me physically present is when they get stuck and need my individual help. They don't need me there in the room with them to yak at them and give them content; they can receive content on their own. (Bergmann & Sams, 2012, pp. 4-5)

In this moment, the flipped classroom was born. Flipping the classroom means that students watch pre-recorded video lectures at home as preparation for class and homework assignments are completed in class with the support of the teacher and peers (Bergmann & Sams, 2012). With websites such as the Khan Academy—an online platform which offers an abundance of instructional videos and practice exercises—the flipped classroom approach has gained increasing popularity and educators from all over the world have implemented it in their practice (Bishop & Verleger, 2013; Johnson et al., 2015).

In the scientific literature, however, flipped classroom instruction became subject of interest much later—approximately starting around 2012 (Bishop & Verleger, 2013). In 2015, Abeysekera and Dawson noted: “The flipped classroom approach is under-evaluated, under-theorised and under-researched in general” (p. 2). Since then, numerous research studies have been conducted to examine the implementation and effectiveness of flipped classroom instruction in a large variety of subjects and different student levels—particularly in the context of higher education. This large body of empirical research has already been synthesised in narrative reviews (e.g. Akçayır & Akçayır, 2018; DeLozier & Rhodes, 2016; O’Flaherty & Philipps, 2015; Lo & Hew, 2017a; Lo et al., 2017) and meta-analyses (e.g. Cheng et al., 2019; Lo et al., 2017; van Alten et al., 2019).

When looking at prior research, it becomes evident that flipped classroom studies in the context of primary or secondary education are still rare. Most of the previous studies in secondary education were conducted in STEM domains (science, technology, engineering and mathematics); in other domains, for example English as a foreign language (EFL), hardly any studies have been carried out. More empirical studies are clearly needed to examine the effects of flipped classrooms in secondary education in various domains (Lo & Hew, 2017a). Previous flipped classroom studies also exhibit several methodological

limitations such as small sample sizes, lack of (appropriate) control groups, lack of theory to legitimate and describe the design of the study, lack of randomly assigned participants, un-validated and un-reliable measures for student learning outcomes and lack of control for important cognitive and non-cognitive variables (Cheng et al., 2019). Multiple authors have therefore emphasised the need for more rigorous and robust research designs when evaluating the effectiveness of flipped classroom instruction (e.g. Abeysekera & Dawson, 2015; Cheng et al., 2019; Lo & Hew, 2017a).

The above-mentioned remarks about current societal and educational developments as well as previous research on flipped classroom instruction serve as the starting point for this doctoral thesis. The main aim of this thesis is to closely examine whether flipped classroom instruction constitutes an effective instructional approach that is worth to be implemented in secondary education. To answer this research question, two methodologically different studies were planned, conducted and analysed.

The implementation of such a research project requires a precise theoretical analysis of existing literature and empirical research on flipped classroom instruction. In the following subchapters, the theoretical background of the flipped classroom model is presented, which also served as the theoretical framework for the two studies. First, an overview of existing definitions of flipped classroom instruction in general is provided and used to formulate a working definition for this thesis (Chapter 1.2). Then, a description of the flipped classroom model in secondary education is given, elucidating the two learning phases (out-of-class and in-class learning) of a flipped classroom in greater detail (Chapter 1.3). Finally, the aims of the dissertation are elaborated at the end of this chapter (Chapter 1.4). In Chapter 2, a brief summary of the first study—a meta-analysis about the effectiveness of the flipped classroom in secondary education—is outlined. This study has already been published in the German journal *Zeitschrift für Pädagogische Psychologie*. In Chapter 3, the second study—an intervention study about the effectiveness of flipped classroom instruction in secondary education—is fully reported. Finally, Chapter 4 summarises the main findings of the two studies and discusses implications for educational practice and future research.

## 1.2. Defining Flipped Classroom Instruction

Despite the growing interest and popularity of flipped classroom instruction, there still exists no universally agreed definition or model (Abeysekera & Dawson, 2015; Bernard, 2015; Bishop & Verleger, 2013; Geiger et al., 2019). The term “classroom flip” was first introduced by Baker (2000)—roughly at the same time when Lage et al. (2000) coined the term “inverted classroom” in the context of higher education. According to Lage et al. (2000), inverting the classroom implies that “events that have traditionally taken place inside the classroom now take place outside the classroom and vice versa” (p. 32). Broadly speaking, flipped or inverted classroom entails a change of learning activities in space and time. Initially, this new instructional approach was adopted at universities where students watched technology-enhanced lectures either at home or in computer labs and homework assignments were completed in class and in groups (Lage et al., 2000).

A few years later, Bergmann and Sams (2012)—the two Chemistry teachers from Colorado—took up this approach for secondary education and named it “flipped classroom”. They provide nearly the same definition as Lage et al. (2000): “that which is traditionally done in class is now done at home, and that which is traditionally done at home is now completed in class” (Bergmann & Sams, 2012, p. 13). While these definitions explain the use of the terminology “flipped” or “inverted”, it remains unclear which classroom and at-home activities are usually implemented in a flipped classroom. The Flipped Learning Network—a group of experienced flipped educators founded by Bergmann and Sams—aimed to conceptually define the flipped classroom approach by using the acronym F-L-I-P to depict the “four pillars” of flipped learning (Hamdan et al., 2013). *Flexible environments* imply that a large variety of learning activities can be used in flipped classrooms and that students can choose themselves when and where they learn. The *learning culture* is shifted from teacher-centred instruction to a learner-centred approach, students being responsible for much of their own learning. *Intentional content* denotes the carefully selected contents that teachers choose to teach directly and which students have to explore on their own in the out-of-class learning phase. Despite being less visible in the classroom, *professional*

*educators* take on a key role in flipped classrooms because they have to orchestrate all learning activities and provide individualised feedback and support (Hamdan et al., 2013). Although this model sounds plausible, there are still a variety of aspects of the flipped classroom model which remain vague.

In the scientific literature, the flipped classroom approach is typically characterised by its course structure: individualised computer-based instruction outside the classroom and group-based interactive learning activities inside the classroom (Bishop & Verleger, 2013; DeLozier & Rhodes, 2016). These definitions highlight that flipped classroom not only entails a change in learning activities in space and time but that the use of instructional media for out-of-class learning and the implementation of group-based learning activities inside the classroom are essential components of a flipped classroom (Cheng et al., 2019). Due to this combination of face-to-face and computer-based learning flipped classroom instruction is considered to be a special form of blended learning (Cheng et al., 2019).

However, there is still widespread disagreement in the literature, whether a particular medium has to be used in the out-of-class learning phase in order to be defined as a flipped classroom (Bernard, 2015; van Alten et al., 2019). While some authors argue that watching instructional videos before class is a key part of a flipped classroom (e.g. Bishop & Verleger, 2013; Cheng et al., 2019; Lo et al., 2017), others state that any form of individualised computer-based instruction, e.g. also a set of guiding links or open educational resources, can be implemented (e.g. Johnson et al., 2014). Other researchers even use a broader definition by suggesting that neither instructional videos nor technology have to be incorporated in a flipped classroom (Abeysekera & Dawson, 2015; Akçayır & Akçayır, 2018; O'Flaherty & Philipps, 2015; van Alten et al., 2019). As indicated by Bishop and Verleger (2013), such a broad definition implies that assigning reading as homework and having discussions in class would also be considered a flipped classroom. Such considerable differences in the implementation, however, constitute an obstacle for evaluating the effectiveness of the flipped classroom approach (DeLozier & Rhodes, 2016).

Likewise, it is not clear from the literature whether particular in-class activities have to be implemented in order to be defined as a flipped classroom. Typically used in-class activities in flipped classrooms include quizzes, individual practices, small-group activities (“pair and share”) and student presentations (DeLozier & Rhodes, 2016; Lo & Hew, 2017a). Some authors (e.g. Bishop & Verleger, 2013), however, underline that flipped classrooms require group-based interactive learning activities in the in-class learning phase.

On the basis of previous remarks, the following working definition of flipped classroom instruction can be formulated, which forms the basis of the empirical studies of this dissertation. Flipped classroom is understood as an instructional approach which comprises both the use of educational video materials for out-of-class learning and regular face-to-face meetings for in-class learning. In these face-to-face meetings, group-based activities typically take place. These days, the terms “flipped classroom” and “inverted classroom” are used interchangeably; however, in this doctoral thesis, only the term “flipped classroom” is used, since this is also the term that is commonly found in the literature in the context of secondary education.

### 1.3. Flipped Classroom Instruction in Secondary Education

For the context of secondary education, Lo and Hew (2017a) proposed a flipped classroom model, which is based on a critical review of empirical studies (see Fig. 1.1).

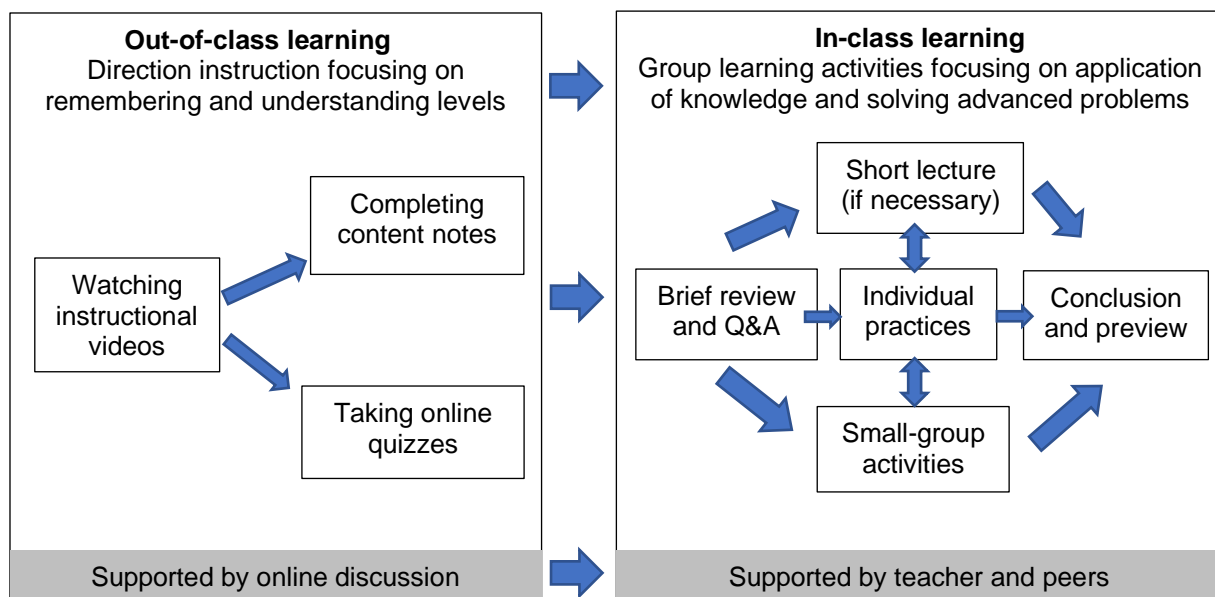


Figure 1.1. Model of Flipped Classroom Approach in K-12 Education (Lo & Hew, 2017a).

Their model comprises two parts: *out-of-class learning* and *in-class learning*. In the out-of-class learning part, students are asked to watch instructional videos, complete content notes and take online quizzes. The main instructional method is direct instruction and the focus lies on the cognitive levels of remembering and understanding. Students may be supported by an online discussion. In the in-class learning part, there is usually a brief review of the video and a question and answer (Q&A) session at the beginning of the lesson. Students have the opportunity to ask further questions about the video contents, which are answered by the teacher. If necessary, the teacher gives a short lecture on topics students have not understood from watching the videos. Then, individual practices and small-group activities take place that focus on the application of knowledge and problem-solving. Students are supported by the teacher and the peers. At the end, the teacher concludes the lesson and gives a short preview on the out-of-class learning activities for the next



lesson (Lo & Hew, 2017a). The two learning phases of flipped classroom instruction in secondary education and their underlying learning mechanisms are now specified in turn.

### **1.3.1. Out-of-Class Learning: Video-Based Learning**

As outlined before, instructional videos are considered to be an essential ingredient of flipped classrooms (DeLozier & Rhodes, 2016). They differ from videos that are watched for entertainment in that they have “the objective to help someone learn about specific concepts or procedures” (De Koning et al., 2018, p. 395). As they include both visual material (in the form of video or pictures) and verbal material (in the form of voice and/or onscreen text), they are a form of multimedia instruction (Fiorella & Mayer, 2018).

Within the past 30 years, a substantial amount of research has been carried out in the field of multimedia learning. Cognitive theories such as Mayer’s Cognitive Theory of Multimedia Learning (Mayer, 2001, 2014) and Sweller’s Cognitive Load Theory (Chandler & Sweller, 1991; Sweller, 1994; Sweller, 2010) provide a theoretical framework for describing and understanding how people learn from multimedia instruction. Mayer’s Cognitive Theory of Multimedia Learning (Mayer, 2001, 2014) is based on three common assumptions:

- (1) Dual-channel assumption: According to Paivio’s Dual Coding Theory (Clark & Paivio, 1991) and Baddeley’s working memory model (Baddeley, 1992), there are two separate channels for the representation and processing of information: a verbal channel for auditory and verbal information (e.g. written or spoken text) and a visual channel for pictorial information (e.g. images).
- (2) Limited-capacity assumption: each channel has a limited capacity for processing information.
- (3) Active processing assumption: information processing involves three types of active processing: selecting relevant material in the sensory memory, organising selected material in the working memory and integrating selected material with

prior knowledge activated from the long-term memory. The whole process of how people learn from words and pictures is delineated in Figure 1.2.

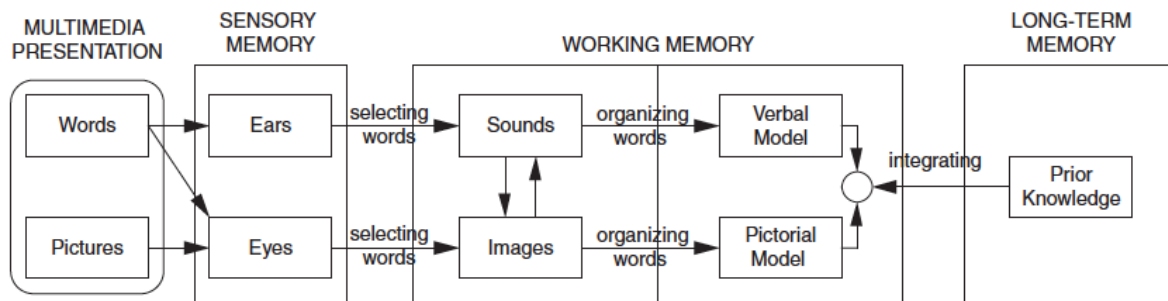


Figure 1.2. Cognitive Theory of Multimedia Learning (Mayer, 2014).

Sweller's Cognitive Load Theory (Chandler & Sweller, 1991; Sweller, 1994; Sweller, 2010) differentiates between three types of cognitive load in the working memory of learners: intrinsic, extraneous and germane cognitive load. Intrinsic cognitive load occurs due to the complexity of the learning material; it cannot be manipulated by instructors apart from changing what is learned or adapting the content to the learner's knowledge level. Extraneous cognitive load results from the instructional design itself, e.g. when learners have to unnecessarily process a huge amount of information simultaneously. Germane cognitive load refers to the cognitive resources that the learner devotes for the acquisition of knowledge, i.e. schema acquisition and automation. It is assumed that intrinsic, extraneous and germane cognitive load add up the overall cognitive load (Paas et al., 2003). In general, the goal is to reduce extraneous cognitive load so that more cognitive resources are available for intrinsic and germane cognitive load (Sweller, 1994, 2010).

Based on these two theories and a large body of empirical research, principles for the design of multimedia learning environments—such as instructional videos—have been developed (Mayer, 2014, 2017). The so-called multimedia principle, which refers to the fact that people learn better from a combination of words and pictures rather than from words alone, provided a starting point for further research that investigates when, how, why and

under which conditions the use of multimedia promotes learning (Butcher, 2014). Some of the most important principles, which can be applied for the design of instructional videos, are summarised in Table 1.1. Mean effect sizes are based on a meta-analytic review conducted by Mayer (2017). If the following design principles are taken into account, it is assumed that instructional videos can foster learning.

Table 1.1

*Design Principles for Computer-Based Multimedia Instruction (Mayer, 2017)*

Principle	Description	<i>k</i>	<i>d</i>
Multimedia	People learn better from a combination of words and pictures rather than words alone.	5	1.67
Coherence	People learn better when extraneous material is excluded.	12	0.70
Signalling	People learn better when essential material is highlighted.	20	0.46
Redundancy	People learn better from graphics and narration than from graphics, narration and onscreen text.	13	0.87
Spatial-contiguity	People learn better when onscreen words are placed next to the corresponding part of the graphic.	8	0.79
Temporal-contiguity	People learn better when narration and graphics are presented simultaneously.	8	1.30
Segmenting	People learn better when a multimedia lesson is presented in small user-paced segments.	12	0.70
Pre-training	People learn better when they learn the key terms prior to receiving a multimedia lesson.	20	0.46
Modality	People learn better from multimedia lesson when words are represented in spoken form.	51	0.72
Personalisation	People learn better when the words in a multimedia lesson are presented in conversational style rather than formal style.	17	0.79
Voice	People learn better from a human voice than a machine-like voice.	6	0.74
Embodiment	People learn better when an onscreen agent uses human-like gestures and movement.	14	0.36

*Note.* *k* = number of experimental comparisons, *d* = mean effect size

Instructional videos, however, have some key features, which differentiate them from other forms of multimedia instruction. Since they provide information dynamically in both auditory and visual channels, they are considered dynamic representations (Ainsworth & VanLabeke, 2004). This implies that learners have to continuously process transient information in their working memory (Merkt et al., 2011). If the information is very complex or presented too fast, it may lead to cognitive overload and thus poorer learning outcomes (Sweller, 2011). One way to reduce cognitive load is to provide interactive features such as allowing the learners to adapt a presentation's pace or sequence according to their cognitive needs and skills (Moreno & Mayer, 2007; Schwan & Riempp, 2004).

In secondary education, instructional videos can either be used within face-to-face classroom lessons or as part of an online or blended learning course such as flipped classroom (Fiorella & Mayer, 2018). The usage patterns of instructional videos in class and at home—when part of a flipped classroom—vary in their level of interactivity. In video-based instruction, the presentation of the video is non-interactive and system-paced: videos are typically presented in broadcast mode in the classroom, meaning that individual learners cannot control the video's transient flow of information (Merkt et al., 2011). Some empirical studies have provided evidence that non-interactive videos are less effective than interactive videos in supporting learning (Schwan & Riempp, 2004; Zhang et al., 2006). In flipped classroom instruction (FCI), in contrast, the presentation of the video is interactive and learner-paced: students can study the videos independently at home and they can pause, rewind, fast-forward and review the video as often as they want. Student's self-pacing of the video should help learners to better manage or even reduce cognitive load and therefore improve learning (Abeysekera & Dawson, 2015). An empirical study conducted by Turan and Goktas (2016) found that students taught with FCI had indeed higher achievement and lower cognitive load levels than students taught with traditional instruction. From these considerations, it can be concluded that watching instructional videos at home (when part of a flipped classroom) may promote learning to a greater extent than watching instructional videos in class.

Lo and Hew's flipped classroom model (2017a) for secondary education suggests that students should not only watch instructional videos at home, but complete content notes and take online quizzes. According to Piolat et al. (2005) note taking is a "complex activity that requires comprehension and selection of information and written production processes" (p. 291). In traditional instruction, note taking constitutes a highly demanding task for students since it is realised under considerable time pressure and working memory capacities are limited (Piolat et al., 2005). In flipped classroom instruction, in contrast, less pressure is put on the students as they can "stop" the teacher (in fact, the video) and take notes at their own pace (Snyder et al., 2014). Besides, they have the possibility to watch the video several times to gain a better understanding of the contents and to finalise their notes (Clark, 2015). In Hattie's (2012) meta-meta-analysis, note taking reached an effect size of  $d = 0.50$ , indicating that it represents an effective learning strategy which can promote student achievement. The positive effect can be explained in two ways: by note taking students record new information to restudy later (*external storage benefit*) and it fosters the encoding of information in ways that enhance later retrieval (*encoding benefit*) (Bui & Myerson, 2014; Di Vesta & Gray, 1972). However, students need to be directed in how to take notes effectively when watching an instructional video in class or at home. Lo (2018) recommends to make use of Mayer's (2014) signalling principle, highlighting important content in the video (e.g. by underlining) in order to direct students' note taking.

In addition to note taking, students are often asked to complete online quizzes about the contents of the video as evidence of their preparation for in-class activities (Chuang et al. 2018). Such quizzes are helpful for both students and teachers as they can check whether students have comprehended the content of the videos. Empirical research has indicated that quizzes have a positive impact on learning outcomes (Bangert-Drowns et al., 1991; Dirx et al., 2014). This result can be explained by the so-called testing effect, which refers to the fact that "tests enhance later retention more than additional study of the material" (Roediger & Karpicke, 2006, p. 181). To sum up, both note taking and completing

online quizzes seem to be effective learning activities for the out-of-class learning phase of a flipped classroom.

### **1.3.2. In-Class-Learning: Group-Based Learning**

The in-class learning phase usually starts with a short summary of the video's content provided by the teacher and a question and answer (Q&A) session to clear up any misunderstandings. Then, the in-class learning phase is mainly characterised by individual and small-group activities, in which students try to apply their acquired knowledge and solve problems with the support of the teacher and their peers (Lo & Hew, 2017a). As the instructional content is removed from in-class time, the additional time can be better utilised for student-centred learning activities (Akçayır & Akçayır, 2018; DeLozier & Rhodes, 2016; Lo & Hew, 2017a).

Student-centred learning has its roots in Constructivist Learning Theory, which assumes that students actively construct knowledge and skills and reorganise their understanding through interactions with their environment (Lee & Hannafin, 2016). Bishop and Verleger (2013) mention several student-centred theories that are relevant in the context of flipped classroom instruction, including, among others, active learning, peer-assisted learning and cooperative learning. While active learning and peer-assisted learning constitute umbrella terms for various student-centred learning methods, cooperative learning refers to a clearly structured educational approach. What all theories have in common is that the focus of instruction and learning is shifted from the teacher to the student.

*Active learning* can be broadly defined as “any instructional method that engages students in the learning process” (Prince, 2004, p. 223). Key features of active learning are student activity and student engagement in the learning process (Roehl et al., 2013). In flipped classroom instruction, students have to actively engage in both out-of-class and in-class learning phase to a large extent and assume responsibility for their own learning process (Lai & Hwang, 2016).

Topping (2005, p. 631) defines *peer-assisted learning* as “the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions”. Students from a similar social group help each other to learn and learn themselves by helping others. Developmental psychologists such as Vygotsky or Piaget have emphasised the important role of social interaction for cognitive development and learning. From a Vygotskian perspective (Vygotsky, 1978), peer-assisted learning fosters meaningful learning because same-age children are more likely within the same zone of proximal development; therefore, students can better learn from each other rather than individually or from an adult (Ginsberg-Block et al., 2008). From a Piagetian standpoint, the benefit of social learning arises from cognitive conflicts and exposure to diversified perspectives when working with peers (Ginsberg-Block et al., 2008). In flipped classroom instruction, more in-class time can be devoted to different peer-assisted learning activities such as peer instruction (e.g. Jungić et al., 2014), group-based learning (e.g. Hao, 2016) or cooperative learning (e.g. in the form of jigsaw activities as in Gilboy et al., 2015).

Within the past decades, *cooperative learning* has become one of the most prominent instructional approaches in schools and universities all around the world. Its success largely relies on the combination of a solid theoretical framework, a substantial body of research and implemented practices (Johnson & Johnson, 2009). Group-based learning, however, is not the same as cooperative learning. Johnson and Johnson (2002; Johnson et al., 1998) identified five essential elements of cooperative learning:

- (1) *Positive interdependence* refers to the perception that each student is linked with other students in such a way that they cannot succeed unless the others do (and vice versa).
- (2) *Individual accountability* exists when the performance of each student is assessed individually and the results are reported back to the group and the individual.

- (3) *Promotive interaction* means that individuals support and promote each other's success face-to-face (by helping, assisting, encouraging and complimenting one another's efforts to learn).
- (4) *Social skills* such as leadership, decision-making, trust-building, communication and conflict-management skills need to be taught so that students can cooperate well with each other.
- (5) *Group processing* occurs when group members regularly reflect on which member actions were useful to attain goals and make decisions about which actions to continue or change.

The most recent meta-analysis on cooperative learning conducted by Kyndt et al. (2013) found a significantly positive effect of face-to-face cooperative learning on achievement outcomes with an average effect size of 0.54. In flipped classroom instruction, different methods of cooperative learning can be incorporated such as think-pair-share (Flynn, 2015; McLaughlin et al., 2013) or jigsaw (Gilboy et al. 2015). To sum up, integrating cooperative learning methods in flipped classrooms seems to be a promising approach to maximising student achievement.

#### **1.4. Aims of the Studies**

The main aim of this dissertation thesis is to investigate the effectiveness of flipped classroom instruction on student achievement in secondary education. Two methodologically different studies were conducted to test whether flipped classroom instruction has a positive impact on student learning outcomes.

Study 1 is a meta-analytic synthesis of the past years of research on the effectiveness of flipped classroom instruction, which aims at examining whether flipped classroom instruction—after controlling for sampling error—has a positive impact on student achievement in secondary education. In addition, the study aims to estimate (some



of the) boundary conditions for the effectiveness of flipped classroom instruction such as disciplinary field, length of the intervention, use of a quiz and use of a learning management system.

Study 2 is a quasi-experimental pre-post-test intervention study, which aims at investigating whether flipped classroom instruction is more effective in terms of promoting student achievement than other forms of video-based instruction. Moreover, the study seeks to determine which types of students benefit most from video-based instruction by using latent profile analysis. The study addresses (some of the) methodological limitations of previous research by using a larger sample size, well-controlled conditions and multi-level analyses.

Both studies aim to scrutinise and assess flipped classroom instruction by employing robust research designs and methodologies. The ultimate goal is to offer theoretically and practically relevant information for the design and implementation of flipped classroom instruction in secondary education.

**CHAPTER 2: EFFECTIVENESS OF THE FLIPPED CLASSROOM ON STUDENT  
ACHIEVEMENT IN SECONDARY EDUCATION: A META-ANALYSIS**

The first study of the dissertation has been published in the German journal *Zeitschrift für Pädagogische Psychologie*. It is available as an online version and in printed form:

Wagner, M., Gegenfurtner, A., & Urhahne, D. (2020). Effectiveness of the flipped classroom on student achievement in secondary education: A meta-analysis. *Zeitschrift für Pädagogische Psychologie*, 1–21. <https://doi.org/10.1024/1010-0652/a000274>

A brief summary of the study is presented in this chapter.

## 2.1. Summary of Study 1

A considerable amount of studies dealing with the flipped classroom model has been published in recent years. This body of literature has been synthesised in narrative reviews and meta-analyses. Results of prior meta-analyses, however, provided heterogeneous evidence concerning the effectiveness of this instructional approach. Moreover, no meta-analysis has yet specifically addressed the context of secondary education. Therefore, we wanted to perform a meta-analysis on studies conducted in secondary school settings and in different disciplinary fields.

The meta-analysis had two aims. A first aim was to use meta-analytic methods to examine whether the flipped classroom approach, after controlling for sampling error, positively impacts student achievement in secondary education. Effect sizes were calculated for the research designs pre-test-post-test (Time), post-test only (PostOnly) and pre-test-post-test with control group (Treatment). A second aim of the study was to estimate the impact of four moderator variables as boundary conditions of flipped classroom effectiveness: disciplinary field, length of the intervention, use of a quiz and use of a learning management system.

The meta-analytical findings for the effect size Treatment confirmed the effectiveness of flipped classroom on student achievement in comparison to traditional instruction (Cohen's  $d = 0.42$ ). Moderator analyses on the effect size Time showed stronger effects for subjects in the STEM area (science, technology, engineering, mathematics) than for foreign languages and humanities. The effect sizes were also higher for shorter intervention studies than for longer ones and if quiz at home had been left out. Moderator analyses on the effect sizes PostOnly and Treatment made clear that the effect sizes for intervention studies without a learning management system were higher than with a learning management system. In sum, the findings provided significant evidence of the effectiveness of the flipped classroom on student achievement and gave insight into (some of the) boundary conditions of flipped classroom in secondary education. Above all, it laid the cornerstone for the design and implementation of Study 2.

**CHAPTER 3: IMPLEMENTING FLIPPED CLASSROOM INSTRUCTION IN  
SECONDARY EDUCATION: WORTH THE HYPE?**

### **3.1. Introduction**

Over the past few decades, the use of instructional videos in education and educational research has grown tremendously and instructional videos are presently regarded as one of the most popular forms of delivering instruction (Bétrancourt & Benetos, 2018; Brame, 2016; De Koning et al., 2018; Giannakos, 2013). They differ from videos that are watched for entertainment in that they have “the objective to help someone learn about specific concepts or procedures” (De Koning et al., 2018, p. 395). Instructional videos are frequently integrated in traditional classroom settings and play a crucial role in blended learning formats such as flipped classrooms (DeLozier & Rhodes, 2016).

Flipped classroom refers to an instructional approach, which is typically characterised by its “flipped” course structure: students study instructional videos at home and homework assignments are done in class (Bishop & Verleger, 2013; DeLozier & Rhodes, 2016; Lo & Hew, 2017a). Lately, flipped classroom instruction (FCI) has attracted widespread attention being extensively examined in different educational contexts—particularly in higher education. Several meta-analyses have shown that FCI can have small positive effects on student achievement (Cheng et al., 2019; Lo et al., 2017; Strelan et al., 2020; van Alten et al., 2019; Wagner et al., 2020). When taking a closer look at the educational level, it becomes evident that rigorous empirical studies about FCI in the context of secondary education are—despite the current hype—still scarce (Bond, 2020; van Alten et al., 2019; Wagner et al., 2020). More robust research is clearly needed to estimate the effectiveness of FCI in secondary education and to determine which types of students benefit most from a flipped or video-based classroom.

#### **3.1.1. Video-Based and Flipped Classroom Instruction**

As noted at the outset, instructional videos can either be used within face-to-face classroom lessons or as part of an online or blended learning course such as flipped classroom (Fiorella & Mayer, 2018). Since instructional videos provide information dynamically in both auditory and visual channels, they are considered dynamic

representations, which revealed to be effective in improving learning compared to static representations (Berney & Bétrancourt, 2016; Höffler & Leutner, 2007). However, the usage patterns of instructional videos in class and at home—when part of a flipped classroom—differ in their level of interactivity.

In video-based instruction (VBI), the presentation of the video is non-interactive and system-paced: videos are typically presented in broadcast mode in the classroom, meaning that individual learners cannot control the video's transient flow of information (Merk et al., 2011). If the transient information is very complex or presented too fast, it may lead to a cognitive overload and thus poorer learning outcomes (Sweller, 2011). Some empirical studies have provided evidence that non-interactive videos are less effective than interactive videos in supporting learning (Schwan & Riempp, 2004; Zhang et al., 2006).

In flipped classroom instruction (FCI), in contrast, the presentation of the video is interactive and learner-paced: students can study the videos independently at home and they can pause, rewind, fast-forward and review the video as often as they want. Student's self-pacing of the video should help learners to better manage or even reduce cognitive load and therefore improve learning (Abeysekera & Dawson, 2015). An empirical study conducted by Turan and Goktas (2016) found that students taught with FCI had indeed higher achievement and lower cognitive load levels than students taught with traditional instruction.

However, watching instructional videos at home is only one part of the “flipped” course structure. DeLozier and Rhodes (2016) concluded in their comprehensive review that “video lectures themselves do not affect learning” (p. 144). The main advantage of viewing instructional videos prior to class is that it frees up class time for active and student-centred learning (Akçayır & Akçayır, 2018; Bishop & Verleger, 2013; DeLozier & Rhodes, 2016; Lo & Hew, 2017a). Typical in-class activities in flipped classrooms include audience response and open questions, cooperative learning activities (“pair-and-share”), student presentations, discussion and individual or paired quizzes (DeLozier & Rhodes, 2016). Student-centred learning implies that students take over responsibility for much of their own

learning, while teachers assume the role of a facilitator or guide rather than a mere instructor, offering individualised feedback (Bishop & Verleger, 2013; Lo, 2018; Sohrabi & Iraj, 2016). Besides, students get support from their peers, as most activities are performed in pairs or small groups (Lo & Hew, 2017a). A meta-analysis by Kyndt et al. (2013) confirmed that face-to-face cooperative learning has a positive effect on student achievement and attitudes. In sum, flipped classroom instruction comprises both video-based learning outside the classroom and group-based learning inside the classroom.

### **3.1.2. Effects on Student Achievement**

Several meta-analyses have already documented small positive effects of FCI on student achievement (Cheng et al., 2019; Lo et al., 2017; Strelan et al., 2020; van Alten et al., 2019; Wagner et al., 2020). Some of these meta-analyses included the educational level (e.g., secondary education) as a moderator in order to detect if FCI is an effective approach for learners of different ages. Cheng et al. (2019), for example, reported a mean effect size of  $g = 0.216$  ( $k = 21$ ) for K-12 students. Strelan et al. (2020) found even a higher mean effect size of  $g = 0.64$  ( $k = 21$ ) for secondary school students. Lo et al. (2017) and van Alten et al. (2019) did not specify separate effect sizes for secondary students, since only a small proportion of the studies included was conducted in this area. The meta-analysis by Wagner et al. (2020) focused solely on flipped classroom studies on the secondary school level and yielded a mean effect size of  $d = 0.42$  ( $k = 20$ ). Based on these results, FCI seems to be a promising approach, which can be implemented in secondary education. However, as can be seen from the small amount of studies included in these meta-analyses, more robust research, which makes use of appropriate control groups (van Alten et al., 2019), is still needed in order to figure out if FCI is indeed an approach worth to be implemented in secondary education.



### 3.1.3. Interindividual Differences

Interindividual differences such as students' intelligence, motivation or self-beliefs can explain a unique amount of variance in students' academic achievement (Hattie, 2012; Kriegbaum et al., 2018; Lee & Stankov, 2018). To date, only few FCI studies have considered relevant student characteristics in their analyses, which might be important predictors of students' achievement outcomes.

In the context of higher education, Lyons et al. (2017) investigated whether students' personality, goal orientation and exam preparedness influenced their preference for FCI compared to traditional instruction. Agreeableness and mastery goal approach turned out to be significant predictors for preferring FCI. Students' exam performance, however, was not included in their analysis. Chen et al. (2019) examined the relationship among gender, cognitive styles, learning strategies and learning performance and found that cognitive styles and learning strategies had a significant impact on learning performance, while gender did not.

In the context of secondary education, only the study conducted by Hao (2016) took a closer look at the relationship of students' personal characteristics and flipped learning readiness in the EFL classroom. Results revealed that students' foreign language beliefs, perceptions of their teachers, availability of outside-school support and resources, learning performance, study time and net-surfing time significantly affected different dimensions of flipped learning readiness. However, like in the study by Lyons et al. (2017), effects on student achievement were not investigated. The present study addresses this research gap and examines the influence of cognitive, motivational and self-regulatory student characteristics on achievement outcomes in flipped and video-based classrooms.

In terms of cognitive characteristics, *prior knowledge* is an essential student variable for learning, which usually yields positive effects on student achievement (Dochy et al., 1999). Overall, prior knowledge can explain between 30% and 60% of the variance in achievement outcomes (Dochy et al., 2002). Regarding motivational characteristics, a large variety of motivational constructs exists in the literature, which can be roughly divided into

expectancy and value constructs (Kriegbaum et al., 2018). *Domain-specific self-concept*, for example, can be assigned to expectancies and is defined as students' self-perceptions about their abilities in a certain academic domain (Marsh & Martin, 2011). According to the reciprocal-effects model (Marsh & Martin, 2011), academic self-concept is reciprocally associated with academic achievement, meaning that self-concept has a positive effect on subsequent achievement and vice versa. *Individual interest*, e.g. in the subject English as a foreign language, can be assigned to values and is defined as a personality trait or motivational disposition, such as a stable preference for a specific learning topic (Krapp, 1999). A meta-analysis by Schiefele et al. (1993) has shown that the relationship between domain-specific interest and student achievement is usually weak to moderate ( $r = .30$ ). Regarding self-regulatory characteristics, *self-regulatory learning skills* include many of the most important predictors of student achievement (Dent & Koenka, 2015). Ziegler and Stöger (2005) developed a seven-step cyclical model of self-regulated learning, which comprises all important aspects: (1) self-assessment, (2) goal setting, (3) strategic planning, (4) strategy implementation, (5) strategy monitoring, (6) strategy adjustment, and (7) outcome evaluation. Previous research emphasised the important role of self-regulatory learning skills in flipped classrooms (e.g., Lai & Hwang, 2016; van Alten et al., 2020), arguing that FCI both requires and fosters self-regulated learning (Hewitt et al., 2014).

#### **3.1.4. The Present Study**

The present study addresses methodological issues, which have been neglected in prior research. First, flipped classroom studies are often small with no more than 100 participants, usually comparing just a few classes from only one school (Bond, 2020). We used a much bigger sample so that findings can be generalised to a higher extent. Second, flipped classrooms are typically compared with control classes, in which students receive direct instruction and further practice at home. While the experimental groups are watching engaging instructional videos at home, the control groups do not experience any benefit. There only exist few studies, in which students of the control group watched the same

instructional videos as students of the experimental group, yet in a traditional classroom setting (e.g., Chen, 2016; Sezer, 2017). We followed a similar path and sought to reduce this differential treatment by using the same instructional videos in all conditions, thereby guaranteeing that all students receive the same information and keeping time on task relatively constant across conditions. Third, prior empirical research did not consider the hierarchical data structure (i.e., students nested into classes). We, however, apply multilevel regression analyses to control for the correlated responses within classes. In sum, the first aim of the study is to examine different instructional design characteristics of flipped and non-flipped, but video-based classrooms and their effects on student achievement by using a better-controlled and more conclusive research design. It was assumed that flipped classroom would outperform the other conditions as it has demonstrated its superiority in several meta-analyses.

To determine which types of students benefit most from flipped and video-based classrooms, the current study employs latent profile analysis (LPA), which tries to identify latent profiles of students based on their responses to continuous variables (i.e., indicators). As a second aim, the study seeks to answer whether (1) latent profiles of students based on certain student characteristics can be identified, (2) whether the membership in these profiles is related to the participants' experimental status and (3) which learner profile is most successful in terms of the development of student achievement. Thereby, the study intends to draw conclusions about the effectiveness of flipped and video-based instruction in secondary education for different learner profiles.

## **3.2. Method**

### **3.2.1. Participants**

Data were collected in 38 ninth-grade English as a Foreign Language (EFL) classes from 12 secondary schools (*Realschule*) in the German state of Bavaria. Initially, 983 students agreed to participate in the study; however, data from 135 students who were absent during the pre- or post-test had to be excluded. The resulting sample comprised a

total of 848 (86.27%) ninth-grade students (52.5% female). The students were on average 14.85 years old ( $SD = .70$ ). A significant difference concerning the distribution of gender between groups was detected ( $\chi^2 = 28.36$ ,  $df = 3$ ,  $p < .001$ ). Therefore, gender was considered as a control variable. The teachers (68.6% female) were on average 42.48 years old ( $SD = 9.62$ ) and had a mean work experience of fifteen years ( $M = 15.37$ ,  $SD = 8.97$ ).

### 3.2.2. Materials

**Instructional videos.** A total of six instructional videos about different English grammar topics positioned in the curriculum were created using the free online video making software “Adobe Spark Video”. Various psychological theories, such as Sweller’s (2011) cognitive load theory, Renkl’s (2014) theory of example-based learning and Mayer’s (2014) principles of multimedia design, as well as EFL education theories, in particular Newby’s (2014) cognitive and communicative approach of teaching grammar, served as a guideline for designing the videos. All videos had a recommended maximum duration of six minutes (Brame, 2016) and a similar structure. First, the new grammatical structure, for example, “would rather”, is introduced through several situational examples (e.g., “I would rather stay at home tonight than go to the cinema”, situational context: talking about preferences), which are supported with visual aids. Second, the students have to think about what this new structure could mean. Third, an explanation of the grammatical structure is provided (in English) and the students take a closer look at the examples again. Fourth, the students are asked to complete two sentences using the new grammatical structure. At the end of the video, a summary of the content is presented.

**Worksheets.** Besides the video, the students received a worksheet with additional explanations and exercises for each specific grammar topic. In case students had difficulties in completing the exercises, they could look up important information on the worksheet, for instance how the grammatical structure is used in different types of sentences (questions, negations etc.).

**Grammar achievement.** An adapted version of the standardised DESI grammar test (Nold & Rossa, 2007) was employed to measure students' grammar achievement before and after the intervention. This grammar test was originally designed for ninth-grade students; however, the tasks were adapted to the grammar topics being dealt with during the intervention. In total, the test contained 18 error correction tasks, in which the students had to first identify a grammatical error in one of three marked areas and second write down the right solution. The internal consistency of the grammar test with 36 items was satisfying, with Cronbach's  $\alpha = .85$  in the pre-test and  $\alpha = .89$  in the post-test. The following is a sample item:

A: "When you lived in New York, [A: did you use to go] to the theatre very often?" B:

"No, I [B: didn't use to go] there, but my mum [C: used to went] regularly."

Right solution: \_\_\_\_\_

In this example, the grammatical error lies in C and the right solution would be "used to go".

**English self-concept.** Students' English self-concept was measured before the intervention with five items taken from the DESI study (Wagner et al., 2009), which had an internal consistency of  $\alpha = .92$ . A five-point Likert scale ranging from "completely disagree" to "completely agree" was used. Sample item: "I get good grades in the subject English".

**Interest in the subject EFL.** Students' interest in the subject EFL was determined before the intervention with six items ( $\alpha = .87$ ) taken from the KESS 10/11 study (Ivanov et al., 2016) and a five-point Likert scale as well. Sample item: "I am looking forward to English lessons".

**Self-regulatory learning skills.** Students' self-regulatory learning skills were assessed with an adapted version of the Questionnaire of Self-Regulated Learning-7 by Ziegler et al. (2010) before the intervention. This questionnaire was constructed based on Ziegler's and Stöger's (2005) seven-step cyclical model of self-regulated learning. The learning situations were adapted to the intervention study: (1) studying for the subject EFL, (2) learning with instructional videos, (3) learning in groups and (4) doing homework assignments. For each situation, students were asked to state their preferred learning method for each of the seven

steps of self-regulated learning by choosing one of three possible answers: self-regulated, externally regulated or unreflective-impulsive learning. For each self-regulated answer, the students got one point. The internal consistency of the test with 28 items was satisfying, with Cronbach's  $\alpha = .84$ . The following is a sample item (Situation 1, Step 1: self-assessment):

How do you study for the subject English?

- (a) Before I start studying, I think about what I can already do well and what I can't do yet. Then I compare it with what I want to learn. [self-regulated learning]
- (b) Before I start studying, I don't think about what I can already do well and what I can't. I'd rather start right away. [unreflective-impulsive learning]
- (c) Before I start studying, the teacher should tell me what I can already do well and what I still have to learn. [externally-regulated learning]

### 3.2.3. Research Design and Procedure

A quasi-experimental 2×2 factorial design with pre- and post-test was employed. Two independent variables were completely crossed resulting in four experimental conditions: video (at home vs. in class) and instructional method (student-centred vs. teacher-centred). In each school, the classes were randomly assigned to one of four conditions. In all four conditions, the same instructional videos and worksheets were used. Only slight variations were adopted regarding instructional video use and teaching method.

**Video at home + student-centred.** The ten classes ( $n = 215$ ) in this condition watched the instructional videos at home as preparation for class. The lessons at school were characterised by alternating individual and dyadic learning phases. First, the students completed several grammar exercises individually and then compared and discussed their results with a learning partner who has also finished a certain amount of exercises at the same time. The teacher served as a coach and resource rather than a purveyor of information, supporting the students when needed.

**Video at home + teacher-centred.** These nine classes ( $n = 201$ ) also watched the instructional videos at home. During the lessons, they completed several exercises first independently and then the results were compared on the plenary level. The teacher acted as a controller, being in charge of the whole class and leading the classroom discourse.

**Video in-class + student-centred.** These eight classes ( $n = 169$ ) classes watched the instructional videos at the beginning of the lesson. Afterwards alternating individual and dyadic learning phases (like in the first condition) took place. Similar to the second condition, the teacher functioned as a coach and resource of information.

**Video in-class + teacher-centred.** These eleven classes ( $n = 263$ ) also watched the instructional videos at the beginning of the lesson. After that, they completed several grammar exercises first individually and then the results were compared on the plenary level. Like in the second condition, the teacher served as a controller.

The intervention study was approved by the Ministry of Education, the headmaster of the school, the teachers and the parents of the students. Participation in the study was voluntary, anonymous and did not affect students' marks. Pre- and post-tests were conducted in the students' regular school lessons by an experienced researcher. Between pre- and post-tests were approximately four weeks, in which the teachers had to use six instructional videos and six worksheets in their regular English lessons.

### 3.2.4. Statistical Analyses

#### Multilevel Regression Analyses

To allow for the hierarchical data structure (i.e., students nested in classes), multilevel regression analyses were conducted in Mplus 8.4 (Muthén & Muthén, 2017). Two models were calculated using the grammar post-test score as outcome variable. In model 1, post-test scores were regressed on the student-level predictors (gender, English self-concept, interest in the subject EFL, self-regulatory learning skills and pre-test scores). All student-level predictors, except for gender, were group-mean centred. In model 2, post-test scores were regressed on the two class-level variables (video, instructional method)

indicating the four conditions and their interaction. Student-level predictors were added as control variables in the model.

### **Latent Profile Analysis**

To find out whether latent classes of students based on several student characteristics can be identified in our sample, we applied latent profile analysis (LPA) using Mplus. In LPA, a categorical latent profile variable is specified to which participants are allocated probabilistically based on their responses to a set of continuous indicators (Vermunt & Magidson, 2002). In this study, we used different student characteristics as indicators, namely students' prior knowledge, English self-concept, interest in the subject EFL and self-regulatory learning skills. The means of the continuous variables were z-standardised so that they could be compared with each other. Since students were nested in classes, a design-based correction of standard errors was accomplished in all LPA analyses via the "type is complex" procedure available in Mplus. The decision on the number of classes was based on several criteria (Marsh et al., 2009; Nylund et al., 2007). First, statistical fit indices, such as the Akaike Information Criterion [AIC], the Bayesian Information Criterion [BIC] and the adjusted BIC [aBIC] were inspected. Lower values of the information criteria (IC) indicate better model fit. Based on the results of a study, Nylund et al. (2007) concluded that the BIC is superior to all other information criteria in identifying the correct model. Therefore, it served as the most convincing IC. Second, classification certainty measured as entropy was taken into account. This statistic can range from 0 to 1 and higher values represent higher classification certainty. Third, the results of the Vuong-Lo-Mendell-Rubin-Test (VLMRT) and the Lo-Mendell-Rubin-Adjusted-Likelihood-Ratio-Test (LMR) were taken into consideration. Significant  $p$ -values refer to an improvement in fit for the inclusion of one more profile (Nylund et al., 2009). The fourth criterion was the meaningful interpretability of the solution (Marsh et al., 2009).

To check whether the membership to a class is related to the students' experimental status, we included the independent variables instructional video use (0 = in class, 1 = at home) and teaching method (0 = teacher-centred, 1 = student-centred) as covariates in the



LPA. In a latent multinomial logistic regression, students' most likely class membership was regressed on instructional video use and teaching method via the three-step (R3STEP) method in Mplus (Asparouhov & Muthén, 2014).

To determine which learner profiles were most successful in terms of the development of grammar achievement, the learning gains (students' score in post-test minus students' score in pre-test) were incorporated as a distal outcome in the LPA. Specifically, the learning gains were regressed on the latent profile variable implementing the BCH approach in Mplus (Bakk & Vermunt, 2016; Bolck et al., 2004). This approach "involves performing a weighted ANOVA, with weights that are inversely related to the classification error probabilities" (Bakk & Vermunt, 2016, S. 21). The main advantage of this approach is that the individual uncertainty of profile classification is taken into consideration (Ferguson et al., 2019). Differences in profile-specific means for the outcome variable "learning gains" were tested using Wald- $\chi^2$  tests (Bakk & Vermunt, 2016).

### 3.3. Results

#### 3.3.1. Students' Grammar Achievement

Table 3.1 presents the descriptive statistics for the pre- and post-tests. A repeated-measures ANOVA with pre- and post-test as within-subject factors and video and teaching method as between-subject factors was conducted. The main effect of time shows a significant improvement of grammar achievement from pre- to post-test ( $F(1, 844) = 133.44$ ,  $p < .001$ ,  $\eta_{p2} = .134$ ). The interaction effect of time and video did not reach significance ( $F(1, 844) = 3.57$ ,  $p = .059$ ,  $\eta_{p2} = .004$ ), but the interaction effect of time and method was significant ( $F(1, 844) = 4.10$ ,  $p = .043$ ,  $\eta_{p2} = .005$ ) indicating higher learning gains in student-centred classes. However, the expected interaction effect of time, video and method could not be found ( $F(1, 844) = 0.03$ ,  $p = .856$ ,  $\eta_{p2} = .000$ ). The intercorrelations of students' learning outcomes and student characteristics are displayed in Table 3.2.

Table 3.1

*Means and Standard Deviations of Students' Grammar Achievement by Condition*

	Video at home + student-centred ( <i>n</i> = 215)		Video at home + teacher-centred ( <i>n</i> = 201)		Video in class + student-centred ( <i>n</i> = 169)		Video in class + teacher-centred ( <i>n</i> = 263)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	Pre-test	20.03	6.80	19.45	6.96	18.29	6.89	19.36
Post-test	22.09	6.98	20.85	7.43	21.10	7.31	21.37	7.25
Learning gains	2.06	5.46	1.39	5.14	2.81	5.20	2.04	5.22

Table 3.2

*Intercorrelations of Student Learning Outcomes and Student Characteristics*

Variable	<i>M</i>	<i>SD</i>	(2)	(3)	(4)	(5)	(6)	(7)
(1) Pre-test	19.34	6.72	.72**	-.29**	.60**	.41**	.03	.19**
(2) Post-test	21.37	7.24	-	.46**	.55**	.38**	.07	.23**
(3) Learning gains	2.04	5.22		-	-.02	-.01	.13	.08*
(4) English self-concept	3.12	1.00			-	.58**	.01	.02
(5) Interest	3.45	0.82				-	.23**	.15**
(6) Self-regulatory learning skills	11.86	5.86					-	.15**
(7) Gender (0 = male, 1 = female)	-	-						-

Note. \*  $p < 0.05$ , \*\*  $p < 0.01$ .

### 3.3.2. Results of the Multilevel Regression Analyses

The null model showed an intra-class correlation (*ICC*) of .154. This means, 15.4% of the variability in the student learning outcomes was explained by between-class differences. Therefore, a multilevel approach was warranted (Finch & Bolin, 2017). Results for models 1 and 2 with the outcome variable “grammar post” are depicted in Table 3.3.

Table 3.3

*Multilevel Regression Analyses Predicting Student Achievement from Individual Student Variables and Intervention*

	Model 1			Model 2		
	$\beta$	<i>SE</i>	<i>p</i>	$\beta$	<i>SE</i>	<i>p</i>
<i>Student level</i>						
<i>(level 1)</i>						
Gender	.11	.03	< .001	.11	.03	< .001
(1 = female)						
Pre-test	.54	.03	< .001	.54	.03	< .001
English self-concept	.21	.03	< .001	.21	.04	< .001
Interest in the subject EFL	.02	.03	.541	.02	.03	.544
Self-regulatory learning skills	.01	.02	.395	.01	.02	.400
<i>Class level</i>						
<i>(level 2)</i>						
Video <sup>a</sup>				-.11	.23	.638
Instructional method <sup>b</sup>				.05	.26	.839
Video * instructional method				.16	.30	.588
Intercept				7.34	1.04	< .001
Explained variance ( $R^2$ )	Estimate	<i>SE</i>	<i>p</i>	Estimate	<i>SE</i>	<i>p</i>
Student level	.518	.03	< .001	.518	.03	< .001
Class level				.030	.05	.585

*Note.* <sup>a</sup> dummy-coded: in class = 0 and at home = 1. <sup>b</sup> dummy-coded: teacher-centred = 0 and student-centred = 1.

Model 1 shows that students' gender, English self-concept and pre-test scores were significantly related to students' post-test scores. Students' interest in the subject EFL and

self-regulatory learning skills, however, had no significant impact on student learning outcomes. In total, student-level predictors could explain 51.8% of the variance in post-test scores. Model 2 indicates that the intervention variables (video, instructional method and their interaction) had no statistically significant effect on post-test scores. The  $R^2$  for the class level is .030, meaning that only 3% of the variance in the grammar post-test scores is associated with the intervention variables.

### **3.3.3. Results of the Latent Profile Analyses**

#### **Learner profiles based on student characteristics**

LPA models with two to eight profiles (see Table 3.4) suggested either a solution with three or five profiles. The low BIC value provided evidence for the five-type solution, while the significant  $p$ -values of the VLMRT and LMR supported the three-type solution. A closer examination of the latent profiles revealed that the five-type solution showed five qualitatively different learner profiles, whereas the three-type solution categorised the students only in low-performing, average and high-performing students. Even though the sample size of one group was rather small (2.39%), this group is interesting content-wise and has still the size of an average class (around 20 students). Based on the fit indices and interpretability of the solution, we regarded the five-profile solution as conceptually and statistically more appropriate. The reliability of the classification was acceptable, as assessed by the average classification probability ( $p = .80$ ) and entropy (see Table 3.4).

Table 3.4

*Selection Criteria for Profile Solution*

# Profiles	AIC	BIC	aBIC	VLMRT	LMR	Entropy
2	9012.728	9074.386	9033.102	.000	.000	0.747
3	8880.205	8965.577	8908.415	.008	.009	0.725
4	8844.040	8953.126	8880.085	.255	.264	0.767
5	<b>8814.387</b>	<b>8947.187</b>	<b>8858.268</b>	<b>.375</b>	<b>.384</b>	<b>0.722</b>
6	8802.180	8958.695	8853.897	.392	.399	0.714
7	8782.018	8962.248	8841.571	.377	.384	0.684
8	8774.892	8978.836	8842.281	.546	.550	0.683

*Note.* AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = sample size adjusted BIC; VLMRT = p-value of the Vuong-Lo-Mendell-Rubin-Test; LMR = p-value of the Lo-Mendell-Rubin-Adjusted-Likelihood-Ratio-Test; boldface font indicates the chosen class-solution.

The five learner profiles were labelled according to their mean profiles (see Fig. 3.1) as *at-risk students*, *confident students*, *average students*, *independent students* and *excellent students*. *At-risk students* ( $n = 135$ , 15.71% of students) showed poor performance in the pre-test, rather low self-regulatory learning skills and the lowest values in English self-concept and interest. *Confident students* ( $n = 19$ , 2.39% of students) exhibited average performance in the pre-test, the lowest self-regulatory learning skills and interest, yet the highest English self-concept. *Average students* ( $n = 253$ , 29.74% of students) were characterised by moderate values on all variables. *Independent students* ( $n = 261$ , 30.90% of students) demonstrated rather poor performance in the pre-test, low English self-concept and interest, but good self-regulatory learning skills. *Excellent students* ( $n = 180$ , 21.26 % of students) displayed very good performance in the pre-test, the highest self-regulatory learning skills and interest and a high English self-concept as well.

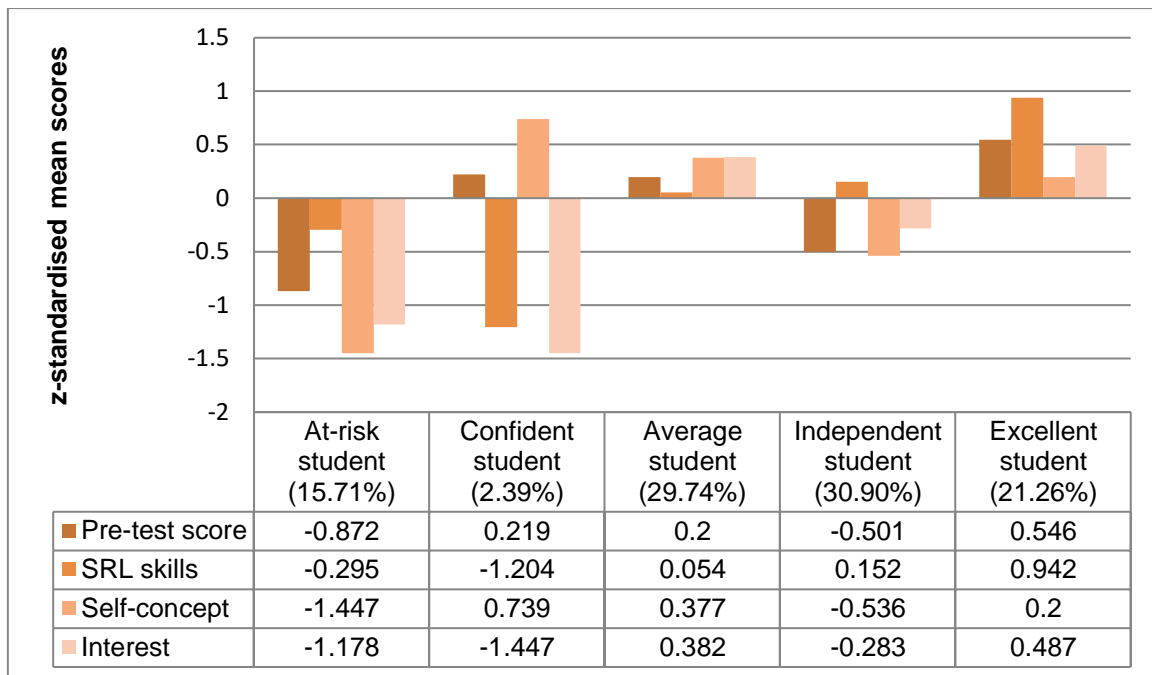


Figure 3.1. Profiles of Learner Types (Mean Scores Z-standardised for Presentation).

Percentages of Students Classified as Learning Types in Brackets.

### Relations between latent profile membership and experimental status

Table 3.5 depicts the results of the multinomial logistic regression analysis implemented via the three-step approach in Mplus. The independent variables instructional video use (0 = in class, 1 = at home) and teaching method (0 = teacher-centred, 1 = student-centred) were added as covariates in the latent profile analysis. The main aim of this analysis was to find out whether latent profile membership was related to the students' experimental status. Profile 1 (*at-risk students*) served as the reference group.

Table 3.5

*Relations Between Latent Profile Membership and Experimental Status*

	<i>B</i>	<i>SE</i>	<i>OR</i>	<i>p</i>
Profile 2 vs. Profile 1				
Video	1.12	0.71	3.08	0.344
Method	-3.19	8.20	0.04	0.004
Video x Method	0.92	8.39	2.51	0.943
Profile 3 vs. Profile 1				
Video	0.42	0.47	1.52	0.462
Method	0.48	0.40	1.61	0.347
Video x Method	0.04	0.61	1.04	0.946
Profile 4 vs. Profile 1				
Video	0.08	0.34	1.08	0.828
Method	0.12	0.32	1.13	0.726
Video x Method	0.16	0.58	1.17	0.790
Profile 5 vs. Profile 1				
Video	0.25	0.43	1.28	0.613
Method	-0.48	0.54	0.62	0.247
Video x Method	0.76	0.69	2.13	0.445

*Note.* Profile 1 is reference category; video: 1 = at home; treatment: 1 = student-centred; *B* = regression coefficient, *SE* = standard error, *OR* = odds ratio.

The findings indicated no statistically significant relations between latent profile membership and experimental status, except for one. Students who were in a teacher-centred condition had significantly better odds of being in Profile 2 than in Profile 1. Overall, this result shows that the different learner profiles were evenly distributed among the four experimental conditions.



### Profile differences in the development of grammar achievement

Table 3.6 presents the z-standardised mean scores and standard errors of the outcome variable “learning gains” for the five different profiles as well as the results of the Wald- $\chi^2$  tests. To aid interpretation, mean learning gains across profiles are visualised in Figure 3.2. *Confident students* (profile 2) and *independent students* (profile 4) had the highest learning gains from pre- to post-test. *Confident students* (profile 2) had significantly higher learning gains than *average students* (profile 3) and *excellent students* (profile 5). *Independent students* (profile 4) had significantly higher learning gains than *at-risk students* (profile 1), *average students* (profile 3) and *excellent students* (profile 5). All other profiles did not significantly differ in learning gains.

Table 3.6

#### *Differences in Learning Gains Indicated by Z-standardised Mean Scores Across Profiles*

	Learning gains			
	Mean (SE)			
Profile 1	-0.15 (0.139)			
Profile 2	0.36 (0.218)			
Profile 3	-0.17 (0.104)			
Profile 4	0.31 (0.117)			
Profile 5	-0.15 (0.070)			
	$\chi^2$ (p-value)		$\chi^2$ (p-value)	
Overall	21.93 (< .001)			
Profile 1 vs. 2	3.74 (.053)	Profile 2 vs. 3	5.34 (.021)	
Profile 1 vs. 3	0.01 (.942)	Profile 2 vs. 4	0.04 (.849)	
Profile 1 vs. 4	8.01 (.005)	Profile 2 vs. 5	5.12 (.024)	
Profile 1 vs. 5	0.00 (.955)	Profile 3 vs. 4	6.72 (.010)	
Profile 3 vs. 5	0.02 (.884)	Profile 4 vs. 5	15.85 (< .001)	

*Note.* Overall tests have 4 degrees of freedom; Profile 1: at-risk students; Profile 2: confident students; Profile 3: average students; Profile 4: independent students; Profile 5: excellent students.

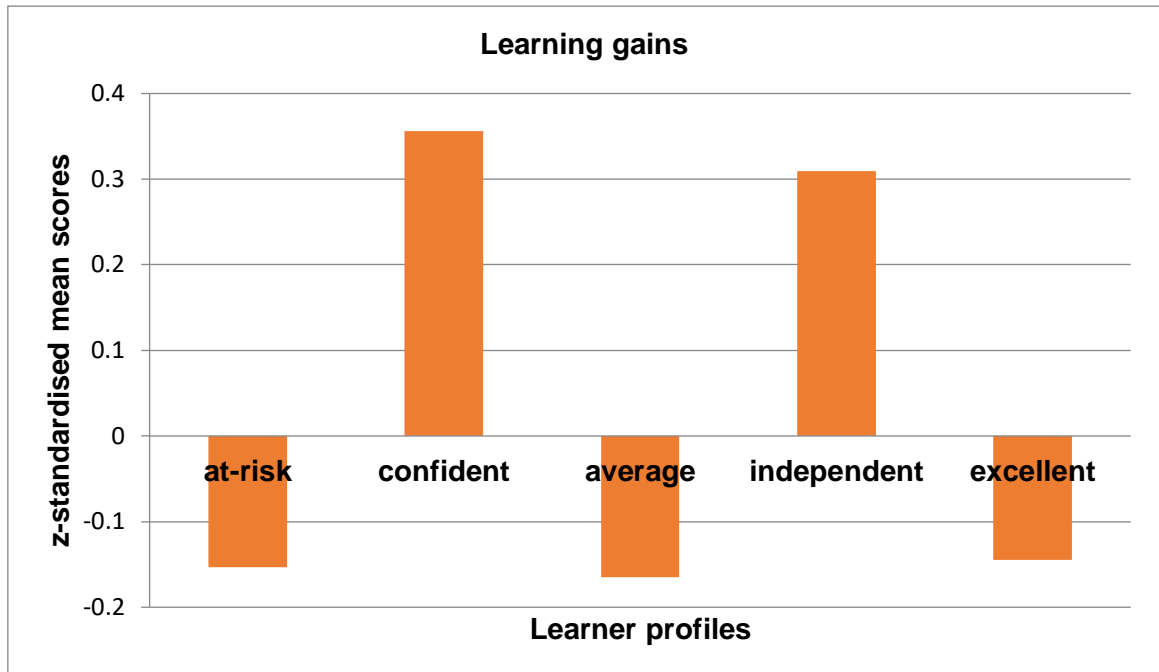


Figure 3.2. Mean Scores of Grammar Achievement (Learning Gains) (Z-standardised for Presentation).

### 3.4. Discussion

FCI has attracted increasing popularity and several empirical studies have been conducted. Empirical research of FCI in secondary education is, however, still in its infancy. Since previous empirical studies displayed methodological limitations, this study provides a more realistic evaluation of FCI by using a larger sample size, well-controlled and comparable conditions and multi-level analyses. Moreover, the study seeks to identify different learner profiles based on certain student characteristics in order to investigate what types of students benefit most from flipped and video-based instruction.

Results of the study documented a significant improvement of achievement scores from pre- to post-test, yet no significant differences in learning gains between the four conditions when student characteristics were taken into account. This result stands in contrast to former studies where the experimental group (FCI) typically outperformed the control group. However, higher learning gains of flipped classroom might be explained by

differential treatment. In this study, we tried to reduce the effect of differential treatment by using the same videos in all conditions.

Results indicate that the videos can either be watched independently by the students at home or in class together with the teacher. Showing the video in class can be useful as it assures that the students truly watch the video, while this is not guaranteed when students are supposed to watch it at home. Students' limited preparation before class has been reported as one of the key challenges of FCI (Akçayır & Akçayır, 2018). Another advantage of showing the video in class is the direct interaction with the teacher: students have the possibility to pose questions right after watching the video. The teacher can then provide additional instruction targeted to the specific individual needs of the students. In FCI, however, students can only note down their questions and then they have to wait until these are answered in the face-to-face lesson, which might be frustrating for some students. Theoretically, they can watch the video as often as they want; however, some students might rely on additional explanations by the teacher—sometimes provided in their first language.

Given the results, both a student-centred approach and a teacher-centred approach can be effective in video-based classroom. This result was contrary to our expectations as cooperative learning usually results in higher achievement outcomes (Kyndt et al., 2013). The cooperative learning method, which we implemented in the student-centred conditions, fulfilled Johnson and Johnson's (2009) cooperative learning criteria of positive interdependence and individual accountability. Students could only achieve their goal if and only if their learning partners achieved their goals. Since students worked in dyads, each student had to put effort in and contribute to the group work. The teacher was rather in the background and assumed the role of a facilitator, supporting the students when needed. A possible explanation for this result might be that some students might have needed more guidance and control by the teacher. A teacher-centred approach can be effective too. Several meta-analyses found medium effect sizes for the effectiveness of teacher-centred approaches on student achievement (Hattie, 2012). The teacher-centred approach is also

considered to be the most prominent approach in German classrooms (Renkl, 2008) and German students are therefore used to it. The clear structure and regular feedback in a teacher-centred classroom are particularly useful for low-achieving students (Chodura et al., 2015). Generally, the choice of approach might be based on the different students' needs in a classroom.

Using latent profile analysis, five different types of students based on certain student characteristics could be identified, which we labelled *at-risk*, *confident*, *average*, *independent* and *excellent students*. Results of multinomial logistic regression analyses showed that latent profile membership is not associated with the participants' experimental status, indicating that the different types of students were evenly spread across the four conditions. Further analyses revealed that *confident students* and *independent students* had the highest learning gains from pre- to post-test. The development of achievement for *at-risk* and *average* students was rather low. Likewise, excellent students could not achieve high learning gains, suggesting that the learning environment did not adequately support these students in their learning process. Further research is needed to determine different approaches on how these students can be better assisted in acquiring new knowledge. Well-structured learning environments—like in this study—seem to slow down their knowledge development. However, two other types of students—*independent* and *confident students*—could benefit from video-based and flipped classroom instruction to a greater extent. These types of students are characterised by good self-regulatory learning skills and high confidence in their own abilities. Both characteristics play an important role in learning environments, which allow students more freedom, since they require independent activity on the part of the student.

Finally, the study underlies some limitations, which have to be acknowledged. First, the study—and FCI in general—still lacks a robust theoretical framework, which can explain the effects of FCI on student achievement in secondary education. Lo (2018) argued that FCI can be grounded in the foundations of educational technology and formulated ten recommendations for the design and implementation of flipped classroom. However, there

currently exists no theoretical model that delineates the relationships between FCI, student achievement and other potentially relevant constructs such as self-regulated learning skills. Future research should start to examine FCI from a theoretical perspective, as this would help both educational practitioners and researchers with the design and implementation of flipped classrooms. Second, due to the focus on grammar achievement, it remains unclear whether flipped or video-based instruction can be successfully implemented in EFL classrooms with a different language skill focus, e.g., reading or writing. While most flipped classroom studies in the context of secondary education have been conducted in the STEM fields, studies in the subject EFL are still in a nascent stage. Another major limitation is that it is unclear to what extent students in the flipped conditions actually worked with the videos, since we were not permitted to log user data due to data protection regulations. As observed in previous studies (e.g., He et al., 2016; van Alten et al., 2020), student's non-compliance to the intervention is a serious issue in flipped classroom studies and might be responsible for smaller treatment effects. On the other hand, the participating teachers did not provide any negative feedback on this issue and watching a short instructional video as homework is indeed less work for students than completing grammar exercises. Nevertheless, future studies should make use of log file data or similar to control how students worked with the videos.

### **3.5. Conclusions**

In conclusion, study findings demonstrate that FCI is not the one and only instructional approach, which all teachers should implement in their classrooms. As Hattie (2012) suggested, "the message is not to choose a top method, but to choose a method and then evaluate its impact on student learning" (p. 94). Results of the study have shown that *at-risk*, *average* and *excellent students* did not benefit from flipped or video-based instruction to a large extent, while *independent* and *confident students* could achieve higher learning gains. The present study constitutes a first step towards a comprehensive evaluation of FCI by using a better-controlled research design and may contribute to a more

objective discussion about the positive effects of FCI. Future research on the effectiveness of FCI may also adopt person-centred approaches in order to investigate how, to what extent and under which conditions flipped and video-based instruction works for individual students in secondary education.

## **CHAPTER 4: GENERAL DISCUSSION**

## **4.1. Summary of Findings**

### **4.1.1. Study 1: Effectiveness of the Flipped Classroom on Student Achievement in Secondary Education: A Meta-Analysis**

In the first study, the effectiveness of flipped classroom instruction on student achievement in secondary education was examined by conducting a meta-analysis of previous research studies. Since the research design of prior flipped classroom studies varied, three different types of effect sizes were calculated: pre-test-post-test (Time), post-test only (PostOnly) and pre-test-post-test with control group (Treatment). The effect size Treatment served as the most convincing and important type of effect size. Besides, the impact of four moderator variables as boundary conditions of flipped classroom effectiveness was estimated: disciplinary field, length of the intervention, use of a quiz and use of a learning management system (LMS).

The 25 articles that were included in the meta-analysis offered a total of 44 independent data sources with 86 effect sizes and a total sample size of 2,323 students. The results for the effect size Treatment provided significant evidence for the effectiveness of flipped classroom instruction on student achievement in comparison to traditional classroom instruction (Cohen's  $d = 0.42$ ). Moderator analyses on the effect sizes Time show stronger effects for subjects in the STEM area (science, technology, engineering, mathematics) than for languages and humanities. The effect sizes were also higher for shorter intervention studies than for longer ones and if quiz at home had been left out. Moderator analyses on the effect sizes PostOnly and Treatment make clear that the effect sizes for intervention studies without a learning management system are higher than with a learning management system.

Since the sample size in most flipped classroom studies was relatively limited, this meta-analysis and quantitative synthesis of individual studies leads to an improved understanding of whether, to what extent and under which conditions flipped classroom has a positive impact on student achievement in secondary education.



#### **4.1.2. Study 2: Implementing Flipped Classroom Instruction in Secondary**

##### **Education: Worth the Hype?**

In the second study, the effectiveness of flipped classroom instruction on student achievement was examined by conducting a quasi-experimental pre-post-test intervention study. As Study 1 revealed that hardly any studies have been carried out in disciplinary fields such as languages or humanities, the flipped classroom approach in Study 2 was adopted in the EFL classroom. Moreover, the study addressed methodological issues, which have been disregarded in previous research. The main aims of the study were to compare flipped classroom with other forms of video-based instruction and to determine which types of students benefit most from video-based instruction.

Thirty-eight school classes with 848 ninth-grade students took part in the study, which lasted four weeks. Two independent variables were completely crossed resulting in four experimental conditions: video (at home vs. in class) and instructional method (student-centred vs. teacher-centred). Students' grammar achievement was measured with an adapted version of the standardised DESI grammar test (Nold & Rossa, 2007) before and after the intervention. Teachers of all groups were asked to use six instructional videos and six worksheets in their regular English lessons; only slight variations were adopted regarding instructional video use and teaching method. Due to results of previous studies and meta-analyses, it was assumed that students in the flipped conditions would outperform students in the other conditions.

However, findings revealed that all four experimental conditions were equally effective in promoting students' learning outcomes. Individual student characteristics such as students' gender, English self-concept and pre-test scores turned out to be much more powerful predictors of student achievement than the intervention variables (video, instructional method and their interaction). Results indicate that videos can either be watched independently by the student at home or in class together with the teacher. Both a student-centred approach and a teacher-centred approach can be effective in video-based classrooms.

By means of latent profile analysis, five different types of students based on certain student characteristics could be identified: at-risk, confident, average, independent and excellent students. Confident students and independent students had the highest learning gains from pre- to post-test. These types of students are distinguished by good self-regulatory learning skills and high confidence in their own abilities, which seem to be important requirements for the success of flipped and video-based classrooms.

All in all, the study showed that flipped classroom instruction is not the one and only approach, which all teachers should implement in their classrooms. In general, the study provided a more comprehensive and realistic evaluation of the flipped classroom by using a larger sample size, well-controlled and comparable conditions and multi-level as well as latent profile analyses.

## **4.2. Implications**

Research on flipped classroom instruction has substantially advanced in the past ten years. Since an increasing number of teachers wants to adopt the flipped classroom approach in their practice, further research is clearly required. The two presented studies in this thesis aimed at examining the effectiveness of flipped classroom instruction in secondary education by conducting a meta-analytic synthesis of prior studies and an intervention study with a methodologically new approach. Specifically, the studies investigated whether and under which conditions the flipped classroom approach has a positive impact on student achievement and which learners benefit most from a flipped or video-based classroom. The findings of the studies have implications for educational practice and future research, which are now explicated in greater detail.

### **4.2.1. Implications for Educational Practice**

Based on the results of the meta-analysis (Study 1), flipped classroom instruction can be regarded as an effective instructional approach that is worth to be implemented in secondary education. Several further implications arise from the moderator analyses, which

illustrated boundary conditions for flipped classroom effectiveness. Since no significant moderator effect could be found for all three types of effect sizes, implications should be viewed with caution though. First, flipping the classroom seems to be particularly effective and suitable for subjects in the STEM area. This can be attributed to the fact that not only a higher number of studies have been conducted in this field, but also that mean effect sizes were much higher compared to other domains. Second, the results indicated that shorter flipped classroom interventions seem to be more effective than longer ones. A change of instructional method by alternating between traditional and flipped classroom can therefore be recommended. Third, the findings showed that the use of a quiz in class or at home is not as important as advocated by some other authors (e.g. Lo et al., 2017). If quizzes are implemented, students should receive immediate (computerised) feedback about the correctness of their answers. A final implication emerges from the interpretation of a learning management system as a moderator. The findings revealed that the use of a learning management system is not indispensable as student achievement was equally high in studies that did not use a LMS. However, if incorporated, principles of Cognitive Load Theory and Multimedia Learning should be taken into account in order to avoid disorientation and cognitive overload (Abeysekera & Dawson, 2015; Paas et al., 2003; Mayer, 2014).

The findings of the intervention study (Study 2), however, limit the positive effects of flipped classroom instruction on student achievement. In this study, students in the flipped conditions did not outperform students in the video-based conditions. In contrast to prior studies, students of all four groups watched the same instructional videos—either at home (flipped) or in class (video-based)—and were equally successful in terms of grammar achievement. This result implies that instructional videos cannot only be watched independently by the students at home, but it is also meaningful to watch them in class together with the teacher. Both approaches have advantages and disadvantages, as indicated in Chapter 3.4. In flipped classrooms, it is important that teachers provide students with learning strategies for the out-of-class learning phase, as it is decisive for the success

of the in-class learning phase (Cheng et al., 2019). Results have also shown that both a student-centred approach and a teacher-centred approach can be effective in video-based classrooms. The choice of approach might be based on the individual students' needs in a classroom. In general, findings have shown that individual student variables such as prior knowledge or domain-specific self-concept are much more powerful predictors of student achievement than intervention variables. It seems that not all types of students benefit in the same way from flipped or video-based classrooms. Student characteristics such as a high self-concept or self-regulatory learning skills seem to be important prerequisites for the success of such learning environments. It is therefore hugely important that teachers are able to diagnose students' learning behaviours and learning needs in order to provide appropriate and effective instruction (Klug et al., 2016).

#### **4.2.2. Implications for Future Research**

As could be seen in the meta-analysis (Study 1), empirical research on the effectiveness of flipped classroom instruction in secondary education is still in a nascent stage. Currently, there exist many versions of the flipped classroom, which makes it difficult to draw general conclusions about the effectiveness of this approach. A first important step for future research would be to clearly define the flipped classroom approach by distinguishing it from similar concepts (e.g. blended learning) and to develop a theoretical model which describes the relationships between flipped classroom instruction, student achievement and other potentially relevant constructs such as self-regulated learning skills. Then, this model needs to be tested in real-life school settings by conducting quasi-experimental studies. These studies should be carried out in different disciplinary fields, in particular in languages or humanities due to a lack of research in these areas. As already pointed out by Cheng et al. (2019), future studies should make use of appropriate comparison groups, larger sample sizes and validated and reliable measures for cognitive learning outcomes. Besides, they should control for an array of confounding variables such

as student attitudes, dispositions and other non-cognitive variables (e.g. motivation). Researchers should be very precise about the operationalisation of the flipped classroom and specify which out-of-class and in-class activities were employed. Research design and implementation of the study need to be carefully reported in publications, including study duration and intensity frequency of flipping the classroom (Cheng et al., 2019). Empirical studies, which consider these methodological aspects, could help to further our understanding of the relationships between flipped classroom instruction, student achievement and other relevant constructs.

In Study 2, we tried to consider the methodological aspects discussed above and found that students in the flipped conditions did not outperform students in the video-based conditions. This finding contradicts the results of our meta-analysis and highlights the fact that more rigorous research studies in different disciplinary fields are still needed to draw solid conclusions about the effectiveness of the flipped classroom in secondary education. Prospective research studies might as well utilise student log data to analyse how students engaged in the out-of-class learning phase, as this part of the flipped classroom deserves further investigation. Person-centred approaches (like in Study 2) may also be adopted in future studies since they shed further light on the influence of individual student characteristics on student learning outcomes in flipped classrooms. Interesting student characteristics, which might influence student achievement, could be students' attitudes towards flipped classroom, other motivational constructs such as achievement goals or students' use of metacognitive skills and strategies.

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*Note.* The reference list also includes the cited references in Study 1, which was published in a scientific journal. References marked with an \* were included in the meta-analysis.

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## APPENDICES

### Appendix A: Participant Letters (Study 2)

#### Schulanschreiben

Betreff: Teilnahme an einer Studie zum Thema „Lernvideos im Englischunterricht“

Sehr geehrte/-r Frau/Herr Direktor(-in).....,

im Rahmen eines vom Bayerischen Staatsministerium für Bildung und Kultus genehmigten Forschungsprojekts untersucht die Abteilung für Pädagogische Psychologie der Universität Passau den Einsatz von Lernvideos im Englischunterricht. Mit der Studie soll geklärt werden, inwieweit sich der Einsatz von Lernvideos innerhalb des Klassenunterrichts bzw. außerhalb des Unterrichts – als Vorbereitung auf den Klassenunterricht – positiv auf sprachliche und selbstregulative Fähigkeiten der Schülerinnen und Schüler auswirkt. Darüber hinaus wird der Einfluss der Unterrichtsform (schülerzentriert vs. lehrerzentriert) auf den Lernerfolg überprüft.

Dazu ist eine Untersuchung mit zwei Erhebungszeitpunkten in allen Klassen der 9. Jahrgangsstufe geplant. Die Teilnahme an der Studie ist freiwillig und aus einer Nichtteilnahme entstehen keine Nachteile. Die Zustimmung zu dem Projekt kann auch nachträglich widerrufen werden. Eine kurze E-Mail ohne Angabe von Gründen an unser Sekretariat genügt.

Die Schülerinnen und Schüler bearbeiten im Rahmen der Studie jeweils einen standardisierten Englischtest für die neunte Klasse sowie einen Fragebogen zu selbstregulativen Fähigkeiten. In einem Zeitraum von vier Wochen sollen in mindestens einer neunten Klasse, wenn möglich auch in mehreren neunten Klassen, mindestens sechs Lernvideos sowie von uns erstellte Unterrichtsmaterialien eingesetzt werden. Alle Lernvideos und sonstige Unterrichtsmaterialien (wie etwa Arbeitsblätter) bekommen Sie von der Universität Passau bereitgestellt.

In den Lernvideos werden verschiedene Themen der englischen Grammatik behandelt, welche alle im Lehrplan der 9. Klasse Realschule verankert sind. Hier haben Sie die Möglichkeit, sich ein Beispielvideo anzusehen: [LINK](#). Im Anhang befindet sich außerdem ein beispielhaftes Arbeitsblatt zu dem obigen Lernvideo.

Alle Tests werden unter sorgfältiger Einhaltung der datenschutzrechtlichen Bestimmungen durchgeführt. Die erhobenen Daten werden in anonymisierter Form verwahrt, ausschließlich für Ausbildungs- und Forschungszwecke genutzt und nach der Veröffentlichung der Forschungsergebnisse im September 2021 wieder gelöscht.

Insgesamt gibt es drei Erhebungszeiträume:

- Erhebungszeitraum 1: 18. März – 12. April
- Erhebungszeitraum 2: 29. April – 7. Juni
- Erhebungszeitraum 3: 24. Juni – 27. Juli

Bitte teilen Sie uns mit, ob einer dieser Zeiträume für Sie möglich wäre. Wir würden uns sehr freuen, wenn Sie mit Ihrer Schule an der Studie teilnehmen würden.

Mit freundlichen Grüßen



Prof. Dr. Detlef Urhahne

**Bitte um Teilnahme an einer Studie zum Thema „Lernvideos im Englischunterricht“**

Sehr geehrte Lehrerin, sehr geehrter Lehrer,

im Rahmen eines vom Bayerischen Staatsministerium für Bildung und Kultus genehmigten Forschungsprojekts untersucht die Abteilung für Pädagogische Psychologie der Universität Passau den Einsatz von Lernvideos im Englischunterricht. Mit der Studie soll geklärt werden, inwieweit sich der Einsatz von Lernvideos innerhalb des Klassenunterrichts bzw. außerhalb des Unterrichts – als Vorbereitung auf den Klassenunterricht – positiv auf sprachliche und selbstregulative Fähigkeiten der Schülerinnen und Schüler auswirkt. Darüber hinaus wird der Einfluss der Unterrichtsform (schülerzentriert vs. lehrerzentriert) auf den Lernerfolg überprüft.

Dazu ist eine Untersuchung mit zwei Erhebungszeitpunkten in allen Klassen der 9. Jahrgangsstufe geplant. Die Schülerinnen und Schüler bearbeiten im Rahmen der Studie jeweils einen standardisierten Englischtest für die neunte Klasse sowie einen Fragebogen zu selbstregulativen Fähigkeiten. Die Durchführung der Untersuchung übernimmt ein geschulter Testleiter. In einem Zeitraum von vier Wochen sollen anschließend in mindestens einer neunten Klasse, wenn möglich auch in mehreren neunten Klassen, mindestens sechs Lernvideos sowie von uns erstellte Unterrichtsmaterialien eingesetzt werden. Alle Lernvideos und sonstige Unterrichtsmaterialien (wie etwa Arbeitsblätter) bekommen Sie von der Universität Passau bereitgestellt. Beim zweiten Erhebungszeitpunkt würden wir Sie bitten, Ihre Einschätzung zum Unterrichtsprojekt anhand eines kurzen Fragebogens abzugeben.

In den Lernvideos werden verschiedene Themen der englischen Grammatik behandelt, welche alle im Lehrplan der 9. Klasse Realschule verankert sind. Hier haben Sie die Möglichkeit, sich ein Beispielvideo anzusehen: [LINK](#). Im Anhang befindet sich außerdem ein beispielhaftes Arbeitsblatt zu dem obigen Lernvideo.

Ich bitte Sie sehr herzlich, einen kleinen Teil Ihrer Zeit der Wissenschaft zu widmen und sich an der Forschungsstudie „Lernvideos im Englischunterricht“ zu beteiligen. Die Teilnahme an der Studie ist freiwillig und aus einer Nichtteilnahme entstehen keine Nachteile. Die Zustimmung zu dem Projekt kann auch nachträglich widerrufen werden. Eine kurze E-Mail ohne Angabe von Gründen an unser Sekretariat genügt.

Alle erhobenen Daten werden streng vertraulich behandelt und ausschließlich für Ausbildungs- und Forschungszwecke genutzt.

Ich bedanke mich für Ihr Engagement und Ihr Verständnis.

Mit freundlichen Grüßen,



Prof. Dr. Detlef Urhahne

## Bitte um die Teilnahme Ihrer Tochter / Ihres Sohnes an einer Lehr-/Lernstudie

Liebe Eltern,

im Rahmen eines Forschungsprojekts untersucht die Abteilung für Pädagogische Psychologie der Universität Passau den Einsatz von Lernvideos im Englischunterricht. Mit der Studie soll geklärt werden, inwieweit sich der Einsatz von Lernvideos innerhalb des Klassenunterrichts bzw. außerhalb des Unterrichts – als Vorbereitung auf den Klassenunterricht – positiv auf sprachliche und selbstregulative Fähigkeiten der Schülerinnen und Schüler auswirkt. Darüber hinaus wird der Einfluss der Unterrichtsform (schülerzentriert vs. lehrerzentriert) auf den Lernerfolg überprüft. Einige Studien bestätigen bereits eine hohe Schülerzufriedenheit beim Einsatz von Lernvideos und eine Verbesserung der Schülerleistungen. Deshalb erwarten wir uns durch den Einsatz von Lernvideos eine Verbesserung sprachlicher und selbstregulativer Schülerkompetenzen.

Zur Durchführung der Studie ist eine Untersuchung im Umfang von vier Wochen geplant, wobei die Schüler und Schülerinnen zu Anfang und Ende jeweils einen standardisierten, pseudonymisierten Leistungstest im Bereich der englischen Grammatik und einen Selbsteinschätzungsfragebogen zu selbstregulativen Fähigkeiten ausfüllen. Zwischen den beiden Erhebungen werden mehrmals Lernvideos im Englischunterricht bzw. außerhalb des Unterrichts – als Vorbereitung auf den Klassenunterricht – eingesetzt. Durch den Vergleich der Vor- und Nachtestergebnisse kann die Wirkung der Lernvideos bzw. der Unterrichtsform festgestellt werden.

Alle Tests werden unter sorgfältiger Einhaltung der datenschutzrechtlichen Bestimmungen durchgeführt, so dass keine Rückschlüsse auf Einzelpersonen – weder Schüler noch Lehrkräfte – gezogen werden können. Die erhobenen Daten werden in anonymisierter Form verwahrt, ausschließlich für Ausbildungs- und Forschungszwecke genutzt und nach der Veröffentlichung der Forschungsergebnisse im September 2021 wieder gelöscht.

Sie haben die Möglichkeit, alle Fragen und Beispiele der Englischaufgaben im Sekretariat der Schule einzusehen.

Ich möchte Sie sehr herzlich um die Einwilligung zur Teilnahme Ihrer Tochter / Ihres Sohnes an der Lehr-/Lernstudie bitten. Die Teilnahme an der Studie ist freiwillig und aus einer Nichtteilnahme entstehen keine Nachteile. Sie können Ihre Zustimmung zu dem Projekt auch nachträglich widerrufen. Ich bedanke mich für Ihre Aufmerksamkeit und hoffe auf Ihr Einverständnis für das wichtige Forschungsvorhaben.

Mit freundlichen Grüßen



Prof. Dr. Detlef Urhahne

✂-----

Ich willige ein, dass meine Tochter / mein Sohn \_\_\_\_\_ (Name) an der Lehr-/Lernstudie der  
Universität Passau teilnimmt.

Ich wurde über den Inhalt und den Zweck der Studie in Kenntnis gesetzt. Ich wurde darüber informiert, dass die Teilnahme meines Kindes freiwillig erfolgt.

\_\_\_\_\_  
Datum und Unterschrift

## Appendix B: Pre-Test (Study 2)

### Liebe Schülerin, lieber Schüler,

vielen Dank, dass du an unserer Studie teilnimmst! Ich kann dir garantieren, dass alle Daten anonym und vertraulich behandelt werden. Um deine Antworten richtig zuordnen zu können, ohne die Geheimhaltung zu verletzen, brauchen wir einen Geheimcode. Achte bitte auch bei allen anderen Bögen (Fragebögen, Arbeitsblätter), die du im Laufe der Studie bekommst, darauf, die Spalte mit dem Code richtig auszufüllen!

Der Code setzt sich folgendermaßen zusammen:

1. 3. Buchstabe deines Vornamens
2. Dein Geburtstag
3. Die ersten beiden Buchstaben des Vornamens deiner Mutter

z.B. Name: Marlene, Geburtstag: 12.06.1992, Vorname der Mutter: Friederike  
Code: R12FR

Dein Geheimcode setzt sich so zusammen:

1. Trage hier den **dritten Buchstaben deines Vornamens** ein:
2. Trage hier deinen **Geburtstag** ein (bei einer Zahl kleiner als 10 bitte zweistellig, also z.B. 03 für den 3.) ein:
3. Trage hier die ersten **beiden Buchstaben des Vornamens deiner Mutter** ein.

□	
□	□
□	□

Geschlecht:

- männlich  
 weiblich

Alter: \_\_\_\_\_

Klasse: \_\_\_\_\_ (z.B. 9b)

## Grammatikteil

In den folgenden Sätzen befindet sich immer **ein** Fehler. Der Fehler kann nur in A, B oder C stecken. Wenn du den Fehler entdeckt hast, kreise einen der Buchstaben A, B oder C ein, um zu zeigen, wo der Fehler steckt. Dann schreibe die richtige Lösung in den Korrekturkasten.

### Hier ist ein Beispiel:

Im Beispiel liegt der Grammatikfehler bei C. Daher kreist du den Buchstaben C ein und schreibst die richtige Lösung in den Korrekturkasten (in diesem Fall *provides*).

**Beispiel** Harry and Sue love going to a youth club. They A meet young people there and they B can have a lot of fun because the club C provide lots of activities.

Richtige Lösung: *provides*

### Beginne jetzt mit den Aufgaben.

1. A: 'When you lived in New York, A did you use to go to the theatre very often?'  
B: 'No, I B didn't use to go there, but my mum C used to went regularly.'

Richtige Lösung:

2. I A would rather to work from home B than come to the office. But my boss C would rather I came to the office every day.

Richtige Lösung:

3. A: 'If I A were you, I B would worn more make-up.'  
B: 'You're joking! It C would make me look more awful.'

Richtige Lösung:

4. My watch A isn't working properly. I must B had it repaired. I C can't repair it myself.

Richtige Lösung:

5. A: 'I can't find my passport! A It's gone!'  
 B: 'We B had better going to the lost-and-found-office.'  
 A: 'But first I C had better phone dad. Maybe the passport is at home.'

Richtige Lösung:

6. The weather in Scotland A is said being very bad. However, B it is known that the people are very friendly and C that they have good humour.

Richtige Lösung:

7. We A are used to go to the seaside every summer B when I was a child. I C didn't use to like seafood at that time, but now I love it!

Richtige Lösung:

8. I A would rather not go out tonight because I B have to get up early tomorrow. I C would rather you stay at home as well.

Richtige Lösung:

9. I A wouldn't buy that dress if I B am you. I C would save the money for something else.

Richtige Lösung:

10. A: A Isn't your hair different?  
 B: 'Yes, I B have had it cut. I think it's horribly short.  
 A: 'Why C did you had it cut then?'

Richtige Lösung:

11. I A had better not leave my bag there. Someone B might steal it.  
 I C have better take it with me.

Richtige Lösung:

12. Spinach A is said to be very good for your health. However, B it is said that children don't like it so much. Children C are say to prefer pizza.

Richtige Lösung:

13. A: A 'Did you use eating a lot of sweets B when you were a child?'  
 B: No, I C didn't use to take many sweets. I eat more chocolate now.

Richtige Lösung:

14. Peter A would rather play football B than do his homework. But I C will rather he finished his homework first.

Richtige Lösung:

15. A: 'You A should go to the disco with me some time.'  
 B: 'Oh, my parents B would never let me do that.'  
 A: 'Well, if I were you, I C will ask them.'

Richtige Lösung:

16. Yesterday I had really bad toothache so I went to the dentist to A have my teeth check. It B turned out that I had an infection. Luckily, I didn't have to C have anything removed.

Richtige Lösung:

17. You A don't look very well. You B not had better go to work today. You C had better stay in bed.

Richtige Lösung:

18. People say a lot of things about Tom. Tom A is said to being very intelligent. He B is said to know a lot about history. C It is said that he reads 10 books per week.

Richtige Lösung:



## Fragebogen

Auf den folgenden Seiten steht eine Reihe von Sätzen. Bitte lies die Aussagen im Fragebogen. Kreuze zu jeder Aussage immer nur **ein** Kästchen an und zwar dasjenige, welches deiner Meinung nach am besten zutrifft.

	Stimmt gar nicht	Stimmt eher nicht	Stimmt teils- teils	Stimmt eher	Stimmt genau
1. Im Fach Englisch bekomme ich gute Noten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. In Englisch würde ich gerne mehr Unterricht haben.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Ich versuche in Englisch gerne, besser zu sein als andere Schülerinnen und Schüler.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Mir liegt viel daran, Englisch gut zu können.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Ich arbeite in Englisch gern mit anderen Schülern bzw. Schülerinnen zusammen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Für das Fach Englisch bin ich einfach begabt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Wenn ich versuche, in Englisch besser als andere zu sein, leiste ich gute Arbeit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Ich finde es nützlich, die Ideen von allen zusammen zu bringen, wenn man in Englisch an einem Projekt arbeitet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Ich wäre gerne in Englisch der/die Beste.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Es ist für mich persönlich wichtig, das in Englisch Gelernte zu behalten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Ich lerne schneller, wenn ich in Englisch versuche, besser zu sein als die anderen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. In Englisch schneide ich in Klassenarbeiten gut ab.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Am meisten lerne ich, wenn ich in Englisch mit anderen Schülern bzw. Schülerinnen zusammenarbeite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Im Fach Englisch lerne ich schnell.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Mein Interesse am Fach Englisch ist hoch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Im Fach Englisch bin ich ein hoffnungsloser Fall.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Im Englischunterricht helfe ich anderen gern dabei, in einer Gruppe gute Arbeit zu leisten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Ich freue mich auf den Englischunterricht.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Die beste Arbeit leiste ich, wenn ich im Englischunterricht mit anderen Schülern bzw. Schülerinnen zusammenarbeite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Englisch gehört für mich zu den wichtigen Fächern.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wir möchten nun von dir wissen, **wie du im Fach Englisch lernst**. Hier sind einige Antworten auf Fragen. Entscheide bei jeder Frage, welche der drei Antworten am besten zu dir passt. Wie lernst du im Fach Englisch? Bitte kreuze nur **eine** Antwort an!

1.

Ich überlege mir beim Englischlernen, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich lernen will. <input type="checkbox"/>	Vor dem Englischlernen denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los. <input type="checkbox"/>	Mir ist es beim Englischlernen am liebsten, wenn der Lehrer mir sagt, was ich schon gut kann und was ich noch lernen muss. <input type="checkbox"/>
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2.

Der Lehrer sollte mir sagen, welches Ziel ich mir beim Englischlernen setzen sollte. <input type="checkbox"/>	Ich setze mir beim Englischlernen ein festes Ziel, was und wie viel ich lernen will. <input type="checkbox"/>	Ich setze mir beim Englischlernen kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
--	--	--

3.

Es bringt mir nichts zu planen, wie ich am besten Englisch lerne. So etwas mache ich automatisch. <input type="checkbox"/>	Der Lehrer kann mir am besten sagen, wie ich beim Englischlernen vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten beim Englischlernen vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich am besten Englisch lerne, gehe ich erstmal genauso vor. <input type="checkbox"/>	Ich lerne Englisch am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich lerne Englisch so, wie der Lehrer mir gesagt hat, dass ich lernen soll. <input type="checkbox"/>
--	---	---

5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich beim Englischlernen einen besseren Weg finde. <input type="checkbox"/>	Ich achte auch während des Englischlernens darauf, ob ich auf andere Weise besser lernen könnte. <input type="checkbox"/>	Während des Englischlernens überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. <input type="checkbox"/>
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6.

Auch wenn ich beim Englischlernen einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Englischlernen nur dann umstellen, wenn mir der Lehrer das empfehlen würde. <input type="checkbox"/>	Wenn mir während des Englischlernens auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. <input type="checkbox"/>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir beim Englischlernen vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich Englisch genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich Englisch genügend gelernt habe. <input type="checkbox"/>
---	---	---

Als nächstes möchten wir von dir wissen, **wie du mit Videos lernen würdest**. Entscheide wieder, welche der drei Antworten am besten für dich passt. Bitte kreuze nur **eine** Antwort an!

1.

Ich überlege beim Lernen mit dem Video, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich lernen will. <input type="checkbox"/>	Vor dem Lernen mit dem Video denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los. <input type="checkbox"/>	Mir ist es am liebsten, wenn der Lehrer mit beim Lernen mit dem Video sagt, was ich schon gut kann und was ich noch lernen muss. <input type="checkbox"/>
---	--	--

2.

Der Lehrer soll mir sagen, welches Ziel ich mir beim Lernen mit dem Video setzen soll. <input type="checkbox"/>	Ich setze mir beim Lernen mit dem Video ein festes Ziel, was und wie viel ich lernen will. <input type="checkbox"/>	Ich setze mir beim Lernen mit dem Video kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
--	--	--

3.

Es bringt mir nichts zu planen, wie ich mit dem Video am besten lerne. So etwas mache ich automatisch. <input type="checkbox"/>	Der Lehrer könnte mir am besten sagen, wie ich beim Lernen mit dem Video vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten beim Lernen mit dem Video vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich am besten mit dem Video lerne, gehe ich erstmal genauso vor. <input type="checkbox"/>	Ich lerne mit dem Video am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich lerne mit dem Video so, wie der Lehrer mir gesagt hat, dass ich lernen soll. <input type="checkbox"/>
---	--	--

5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich beim Lernen mit dem Video einen besseren Weg finde. <input type="checkbox"/>	Ich achte auch während des Lernens mit dem Video darauf, ob ich auf andere Weise besser lernen könnte. <input type="checkbox"/>	Während des Lernens mit dem Video überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. <input type="checkbox"/>
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6.

Auch wenn ich beim Lernen mit dem Video nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Lernen mit dem Video nur dann umstellen, wenn mir der Lehrer das empfehlen würde. <input type="checkbox"/>	Wenn mir während des Lernens mit dem Video auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. <input type="checkbox"/>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir beim Lernen mit dem Video vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich mit dem Video genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich genügend mit dem Video gelernt habe. <input type="checkbox"/>
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Wir möchten nun von dir wissen, **wie du in Gruppenarbeiten lernst**. Entscheide wieder, welche der drei Antworten am besten zu dir passt. Bitte kreuze nur **eine** Antwort an!

1.

Ich überlege vor der Gruppenarbeit zuerst, was schon bekannt ist und was noch unbekannt ist. Dann vergleiche ich das damit, was ich lernen will. <input type="checkbox"/>	Vor der Gruppenarbeit denke ich nicht lange darüber nach, was ich lernen will. <input type="checkbox"/>	Mir ist es am liebsten, wenn mein Lehrer mir vor der Gruppenarbeit sagt, was noch unbekannt ist und was erarbeitet werden soll. <input type="checkbox"/>
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2.

Der Lehrer sollte mir sagen, welches Ziel ich mir bei der Gruppenarbeit setzen sollte. <input type="checkbox"/>	Ich setze mir bei der Gruppenarbeit ein festes Ziel, was und wie viel gelernt werden soll. <input type="checkbox"/>	Ich setze mir bei der Gruppenarbeit kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
--	--	--

3.

Es bringt mir nichts zu planen, wie ich in der Gruppenarbeit am besten lerne. So etwas mache ich automatisch. <input type="checkbox"/>	Der Lehrer kann mir am besten sagen, wie ich in der Gruppenarbeit am besten vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten in der Gruppenarbeit vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich am besten in der Gruppenarbeit lerne, gehe ich am besten erstmal genauso vor. <input type="checkbox"/>	Ich lerne in der Gruppenarbeit am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich lerne in der Gruppenarbeit so, wie es der Lehrer mir gesagt hat, dass ich lernen soll. <input type="checkbox"/>
--	---	--

5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich in der Gruppenarbeit einen besseren Weg finde. <input type="checkbox"/>	Ich achte auch während der Gruppenarbeit darauf, ob ich auf eine andere Weise besser lernen könnte. <input type="checkbox"/>	Während der Gruppenarbeit überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. <input type="checkbox"/>
---	---	--

6.

Auch wenn ich beim Lernen in der Gruppenarbeit einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Lernen in der Gruppenarbeit nur dann umstellen, wenn mir der Lehrer das empfehlen würde. <input type="checkbox"/>	Wenn mir während der Gruppenarbeit auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. <input type="checkbox"/>
---	---	--

7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir für die Gruppenarbeit vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich in der Gruppenarbeit genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich genügend in der Gruppenarbeit gelernt habe. <input type="checkbox"/>
---	---	---

Schließlich möchten wir möchten von dir wissen, **wie du bei den Hausaufgaben vorgehst**. Entscheide wieder, welche der drei Antworten am besten zu dir passt. Bitte kreuze nur **eine** Antwort an!

1.

Ich überlege vor den Hausaufgaben zuerst, ob die Aufgaben leicht zu lösen sind oder nicht. <input type="checkbox"/>	Vor den Hausaufgaben denke ich nicht lange darüber nach, ob die Aufgaben leicht zu lösen sind oder nicht. Da lege ich lieber gleich los. <input type="checkbox"/>	Mir ist es am liebsten, wenn der Lehrer mir zu den Hausaufgaben sagt, ob die Aufgaben leicht zu lösen sind oder nicht. <input type="checkbox"/>
--	--	--

2.

Der Lehrer sollte mir feste Vorgaben machen, wann und wie ich meine Hausaufgaben anfertigen soll. <input type="checkbox"/>	Ich mache mir selbst feste Vorgaben, wann und wie ich meine Hausaufgaben anfertige. <input type="checkbox"/>	Ich brauche keine festen Vorgaben, wann und wie ich meine Hausaufgaben anfertigen soll. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
---	---	--

3.

Es bringt mir nichts zu planen, wie ich bei den Hausaufgaben vorgehen soll. So etwas läuft bei mir automatisch. <input type="checkbox"/>	Der Lehrer sollte mir am besten sagen, wie ich bei den Hausaufgaben vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten bei den Hausaufgaben vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich die Hausaufgaben am besten mache, gehe ich erstmal genauso vor. <input type="checkbox"/>	Ich mache die Hausaufgaben am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich mache die Hausaufgaben so, wie es der Lehrer mir gesagt hat, dass ich sie machen soll. <input type="checkbox"/>
--	---	--

5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich bei den Hausaufgaben anders hätte vorgehen können. <input type="checkbox"/>	Ich achte bei den Hausaufgaben darauf, ob ich sie auf eine andere Weise besser erledigen könnte. <input type="checkbox"/>	Während der Hausaufgaben überlege ich nicht, wie ich sie besser erledigen könnte. Ich richte die Aufmerksamkeit ganz auf die Lösung der Aufgaben. <input type="checkbox"/>
---	--	---

6.

Auch wenn ich bei den Hausaufgaben einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Vorgehen bei den Hausaufgaben nur dann umstellen, wenn mir der Lehrer das empfehlen würde. <input type="checkbox"/>	Wenn mir während der Hausaufgaben auffällt, wie ich besser vorgehen könnte, dann stelle ich meine Vorgehensweise um. <input type="checkbox"/>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir für die Hausaufgaben vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich die Hausaufgaben gut erledigt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich die Hausaufgaben gut erledigt habe. <input type="checkbox"/>
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## Appendix C: Post-Test (Study 2)

### Grammatikteil

In den folgenden Sätzen befindet sich immer **ein** Fehler. Der Fehler kann nur in A, B oder C stecken. Wenn du den Fehler entdeckt hast, kreise einen der Buchstaben A, B oder C ein, um zu zeigen, wo der Fehler steckt. Dann schreibe die richtige Lösung in den Korrekturkasten.

#### Hier ist ein Beispiel:

Im Beispiel liegt der Grammatikfehler bei C. Daher kreist du den Buchstaben C ein und schreibst die richtige Lösung in den Korrekturkasten (in diesem Fall *provides*).

**Beispiel** Harry and Sue love going to a youth club. They A meet young people there and they B can have a lot of fun because the club C provide lots of activities.

Richtige Lösung: *provides*

#### Beginne jetzt mit den Aufgaben.

1. A: 'When you lived in New York, A did you use to go to the theatre very often?'  
B: 'No, I B didn't use to go there, but my mum C used to went regularly.'

Richtige Lösung:

2. I A would rather to work from home B than come to the office. But my boss C would rather I came to the office every day.

Richtige Lösung:

3. A: 'If I A were you, I B would worn more make-up.'  
B: 'You're joking! It C would make me look more awful.'

Richtige Lösung:

4. My watch A isn't working properly. I must B had it repaired. I C can't repair it myself.

Richtige Lösung:

A: 'I can't find my passport! A It's gone!'

5. B: 'We B had better going to the lost-and-found-office.'

A: 'But first I C had better phone dad. Maybe the passport is at home.'

Richtige Lösung:

6. The weather in Scotland A is said being very bad. However, B it is known that the people are very friendly and C that they have good humour.

Richtige Lösung:

7. We A are used to go to the seaside every summer B when I was a child. I C didn't use to like seafood at that time, but now I love it!

Richtige Lösung:

8. I A would rather not go out tonight because I B have to get up early tomorrow. I C would rather you stay at home as well.

Richtige Lösung:

9. I A wouldn't buy that dress if I B am you. I C would save the money for something else.

Richtige Lösung:

10. A: A Isn't your hair different?'

B: 'Yes, I B have had it cut. I think it's horribly short.'

A: 'Why C did you had it cut then?'

Richtige Lösung:

11. I A had better not leave my bag there. Someone B might steal it.

I C have better take it with me.

Richtige Lösung:

12. Spinach A is said to be very good for your health. However, B it is said that children don't like it so much. Children C are say to prefer pizza.

Richtige Lösung:



13.

A: A 'Did you use eating a lot of sweets B when you were a child?'B: No, I C didn't use to take many sweets. I eat more chocolate now.

Richtige Lösung:

14.

Peter A would rather play football B than do his homework. But I C will rather he finished his homework first.

Richtige Lösung:

15.

A: 'You A should go to the disco with me some time.'B: 'Oh, my parents B would never let me do that.'A: 'Well, if I were you, I C will ask them.'

Richtige Lösung:

16.

Yesterday I had really bad toothache so I went to the dentist to A have my teeth check. It B turned out that I had an infection. Luckily, I didn't have to C have anything removed.

Richtige Lösung:

17.

You A don't look very well. You B not had better go to work today. You C had better stay in bed.

Richtige Lösung:

18.

People say a lot of things about Tom. Tom A is said to being very intelligent. He B is said to know a lot about history. C It is said that he reads 10 books per week.

Richtige Lösung:

### Fragebogen

Bitte lies die Aussagen im Fragebogen. Kreuze zu jeder Aussage immer nur **ein** Kästchen an und zwar dasjenige, welches deiner Meinung nach am besten zutrifft.

	Stimmt gar nicht	Stimmt eher nicht	Stimmt teils- teils	Stimmt eher	Stimmt genau
1. Durch den Einsatz von Videos im Unterricht wurde zu viel Zeit vergeudet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Ich fände es gut, wenn im Unterricht weiterhin mit Videos gearbeitet würde.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Der Einsatz von Videos hat den Unterricht besser gemacht.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Durch die Videos hat sich meine Motivation zum Lernen erhöht.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Es war einfach, die Videos zu benutzen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Die Videos haben mir beim Lernen geholfen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Ich glaube, dass ich mit Videos besser lernen kann als in Unterrichtsstunden ohne Videos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Der Einsatz von Videos hat mir geholfen, tiefer über den Lernstoff nachzudenken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Die Verwendung von Videos hat mein Selbstbewusstsein für den Unterricht gestärkt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Die Verwendung von Videos hat mir geholfen, aktiver am Unterricht teilzunehmen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Die Benutzung der Videos war klar und verständlich.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Der Einsatz von Videos hat mir geholfen, im Unterricht aufmerksamer zu sein.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Die Verwendung von Videos hat meine Konzentration im Unterricht verbessert.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Die Benutzung der Videos erfordert nicht viel Denkarbeit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Die Videos haben dafür gesorgt, dass ich lieber am Unterricht teilgenommen habe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Es gab zu viele technische Probleme bei dem Einsatz von Videos.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Der Einsatz von Videos hat meine Freude am Unterricht gesteigert.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Es war einfach, die Videos so zu steuern, wie ich es wollte.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Stimmt gar nicht	Stimmt eher nicht	Stimmt teils- teils	Stimmt eher	Stimmt genau
21. In Englisch würde ich gerne mehr Unterricht haben.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Ich versuche in Englisch gerne, besser zu sein als andere Schülerinnen und Schüler.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Mir liegt viel daran, Englisch gut zu können.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Ich arbeite in Englisch gern mit anderen Schülern bzw. Schülerinnen zusammen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Wenn ich versuche, in Englisch besser als andere zu sein, leiste ich gute Arbeit.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Ich finde es nützlich, die Ideen von allen zusammen zu bringen, wenn man in Englisch an einem Projekt arbeitet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Ich wäre gerne in Englisch der/die Beste.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Es ist für mich persönlich wichtig, das in Englisch Gelernte zu behalten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Ich lerne schneller, wenn ich in Englisch versuche, besser zu sein als die anderen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Am meisten lerne ich, wenn ich in Englisch mit anderen Schülern bzw. Schülerinnen zusammenarbeite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Mein Interesse am Fach Englisch ist hoch.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Im Englischunterricht helfe ich anderen gern dabei, in einer Gruppe gute Arbeit zu leisten.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Ich freue mich auf den Englischunterricht.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Die beste Arbeit leiste ich, wenn ich im Englischunterricht mit anderen Schülern bzw. Schülerinnen zusammenarbeite.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Englisch gehört für mich zu den wichtigen Fächern.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wir möchten nun von dir wissen, **wie du im Fach Englisch lernst**. Hier sind einige Antworten auf Fragen. Entscheide bei jeder Frage, welche der drei Antworten am besten zu dir passt. Wie lernst du im Fach Englisch? Bitte kreuze nur **eine** Antwort an!

1.

<p>Ich überlege mir beim Englischlernen, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich lernen will.</p> <p><input type="checkbox"/></p>	<p>Vor dem Englischlernen denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los.</p> <p><input type="checkbox"/></p>	<p>Mir ist es beim Englischlernen am liebsten, wenn der Lehrer mir sagt, was ich schon gut kann und was ich noch lernen muss.</p> <p><input type="checkbox"/></p>
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2.

Der Lehrer sollte mir sagen, welches Ziel ich mir beim Englischlernen setzen sollte. <input type="checkbox"/>	Ich setze mir beim Englischlernen ein festes Ziel, was und wie viel ich lernen will. <input type="checkbox"/>	Ich setze mir beim Englischlernen kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
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3.

Es bringt mir nichts zu planen, wie ich am besten Englisch lerne. So etwas mache ich automatisch. <input type="checkbox"/>	Der Lehrer kann mir am besten sagen, wie ich beim Englischlernen vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten beim Englischlernen vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich am besten Englisch lerne, gehe ich erstmal genauso vor. <input type="checkbox"/>	Ich lerne Englisch am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich lerne Englisch so, wie der Lehrer mir gesagt hat, dass ich lernen soll. <input type="checkbox"/>
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5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich beim Englischlernen einen besseren Weg finde. <input type="checkbox"/>	Ich achte auch während des Englischlernens darauf, ob ich auf andere Weise besser lernen könnte. <input type="checkbox"/>	Während des Englischlernens überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. <input type="checkbox"/>
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6.

Auch wenn ich beim Englischlernen einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Englischlernen nur dann umstellen, wenn mir der Lehrer das empfehlen würde. <input type="checkbox"/>	Wenn mir während des Englischlernens auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. <input type="checkbox"/>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir beim Englischlernen vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich Englisch genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich Englisch genügend gelernt habe. <input type="checkbox"/>
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Als nächstes möchten wir von dir wissen, **wie du mit Videos lernst**. Entscheide wieder, welche der drei Antworten am besten für dich passt. Bitte kreuze nur **eine** Antwort an!

1.

<p>Ich überlege beim Lernen mit dem Video, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich lernen will.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Vor dem Lernen mit dem Video denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Mir ist es am liebsten, wenn der Lehrer mit beim Lernen mit dem Video sagt, was ich schon gut kann und was ich noch lernen muss.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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2.

<p>Der Lehrer soll mir sagen, welches Ziel ich mir beim Lernen mit dem Video setzen soll.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich setze mir beim Lernen mit dem Video ein festes Ziel, was und wie viel ich lernen will.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich setze mir beim Lernen mit dem Video kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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3.

<p>Es bringt mir nichts zu planen, wie ich mit dem Video am besten lerne. So etwas mache ich automatisch.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Der Lehrer könnte mir am besten sagen, wie ich beim Lernen mit dem Video vorgehen soll.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich überlege mir genau, wie ich am besten beim Lernen mit dem Video vorgehe.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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4.

<p>Nachdem ich mir überlegt habe, wie ich am besten mit dem Video lerne, gehe ich erstmal genauso vor.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich lerne mit dem Video am besten so, wie es mir spontan einfällt.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich lerne mit dem Video so, wie der Lehrer mir gesagt hat, dass ich lernen soll.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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5.

<p>Ich finde es besser, wenn der Lehrer mir sagt, wie ich beim Lernen mit dem Video einen besseren Weg finde.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich achte auch während des Lernens mit dem Video darauf, ob ich auf andere Weise besser lernen könnte.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Während des Lernens mit dem Video überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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6.

<p>Auch wenn ich beim Lernen mit dem Video nicht so gut vorankomme, behalte ich meinen Kurs bei.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich würde mein Lernen mit dem Video nur dann umstellen, wenn mir der Lehrer das empfehlen würde.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Wenn mir während des Lernens mit dem Video auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir beim Lernen mit dem Video vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich mit dem Video genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich genügend mit dem Video gelernt habe. <input type="checkbox"/>
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Wir möchten nun von dir wissen, **wie du in Gruppenarbeiten lernst**. Entscheide wieder, welche der drei Antworten am besten zu dir passt. Bitte kreuze nur **eine** Antwort an!

1.

Ich überlege vor der Gruppenarbeit zuerst, was schon bekannt ist und was noch unbekannt ist. Dann vergleiche ich das damit, was ich lernen will. <input type="checkbox"/>	Vor der Gruppenarbeit denke ich nicht lange darüber nach, was ich lernen will. <input type="checkbox"/>	Mir ist es am liebsten, wenn mein Lehrer mir vor der Gruppenarbeit sagt, was noch unbekannt ist und was erarbeitet werden soll. <input type="checkbox"/>
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2.

Der Lehrer sollte mir sagen, welches Ziel ich mir bei der Gruppenarbeit setzen sollte. <input type="checkbox"/>	Ich setze mir bei der Gruppenarbeit ein festes Ziel, was und wie viel gelernt werden soll. <input type="checkbox"/>	Ich setze mir bei der Gruppenarbeit kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. <input type="checkbox"/>
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3.

Es bringt mir nichts zu planen, wie ich in der Gruppenarbeit am besten lerne. So etwas mache ich automatisch. <input type="checkbox"/>	Der Lehrer kann mir am besten sagen, wie ich in der Gruppenarbeit am besten vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten in der Gruppenarbeit vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich am besten in der Gruppenarbeit lerne, gehe ich am besten erstmal genauso vor. <input type="checkbox"/>	Ich lerne in der Gruppenarbeit am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich lerne in der Gruppenarbeit so, wie es der Lehrer mir gesagt hat, dass ich lernen soll. <input type="checkbox"/>
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5.

<p>Ich finde es besser, wenn der Lehrer mir sagt, wie ich in der Gruppenarbeit einen besseren Weg finde.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich achte auch während der Gruppenarbeit darauf, ob ich auf eine andere Weise besser lernen könnte.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Während der Gruppenarbeit überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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6.

<p>Auch wenn ich beim Lernen in der Gruppenarbeit einmal nicht so gut vorankomme, behalte ich meinen Kurs bei.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich würde mein Lernen in der Gruppenarbeit nur dann umstellen, wenn mir der Lehrer das empfehlen würde.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Wenn mir während der Gruppenarbeit auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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7.

<p>Am Schluss überprüfe ich immer, ob ich das, was ich mir für die Gruppenarbeit vorgenommen habe, auch erreicht habe.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich habe das im Gefühl, ob ich in der Gruppenarbeit genügend gelernt habe. Das brauche ich nicht extra zu überprüfen.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Am liebsten ist es mir, der Lehrer sagt mir, ob ich genügend in der Gruppenarbeit gelernt habe.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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Schließlich möchten wir von dir wissen, **wie du bei den Hausaufgaben vorgehst**. Entscheide wieder, welche der drei Antworten am besten zu dir passt. Bitte kreuze nur **eine** Antwort an!

1.

<p>Ich überlege vor den Hausaufgaben zuerst, ob die Aufgaben leicht zu lösen sind oder nicht.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Vor den Hausaufgaben denke ich nicht lange darüber nach, ob die Aufgaben leicht zu lösen sind oder nicht. Da lege ich lieber gleich los.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Mir ist es am liebsten, wenn der Lehrer mir zu den Hausaufgaben sagt, ob die Aufgaben leicht zu lösen sind oder nicht.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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2.

<p>Der Lehrer sollte mir feste Vorgaben machen, wann und wie ich meine Hausaufgaben anfertigen soll.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich mache mir selbst feste Vorgaben, wann und wie ich meine Hausaufgaben anfertige.</p> <p style="text-align: center;"><input type="checkbox"/></p>	<p>Ich brauche keine festen Vorgaben, wann und wie ich meine Hausaufgaben anfertigen soll. Ich kann mich da ganz auf mein Gefühl verlassen.</p> <p style="text-align: center;"><input type="checkbox"/></p>
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3.

Es bringt mir nichts zu planen, wie ich bei den Hausaufgaben vorgehen soll. So etwas läuft bei mir automatisch. <input type="checkbox"/>	Der Lehrer sollte mir am besten sagen, wie ich bei den Hausaufgaben vorgehen soll. <input type="checkbox"/>	Ich überlege mir genau, wie ich am besten bei den Hausaufgaben vorgehe. <input type="checkbox"/>
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4.

Nachdem ich mir überlegt habe, wie ich die Hausaufgaben am besten mache, gehe ich erstmal genauso vor. <input type="checkbox"/>	Ich mache die Hausaufgaben am besten so, wie es mir spontan einfällt. <input type="checkbox"/>	Ich mache die Hausaufgaben so, wie es der Lehrer mir gesagt hat, dass ich sie machen soll. <input type="checkbox"/>
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5.

Ich finde es besser, wenn der Lehrer mir sagt, wie ich bei den Hausaufgaben anders hätte vorgehen können. <input type="checkbox"/>	Ich achte bei den Hausaufgaben darauf, ob ich sie auf eine andere Weise besser erledigen könnte. <input type="checkbox"/>	Während der Hausaufgaben überlege ich nicht, wie ich sie besser erledigen könnte. Ich richte die Aufmerksamkeit ganz auf die Lösung der Aufgaben. <input type="checkbox"/>
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6.

Auch wenn ich bei den Hausaufgaben einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. <input type="checkbox"/>	Ich würde mein Vorgehen bei den Hausaufgaben nur dann umstellen, wenn mir der Lehrer das empfohlen würde. <input type="checkbox"/>	Wenn mir während der Hausaufgaben auffällt, wie ich besser vorgehen könnte, dann stelle ich meine Vorgehensweise um. <input type="checkbox"/>
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7.

Am Schluss überprüfe ich immer, ob ich das, was ich mir für die Hausaufgaben vorgenommen habe, auch erreicht habe. <input type="checkbox"/>	Ich habe das im Gefühl, ob ich die Hausaufgaben gut erledigt habe. Das brauche ich nicht extra zu überprüfen. <input type="checkbox"/>	Am liebsten ist es mir, der Lehrer sagt mir, ob ich die Hausaufgaben gut erledigt habe. <input type="checkbox"/>
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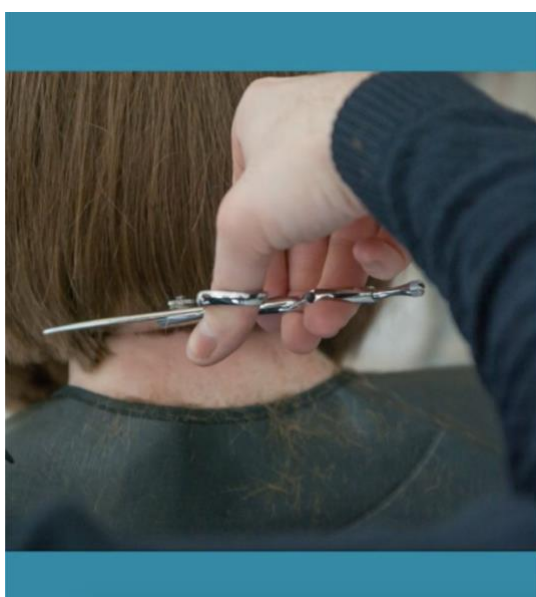
### Appendix D: Teaching Materials (Study 2)

The instructional videos and worksheets, which were implemented in Study 2, are available upon request from the author and may be used for further research studies or educational practice. In total, six instructional videos on different grammar topics were created. The following are screenshots of the videos and should give insight into the design of the videos.

#### Video 1: Talking about decisions ('had better', opinion + action)



#### Video 2: Talking about things others do for us ('have something done')



Last week Lisa  
had her hair cut .

**Video 3: Talking about preferences ('would rather')**

I would  
rather go to  
school by  
bike than by  
bus.

Sp Adobe Spark

**Video 4: Reporting opinions ('be said to')**

English food is said to  
be very bad.

People say that  
English food is very  
bad, but we don't know  
if this is really true.



Sp Adobe Spark

**Video 5: Talking about the old times ('used to')**

We use 'used to' to talk about things that happened regularly in the past, but no longer happen in the present.

Sp Adobe Spark

**Video 6: Giving advice ('If I were you, I would...')**

Your best friend wants to go on a holiday.  
Give him/her some advice where to go!

Sp Adobe Spark

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Ich versichere hiermit

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Ort, Datum

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Unterschrift