

# THE POTENTIAL OF DIGITAL LEARNING PATHS FOR PROVIDING EQUITABLE CONDITIONS FOR LEARNING ENGLISH GRAMMAR

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**Abstract:** The purpose of this article is to present a case study that explores the effectiveness of digital learning paths (DLPs) in improving English grammar proficiency among English language learners in secondary schools (Years 6-10), and to assess their potential for promoting equity in classroom instruction. To answer this question, we provided the English teachers with access to our grammar-focused DLPs, which were relevant to the year they were teaching, so that they can plan a 45-minute English grammar lesson that combines the book and the DLP, be it theory and/or context and/or exercises. Learners were given access to the DLP via tablets. The data about pupils' reactions was collected via lesson observation and an online questionnaire, made up of 16 multiple-choice closed questions that pupils filled in immediately after the DLP-supported English grammar lesson. Our results showed that pupils felt supported in the following four areas during the DLP-supported lesson: 1. Technology-enhanced learning; 2. Stimulating teaching and learning materials; 3. Open access to additional learning materials (theory and exercises); 4. Freedom to choose the exercises according to the individual's level of knowledge. This study takes place as part of the BMBF-project InDiKo that research media-didactic competence development in pre-service teachers; the English team works on the development, implementation, and evaluation of narrative Innovation Space-based DLPs on grammar, created by the pre-service English teachers in a media-didactics/Grammar double-seminar at the University of Education Karlsruhe. By attempting to address multiple factors and learner characteristics simultaneously, DLPs can be seen as facilitating the learning process by promoting learner-centred and differentiated learning.

**Keywords:** differentiation, pre-service English teachers, learning paths, educational equity, EFL

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## Introduction

“Every student can learn. Just not on the same day, or the same way” (George Evans).

Because of today's large class sizes and the need to follow the curriculum to the letter, teachers are not able to spend time with each student to help them improve their knowledge; this is the current educational problem that this study aims to address. Very often teachers rely on a ‘one-size-fits-all’ model that employs instructional strategies and educational technology tools to enhance the output from teacher-centred classrooms (Demski, 2012). In such settings, pupils learn from standardised curricula, instructional strategies, and time-based models of learner progress (Demski, 2012).

This situation often fails to consider learners' differentiated characteristics such as abilities, literacy levels, and backgrounds. Consequently, it functions as a hindrance rather than an aid to pupils. So, we can frequently talk about an opportunity and achievement gap in the classroom. According to Anderson et al. (2007), we can measure many types of gaps in terms of learner performance.

Kyriakides et al. (2021) confirm that pupils' learning success is associated with various factors, including their social background (ethnicity and gender), which are given characteristics and which pupils are unable to change easily in order to achieve better learning outcomes. Meta-analyses have also revealed that pupils' economic status factors such as the lack of financial strength of socially disadvantaged families have an impact on their academic achievement (White, 1982, Sirin, 2005).

Educational equity refers [...] to the ideal of an education system that is independent of individual factors such as gender, ethnic or social origin, economic ability, religious and political views (Klenk and Schmid, 2018).

In many cases, the aforementioned factors still prevent pupils today from enjoying the same educational opportunities as their peers. Having said that, many pupils need access to additional support to succeed academically, whether this involves further tutoring or additional theory and practice books. At the same time, it is undeniable that glaring inequality in terms of resources affects equality of opportunity (Giesinger, 2007).

Hence, there is an urgent need to shift to a learner-centred pedagogy (LCP) that promotes aspects such as active participation, adapting to needs, autonomy, power sharing, 21st-century skills, and formative assessment (Bremner et al. 2022). LCP is defined as "an instructional approach in which students influence the content, activities, materials, and pace of learning" (Collins and O'Brien, 2003, p. 338). LCP, which has its origins in constructivist learning theory, is a dialogue and reciprocity between the teacher and the learners as well as between the learners themselves. Teachers who wish to teach according to LCP must be willing to implement teaching approaches such as differentiating instruction in order to respond to learner variance in the classroom.

Differentiating instruction means recognising and responding to pupils' different background knowledge, readiness, language, learning preferences, and interests. It is defined as a process to approach teaching and learning for pupils of differing abilities in the same class (Hall, 2002). The purpose of differentiating instruction is to maximise each pupil's growth and individual success by meeting each pupil where he or she is and supporting the learning process.

Differentiation plays an important role in the digital learning paths (DLPs) that were constructed by our pre-service English teachers during the last 3 semesters in our seminar on 'Media-didactic Competence: Learning Paths and Digital Storytelling for Grammar Teaching' at the University of Education Karlsruhe. Because our seminar targets the teaching of grammar, the DLPs focus on teaching grammar to secondary English learners. A learning path (LP) is a unit of study with several learning steps that learners work through independently and at their own pace. The learners work through the learning steps in a given order, document their learning progress after each step, and can refer to comparable results at the end (Hessisches Schulportal, 2016).

The following goals can be achieved with an LP: Self-organised and independent practice and learning, transparency of learning and performance expectations, and differentiated support for the learner (Hessisches Schulportal, 2016). DLPs can be viewed as follows:

- Expository arrangements, where the learning content is in a predetermined, highly sequenced order and the learner has relatively few choices about the course of the learning journey.
- Explorative arrangements, where the focus is on the learners and their individual learning needs. The content is not sequentially processed by the learner, but can usually be explored via hypertext.
- Complex arrangements, where, depending on the learning scenario (usually problem-oriented and cooperative), the focus is on developing complex skills and reaching the meta-level where the group process and the individual learning process are reflected.

Components of an LP can include resources such as Word, Excel, PowerPoint files, images, pages, links, and notes, as well as activities such as surveys, tests, quizzes, assignments and discussions. An LP can be completely implemented in the form of the flipped classroom concept, but the phases of learning can also alternate between digitally supported media and traditional teaching methods (Roth and Wiesner, 2014). The ultimate goals of DLPs are the transfer of knowledge and the cognitive acquisition of knowledge (Schmidt, 2009).

The purpose of this article is to present a case study that examines the effectiveness of DLPs in improving the English grammar skills of English language learners in secondary schools (grades 6-10) and their potential for ensuring equity in the delivery of instruction. The research question derived from the aforementioned research aim is: In what areas can DLPs support secondary English learners during grammar lessons?

## **Materials and Methods**

The seminar, ‘Media-didactic competence: LPs and Digital Storytelling for grammar teaching’, in which our DLPs are created, is part of the InDiKo project ‘Sustainable integration of subject didactic digital teaching-learning concepts’, which began in May 2020 at the University of Education in Karlsruhe (InDiKo, 2020–2023). The English Department is also part of the project and focuses its research on the development of pre-service English teachers’ media-didactic competencies, while their grammar competency development is also measured; therefore, we created this seminar. This is a double seminar, which is separated into two parts: the grammar part and the media-didactics part. Both take place on a weekly basis. The seminar aims to enhance the media-didactic abilities of our pre-service teachers. It will equip them with the skills necessary to produce their own digital teaching materials for English grammar. The educational objective is for pre-service teachers to master the grammar topic that they struggled with as English learners and then teach it through a DLP. On one hand, the grammar part concentrates on teaching the grammar topics that German English learners, as our pre-service teachers, find the most difficult. On the other hand, the media-didactics part takes place on a flipped classroom basis and concentrates on providing pre-service teachers with information about Instructional Design (ID) (events of instruction, analysis, and planning models), LPs (potential, opportunities, limitations, and media-didactic requirements), learning theories (behaviourism, cognitivism, constructivism, and connectivism), and lesson planning (Bloom’s

Taxonomy and learning objectives), digital storytelling (definition, didactic value, tools, apps, and examples), competency-based teaching (grammar, vocabulary, pronunciation, reading, writing, listening and speaking) and last, but not the least, the learning task typologies (elaboration tasks, decontextualisation tasks, exercise tasks, transfer tasks, evaluation tasks and self-differentiating tasks).

So far, the topics of our DLPs are conditional clauses: 0, 1, 2 and 3 and relative clauses: simple present, future simple, future continuous, be going to, direct and reported speech, present progressive, simple past, present perfect, future perfect simple and modal verbs.

DLPs appear to be a relatively new area of research. The reason why we chose to focus our DLPs on the teaching of grammar is that there are no relevant contributions in the language area of grammar to date.

The DLPs for our pre-service English teachers are based on Bloom's Taxonomy. The reason why this Taxonomy was chosen is that we find it a useful checklist to ensure that every level of grammar learning has been assessed and that the appropriate assessment methods have been matched to the lesson. Our objective in instructing our pre-service teachers to base their DLP on Bloom's Taxonomy is to foster higher-order thinking in their secondary English learners by nurturing their lower-level cognitive skills. Specifically, Bloom's Taxonomy consists of six levels: Recalling previously learned information, understanding new facts, applying knowledge to current situations, analysing ideas into simpler parts and finding evidence to support generalisations, evaluating information to construct alternative solutions and creating artifacts based on internal evidence or external criteria.

Our DLPs are created on Innovation Space, the university's Learning Management System platform. Our pre-service English teachers work in groups of 2–4 to create their DLP based on the grammar topic they find most challenging, following Dewey's learning-by-doing approach. The grammar and media-didactic parts of the seminar served as an opportunity for pre-service teachers to familiarise themselves with the content, which is none other than English grammar and media didactics, before proceeding with the creation of their DLP. Once the grammar topic is known, the pre-service teachers start working in groups on the content and structure of their DLP. Finding a suitable story that is ideally close to pupils' reality and will motivate their pupils to go through the DLP also plays an important role. Pre-service teachers work autonomously and manage their workload from the beginning until the end, gaining thus hands-on experience in doing something that they can later use in their classes as in-service English teachers. The idea behind having pre-service teachers create DLPs is to prepare them for the challenges of their future work, where online learning should be an integral part of learners' learning and everything changes very quickly, as with COVID-19 when teachers suddenly had to move to online teaching.

While creating DLPs, our pre-service teachers are asked to create their own pictures, videos, and comics, and to record their own audio material to support their learning unit. In particular, the use of self-produced explanatory videos combines the advantages of dual coding (linguistic and pictorial representation) with the use of multiple sensory channels, which can support learning and practice, especially for weaker learners (Schmidt-Borcherding, 2020, Windler and Wolf, 2021). Given the heterogeneous composition of the class, differentiated learning situations have been created through selectable levels of difficulty (G, M, and E), the provision of additional tasks and individual

automated feedback. Learning materials are available for learners of every level to work on individually and according to their own level. Self-directed learning is also possible through interactive materials, where audio-visual formats can be used in addition to visual formats. At the end of the seminar, the groups present their DLPs and reflect on the experience they had.

A mixed methods research design was chosen to conduct this study. The purpose of choosing this type of research design was to reach a more robust conclusion, to counter the weaknesses of one method by using the other and to increase the ability to generalise the findings compared to using only qualitative research designs. In particular, the study was built upon the explanatory sequential mixed methods research type as we aimed to, first, collect qualitative data (from the classroom observation) to investigate pupils' reactions towards the DLPs as part of the teaching process, and second, gather quantitative data (from the questionnaire) to explain the qualitative findings.

The first research method chosen for this study was survey research. The purpose was to understand a large group of secondary English learners by using statistics to make generalisations. Specifically, an online Google Forms questionnaire was used for data collection, which consisted of 16 predetermined multiple-choice (closed) questions. Pupils were asked to complete the questionnaire anonymously on their tablets immediately after the DLP-supported English grammar lesson. The anonymity of the surveys allowed the respondents to provide more valid answers.

The second research method chosen for this study was classroom observation. The purpose was to study the processes of teaching and learning in a naturalistic setting. In other words, the purpose was to observe the live classroom activity when DLPs are an integral part of the English grammar lesson and to collect data (pupils' reactions when they engage with the DLP) by listening and taking notes (narrative description).

The observations took place in October 2022 in a secondary school in Eggenstein, which is located in the province of Baden-Württemberg in Germany. The researcher's focus was on the subject of English, specifically the teaching of English grammar. The years in which the observations took place were the sixth, seventh, eighth, ninth, and tenth.

Some time ago, the teachers of the previously mentioned years at this school were given nine of our DLPs to use in their English lessons. The topics of these DLPs included Conditional Clauses: 0, 1, 2, and 3; and Relative Clauses: Simple Present and Present Progressive, Will Future and Future Continuous, Reported Speech, Simple Past, Present Perfect, and finally Future Perfect. The idea was for teachers to integrate parts of the DLP (theory and/or context and/or tasks) to plan a 'perfect' lesson (45 minutes), which was also in line with their regular syllabus. In other words, the teachers were asked to combine their book and the DLP in order to teach one of the grammar phenomena mentioned above. Pupils in all years were working individually or in collaboration with their peers, according to the requirements of the task and the instructions of their teacher. There were tablets and a headset available for every pupil to use during the lesson.

The observer did not take part in the lesson but sat at the back of the classroom to ensure that the lesson was not disrupted. The observations were taken over nine days.

## **Sample**

A total of 50 pupils, aged between 11 and 15 years, took part in the study. In particular, there were 30 boys and 20 girls with different levels of knowledge and various learning styles. They had been learning English at school for between 3 and 7 years. These pupils were studying in years 6, 7, 8, 9, and 10 at a state secondary school in Germany. A total of 14 pupils were from different cultural and/or immigrant backgrounds. There were no further inclusion or exclusion criteria for selecting the sample. For the purpose of the study, we sought secondary school English learners in general.

## **Results and Discussion**

This study was conducted to explore the areas in which secondary school pupils felt supported by DLPs during the English grammar lessons (as demonstrated in Table 1). This case study can help to highlight DLPs as an alternative means of assisting English learners who need more support to succeed academically both in and out of the classroom. The Results section will be organised into two sub-sections: Results from the lesson observation and results from the questionnaire.

### **Results from the lesson observation**

To begin with, five lesson observations occurred, one in every year from 6 to 10. The lesson observations revealed that the learners were enthusiastic about the fact that the English grammar lesson on this day would be technology-supported and thus different from the other days. Normally, the teacher would use the book as the main source of material, along with worksheets with more exercises, but this time we asked the teachers to incorporate our grammar-focused DLP into their lessons. All the learners were happy with the fact that they would be using a tablet during the lesson, so they would not be writing in their books or on worksheets all the time. Some examples of pupil comments are "I like using the tablet during the lesson" and "It is more fun to tap on the screen and explore the different functions of the DLP than to write exercises in the book or on the worksheet". Pupils enjoyed the fact that the lesson became more interactive through the voice recordings and videos, as well as the automatic (formative) feedback after each exercise, which allowed them to quickly and conveniently check whether their answers were right or wrong (and why) and have the opportunity to do it again. Some examples of pupil comments are "DLPs are cool", "I liked the story. It motivated me to do the exercises", "I like DLPs because I can see immediately if I gave the right answer", "I liked the DLP very much. It was good. It was fun and it helped me improve some English skills", "I liked the DLP because it was useful and it was a new way to practise English grammar" and "I find grammar lessons boring, but DLPs make them more interesting". They seemed focused on the DLP-based tasks and were not distracted by anything else outside the DLP. Finally, and most importantly, there were many learners in different years who commented on the fact that it was not only the teacher who determined the exercises but also the learners themselves, depending on their own level of knowledge. Some examples of pupil comments are "I like being able to choose the exercises I want to do" and "I can try more difficult exercises and test my knowledge without waiting for others to finish or asking my teacher". During the lesson, when the learners were working on their tablets, the observer approached them without disturbing or interfering to understand how they were working in the DLP. It turned out that a surprisingly large number of learners were already reading the additional theory and/or trying to do more exercises, either at their current level or at an advanced level that the DLP offered them.

## **Results from the questionnaire**

48 pupils (97%) felt supported by the fact that they were using electronic devices to learn instead of only their books. These findings were also confirmed by Ciampa (2014), Jayanthi and Kumar (2016) and Azmi (2017). Technology has been shown to have an overall positive impact on the learner's motivation as it encourages them to learn (Cukalevska and Johansson, 2021). Similarly, researchers such as Habel and Stubbs (2014), and Zweekhorst and Maas (2015) point to the potential for greater learner engagement in the classroom, with studies showing that asking learners to use (their) mobile devices for class-related activities can make lessons more interactive, which in turn increases overall learner engagement. One can argue that learner motivation is one of the reasons why English as a foreign language (EFL) teachers use technology (Abukhattala, 2016). The recent study by Bilotserkovets and Fomenko (2022) also shows that the implementation of mobile devices and applications was very attractive and practical, as 96.1% of learners preferred to combine learning with the use of digital devices such as smartphones and tablets in everyday life. Kayapinar et al. (2019) and Lin (2014) found in their studies that the changes because of the use of educational technology in the classroom could also lead to an overall statistically significant difference in achievement scores.

A total of 40 pupils (80%) appreciated that the DLP was providing them with the opportunity to click on a given link in order to access more theory and exercises. DLPs can offer various exercises that allow learners to practise the grammar topic sufficiently. Learners can access different sources of information and find various learning materials. Chartrand (2016) adds that multimedia capability is another advantage of using mobile devices, and in our case, DLPs allow learners to further practise their foreign language in different ways, including by watching videos or listening to how natives speak the language. In this way, learners have instant access to individual research, providing a huge knowledge base (Kayapinar et al. 2019). DLP-based exercises can instantly assess learners' answers and provide detailed explanations of the grammar point in question, giving learners independence, as they do not have to rely solely on the teacher's explanations (Kayapinar et al. 2019).

A total of 47 pupils (95%) appreciated the fact that the exercises in the DLP could be freely chosen by them, based on their individual level of English grammar knowledge. Similar findings were reported by Meurers et al. (2010), according to which allowing learners to choose the exercises they feel are appropriate to their level of proficiency clearly has a positive effect on learner motivation and encourages them to change their role from passive recipients to active constructors of their learning (Dumančić et al. 2016).

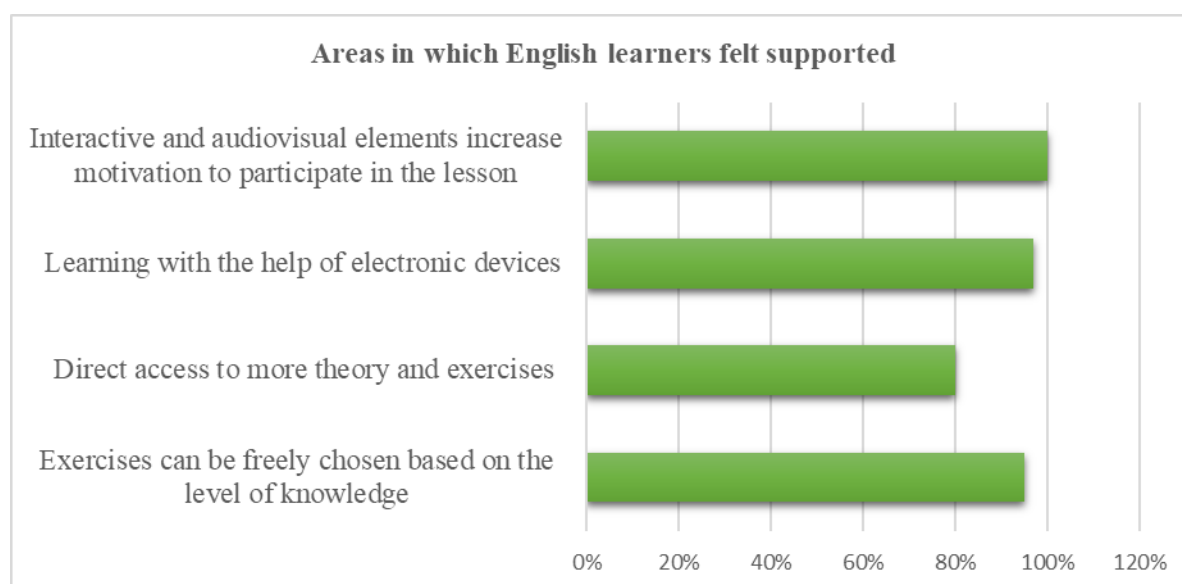
Finally, all the pupils (100%) felt 100% supported by the interactive and audio-visual elements that our DLPs contain and mentioned that these elements motivated them to participate in the English grammar lesson.

The use of DLPs in teaching, particularly for grammar instruction, can promote open education and enhance the effectiveness of educational activities. Besides the knowledge imparted by teachers in the classroom, pupils can enhance their learning and research and deepen their understanding through effective access to multidimensional information, reducing distance, bridging gaps, and optimising time. In contemporary education, teachers primarily transmit essential foundational knowledge to pupils, instructing them on how to identify and utilize lessons pertinent to the subject matter, which are widely available within a diverse array of online learning sources, in our case within the DLP.

Concurrently, pupils can locate and complete additional exercises to reinforce and extend their grasp of the (newly) learned grammatical concepts. This approach facilitates a more proactive approach to learning. Further opportunities are provided by DLPs allowing learners to select material they are not yet familiar with or want to develop, in order to improve themselves. Teachers can develop their grammar-focused DLPs based on real-life situations that learners may encounter in their daily lives. This approach can be particularly advantageous for English grammar learning, as learners engage with a narrative that demonstrates the relevance and importance of learning specific grammatical concepts. Opportunities to apply recently acquired knowledge within a real-life context can be highly rewarding and promote long-term language skill improvement, leading to greater success in language use overall. In addition to that, DLPs may also include a discussion forum and/or communication channel for teacher/learner comments/questions, which is consistent with what Shahid et al. (2019) observed in their research: Digital tools have the potential to encourage greater interaction between teachers and learners. It could be argued that integrating DLPs into the classroom fosters a constructive approach to learning among students, thereby raising educational standards.

More research is necessary to better understand how DLPs can support secondary English learners in learning English grammar. Future studies should include participants from various schools in order to obtain more comparable and generalisable results. It is also advisable to conduct a study to compare learners' and teachers' views on the extent to which DLPs can benefit the learning process, not only in learning English grammar but also in other subjects. Another idea for further research is to explore whether secondary school pupils consider DLPs sufficient to learn/practise English grammar, or whether they prefer to combine DLPs with further materials and explanations from the teacher, and why.

Table 1: Areas in which English learners felt supported by digital learning paths.





## **Conclusion**

This research was conducted with the aim of exploring the areas in which secondary English learners felt supported by DLPs during English grammar lessons. Based on the findings of this research, it can be inferred that DLPs possess the capacity to provide fair learning opportunities. Moreover, the areas in which secondary English learners felt supported during the English grammar lesson, as highlighted by both research methods, are as follows: 1. Technology-enhanced learning; 2. Stimulating teaching and learning materials; 3. Open access to additional learning materials (theory and exercises); 4. Freedom to choose the exercises according to the individual level of knowledge.

The study found that learners generally appreciated being able to choose the exercises they wanted to do according to their current level of proficiency, or to try a more advanced level, rather than being forced to do those chosen by the teacher. Technological devices such as tablets were seen as effective learning tools for giving learner's access to DLPs during the lessons.

Taken together, these findings suggest that learners in general, and those from lower economic backgrounds in particular, benefit from digital learning materials and appreciate it when learning materials such as DLPs, provide them with opportunities to access additional and free learning materials that they would otherwise have to purchase in order to practise more. Teaching English grammar using DLPs can lead to improved academic results for everyone in the long term while the positive attitude towards DLPs suggests a promising future for the use of mobile devices and DLPs in learning English grammar.

Today's learners are different from previous generations and are described as 'digital natives' because various technologies have been an integral part of their lives since childhood. This means that teachers need new teaching methods and tools to keep up with the changes in learners' lives and learning techniques. Therefore, given that today's generations of learners have various learning needs and preferences, it is important for language teachers to adapt their teaching methods and promote active learning through the integration of technology. However, making grammar interesting is not the easiest task. These results revealed that DLPs can prove to be an operator that facilitates both the teaching and learning processes by trying to take into account multiple factors and characteristics of the learners at the same time. However, the use of digital media is not in itself conducive to learning. It depends on the didactic embedding and the pedagogical meaningful benefits that learners can derive from it.

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## Appendix



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