

*Research Article*

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## How do the current e-learning offers affect the learning behaviour of students?

### A study of e-learning offers and learning behaviour among students from different universities and colleges in the fields of media management and business administration in Baden-Württemberg

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#### Abstract

Students today have unlimited access to digital resources, yet this abundance often hinders independent learning, which is crucial for academic success. This study investigates how current e-learning tools influence the learning behaviour of students specializing in media management and business administration across universities in Baden-Württemberg. A qualitative group discussion with eight students aged 20–24, analyzed through Mayring's content analysis, reveals that while e-learning platforms offer flexibility and accessibility, they also present challenges such as distraction and the need for self-discipline. The findings highlight that optimal learning outcomes require structured e-learning strategies tailored to individual needs and emphasize the hybrid model as a promising approach for future education.

**Keywords:** E-Learning tools, student learning behaviour, hybrid education models, digital learning strategies, higher education digitalisation

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## INTRODUCTION

The coronavirus pandemic served as a catalyst for digitalisation. During this time, e-learning programmes at colleges and universities have grown rapidly (Schnelle, Schöpfer & Kersten, 2021, p. 31; Schüür-Langkau, 2020). Both purely online events and new hybrid offerings have emerged, which have significantly changed learning situations. As a result, the structure of seminars and lectures has changed significantly during this time and has been retained in many cases (Statista, 2021).

The present research is related to the study of academic media use by students in the 2020 coronavirus semester (Bedenlier, Händel, Kammerl, Gläser-Zikuda, Kopp and Ziegler). This longitudinal questionnaire study examines the academic media use, skills and equipment of students (N = 2,037) at a German comprehensive university at the beginning and middle of the 2020 summer semester, which took place nationwide in online teaching in emergency mode. It emerged that academic media use has intensified, students' perceived digital skills are increasing and e-learning offerings are being deployed and used on a faculty-specific basis. However, it also became clear that students started the semester with heterogeneous prerequisites, which also had an impact on the study situation over the course of the semester.

The analyses by Paschke, Lindemann-Matthies, Eichenberger and Brandl (2003) are also included. They found that motivated students spent much more time in an internet-based learning environment than non-motivated students. It was shown that only genuine interest in the content provided led to an understanding of the learning material, regardless of the motivation to learn. Learning satisfaction was achieved when students knew what was relevant to the exam at the end of working with the virtual learning environment. Visualising the content with the help of Flash animations and demonstrating it with examples increased the students' interest in learning.

Building on Mayer's Cognitive Theory of Multimedia Learning (1997), e-learning design can benefit from principles such as the Multimedia Principle, which shows students learn better with words and visuals combined, fostering deeper connections. Similarly, the Temporal Contiguity Principle emphasizes presenting words and visuals simultaneously to enhance retention and understanding. These research-backed principles can improve e-learning outcomes by addressing cognitive load and diverse learner needs, making them vital for optimizing digital education.

Why do some people find it easier to learn and some people find it harder? Both internal and external factors that make learning easier or more difficult play a role for learners. On the one hand, there is the learner's inner life, their values, characteristics and traits and thus also their resilience and self-discipline, while the other side comprises external influences (Quast, 2011, p. 27; Snow, 1989). The external factors include the use of widespread digital media, which have a growing influence on current educational culture. There is no question that digital media influence learning behaviour, but the constellations in which they have a positive or negative effect have not been conclusively clarified. E-learning offers students many advantages. For example, there is no need to travel to the university and the resulting time can be put to good use, for example for writing a project paper.

## 2. LITERATURE REVIEW

A central challenge in the learning process can be easily accessible digital, distracting offers, which are usually just a mouse click away and are often used on another device, e.g. a smartphone, at the same time as a digital lecture. (Blessing, 2011, p.129)

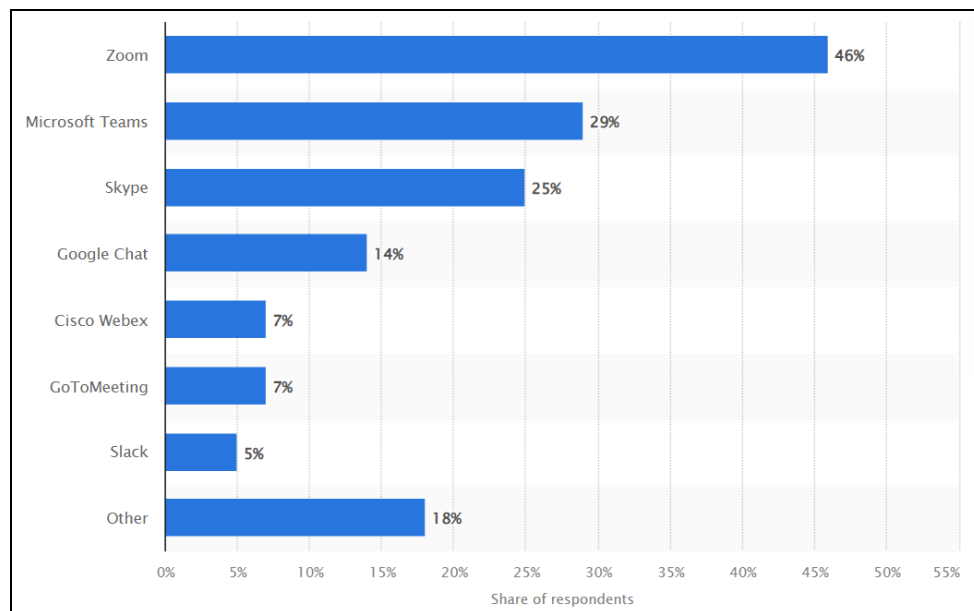
In this study, Sandro Droese and Christina Vaih-Baur investigate the following research question: What effect do current e-learning offerings have on the learning behaviour of male and female students? In the following step, the terms e-learning and learning behaviour are clarified.

## 2.1. E-Learning

Döring & Fellenberg (2005) consider e-learning to be a collective term for different teaching-learning scenarios "characterised by the significant use of online media" (Blessing, 2011, p.113). E-learning therefore refers to "learning in a teaching-learning environment in which the learner processes digital content on a suitable end device" (Blessing, 2011, p.115).

According to Blessing (2011, p.171), e-learning stands for a new dimension of digitalisation and offers "depending on the technology available - a wide range of possibilities, such as application sharing, audio conferencing, chat, file upload and download, database, email, forum, groupware, internet telephony, noticeboard or video conferencing".

The following e-learning tools are frequently offered at colleges and universities: Firstly, online lectures take place via various programmes such as Zoom, Microsoft Teams or Skype.



**Fig. 1: Leading online communication services that are regularly used worldwide (as of March 2021). (Source: Statista, 2021)**

Secondly, learning support programmes and apps such as StudyDrive, StudySmart, EcoReps or SimpleClub are used privately by students as a supplement. These e-learning methods can make it easier for students to learn in a more structured and efficient way. However, good performance depends not only on how the student learns, but also on whether they learn at all. The next section therefore deals with the internal influences of the student - the learning behaviour.

Recent advancements in technology have revolutionized the landscape of e-learning, making it more personalized and efficient. Adaptive learning platforms, powered by AI, customize the learning journey based on an individual's pace, strengths, and weaknesses.

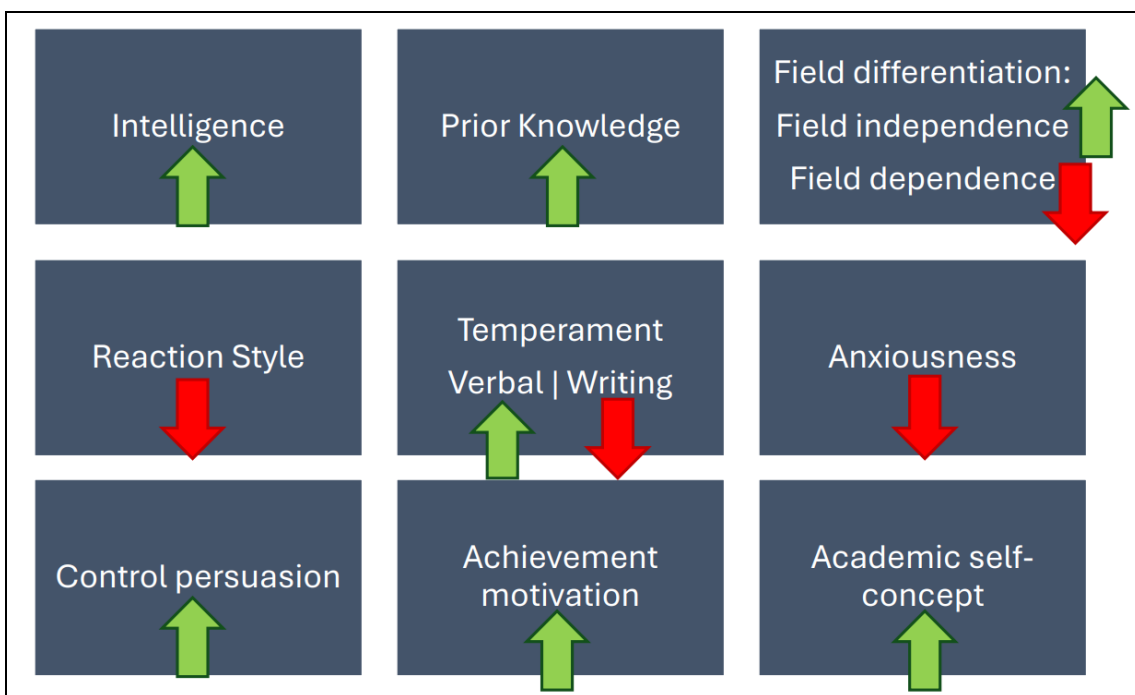
AI-driven tools like ChatGPT and DeepL have emerged as vital resources for academic support. ChatGPT assists with brainstorming, refining ideas, and overcoming writer's block, while DeepL's translation capabilities bridge language barriers, particularly for non-native students. Additionally, platforms like Gradescope leverage

machine learning to automate grading and provide detailed feedback, streamlining administrative tasks for educators. (EY, 2024)

## 2.2. Learning behaviour

According to Engelbert (2017, p. 43), learning takes place in phases, with well-known stages being "kindergarten, school and university". In addition to a situational and a social component, learning behaviour has "above all a pronounced individual dimension (Quast 2011, p. 27; Snow, 1989). There are various factors that influence learning; Quast (2011, p. 27) and Snow (1989) speak of "internal and external learning conditions".

The so-called ATI research, which is based on Vester's explanations, is presented here. The research is based on the assumption that every learner has different approaches to learning. A learner stereotype is formed from various characteristics. The nine learner characteristics described here are intelligence, prior knowledge, field differentiation, response style, temperament, anxiety, locus of control, achievement motivation and academic self-concept (Quast, 2011, p.51; Snow, 1989). All characteristics are probed between high and low, except for field differentiation. A choice is made between field dependence and field independence. This research provides a real picture of the characteristics of optimal, good and bad learners: According to this, an optimal learner is highly intelligent and has extensive prior knowledge of the subject matter to be learnt. He acquires knowledge independently of the field and reacts reflexively, is extraverted and has no fear. His sense of control is internal, his achievement motivation is also high and he has a positive self-concept. The illustration below shows the ideal learner.



**Fig. 2: Characteristics of ATI research, the optimal learner (own illustration, 2022)**

The worst learner is the exact opposite: he is not very intelligent; his prior knowledge is low, and he is field-dependent. His reaction style is impulsive, he is introverted and has a high level of anxiety. His sense of control is external, his achievement motivation is low, and he is filled with fear and failure, and he also has a negative self-concept.

Most learners develop one characteristic or another to a greater or lesser extent. It should be added that "in the sense of adaptive teaching, other learner characteristics, namely emotional and motivational conditions in addition to cognitive prerequisites, should also be taken into account when considering a differential approach and individualised support" (Quast, 2011, p.171; Snow, 1989; Alonso, Blumentritt, Olderog & Schleswig, 2017, p.8). Teaching-learning processes are therefore better if they are customised for the learner. (Quast, 2011, p.170). To summarise, it can be stated that digital educational offerings can be used in a targeted manner. However, these are not (yet) tailored to the individual needs of learners. However, learning only works optimally if personal needs are considered (Quast, 2011, p.171, Snow, 1989, Alonso et al., 2017, p.8). There is the aforementioned risk of students withdrawing from the learning process through procrastination and thus causing the acquisition of knowledge to stagnate. This is also due to the fact that digitalisation has not only made educational methods more sophisticated, but also online marketing and advertising as well as games and social media offerings. One possible solution here is to develop an individual learning strategy. Learners should therefore be aware of their current learning behaviour and be able to discuss their own learning behaviour. This is the only way a person can create their own learning plans for examinations. This is because personality is the foundation on which the ways of learning are based (Blessing, 2011, p.278).

In the following, the observations presented will be analysed and elaborated on the basis of the research question using the group discussion as a research method.

### *2.3. Critical Evaluation of the cited works*

While the cited studies provide valuable insights into the adoption and impact of e-learning and digital tools, they exhibit several limitations that merit discussion. Blessing's (2011) early work on e-learning is foundational, yet it may not fully account for the rapid technological evolution observed in the past decade, such as the integration of artificial intelligence (AI) in educational platforms. Similarly, Döring & Fellenberg's (2005) definition of e-learning focuses predominantly on online media, potentially overlooking the role of immersive technologies like virtual reality (VR) or adaptive learning algorithms.

Moreover, Quast's (2011) exploration of learning behavior and the characteristics of optimal learners draws heavily on established cognitive models, but it assumes a relatively static learning environment. Modern educational settings, shaped by ubiquitous internet access and real-time feedback tools, may demand a reevaluation of these learner typologies. Snow's (1989) emphasis on internal and external conditions also reflects a pre-digital perspective, which may limit its applicability to contemporary challenges like information overload or multitasking in digital environments.

Lastly, while Engelbert's (2017) phases of learning provide a structured framework, they lack an integrated view of how digital tools can influence transitions between these stages. Overall, the cited works are seminal but would benefit from an updated perspective that incorporates the transformative potential of AI and adaptive technologies.

### 3. EMPIRICAL STUDY: GROUP DISCUSSION AND CONTENT ANALYSIS ACCORDING TO MAYRING

The following research question arises from the theoretical analysis: "How does digitalisation through media and e-learning affect the learning behaviour of students?"

#### 3.1. Methodological Approach

In this study, a qualitative research approach is chosen because a lack of theory in this area. The research method used is the qualitative method of group discussion (Blasius, 2019; Mayring, 2022). The audio material created during the discussion was then transcribed and the text summarised by means of a content analysis according to Mayring (Blasius, 2019; Mayring, 2022). In order to gain a deeper overview about the learning behaviour and media use of students, Students were selected to attend five different universities and Study at universities.

The aim was to form a group of eight students aged between 20 and 24 that was as broadly diversified as possible. In addition, it is important that the students have already studied during the Covid-19 period and thus have extensive experience with e-learning and online lectures, but can also offer a comparison with face-to-face courses. In order to obtain answers that are as authentic as possible, a student, namely Sandro Droese, also took on the role of moderator.

The categorization process relied heavily on participants' verbatim contributions. For example:

- The statement, *"Well, first of all, I think the simplest, the biggest, the worst mistake that could easily be eliminated without any problems are the bad microphones currently in use."* (Student B) contributed to the category **The role of the teacher in learning**.
- Similarly, the comment, *"I find that e-learning confronts you much more with what needs to be learnt, and that learning is necessary."* (Student A) was categorized under **Advantages of E-Learning**.
- Another participant, Student F remarked, *"I think the biggest thing that we can summarise as hindering concentration is social media itself. So TikTok, Instagram, WhatsApp etc. And then there's gaming."* This was used to develop the category **Media that can hinder learning and other factors**.

While the qualitative approach and the selection of a diverse sample offer valuable insights, some limitations must be acknowledged. The small sample size of eight participants, though deliberately chosen for depth, restricts the generalizability of the findings. Additionally, the use of a student-moderator, while fostering an authentic discussion atmosphere, may introduce bias, as participants might align their responses with perceived expectations or group dynamics. These factors should be considered when interpreting the results, emphasizing the exploratory nature of the study rather than broad representativeness.

Despite these limitations, the use of verbatim quotes strengthens the reliability and transparency of the analysis, offering a direct connection between the participants' voices and the study's conclusions. The findings should therefore be interpreted as exploratory, laying the groundwork for broader quantitative research in the future.

1. Student A (Economics at the University of Hohenheim in the fifth semester)
2. Student B (Business Informatics at the University of Stuttgart and the University of Hohenheim; a cooperative study programme in the third semester)
3. Student C (Business Informatics at the Stuttgart University of Applied Sciences in the fifth semester)
4. Student D (sports and philosophy teacher training at the University of Heidelberg in the fifth semester)
5. Student E (Media and Event Management at Macromedia University of Applied Sciences in her seventh semester)
6. Student F (Business Psychology at Macromedia University in the seventh semester)
7. Student G (Business Psychology at Macromedia University of Applied Sciences in the seventh semester)
8. Student H (Media and Event Management at Macromedia University of Applied Sciences in the seventh semester).

The discussion took place on 27.12.2022 and lasted 1h 48 min. The focus of the evaluation is on inductive category formation. The statements were reduced to a cross-case category system. The discussion was conducted using the following guidelines.

Guide with key points:

1. Definition of e-learning
2. Conflicts and challenges in connection with e-learning
3. Positive effects of online learning
4. Digital media that hinder concentration and learning
5. Digital media products and/or methods that promote learning
6. Characteristics of an optimal learner
7. Ideal learning locations
8. Ideal learning time (time and duration)
9. The role of resilience and self-discipline in learning
10. Role of the lecturer in learning
11. Effects of digital learning methods on learning behaviour

### 3.2. Evaluation: Category System

	<b>1. E-learning</b>
<b>K1</b>	Use of e-learning
<b>K2</b>	Advantages of e-learning
<b>K3</b>	Additional commercial e-learning aids for students
<b>K4</b>	Different uses of e-learning
	<b>2. Lectures</b>
<b>K5</b>	Advantages of online lectures
<b>K6</b>	Advantages of face-to-face lectures
<b>K7</b>	The role of the teacher in learning
<b>K8</b>	Hardware equipment for online events
	<b>3. Learning behaviour when using media</b>
<b>K9</b>	Media that hinder learning and other factors
<b>K10</b>	Secondary employment in e-learning
<b>K11</b>	Music promotes concentration
<b>K12</b>	Learning partners as supporting factors
	<b>4. Characteristics of learners</b>
<b>K13</b>	Self-discipline
<b>K14</b>	Other characteristics of good learners
<b>K15</b>	Favourite place and time to learn
<b>K16</b>	Learning practices
	<b>5. Future and conclusion</b>
<b>K17</b>	Appropriate use of e-learning as a solution for better learning
<b>K18</b>	Entitlement to a college or university degree program

### 3.3. Results of the study

The results of the survey are presented in the following sections. The results are segmented into five subject areas: E-learning, Lectures, Learning behaviour in e-learning, Characteristics of learners and Future & conclusion:

#### 3.3.1 E-learning

##### **K1 Use of e-learning**

A wide variety of e-learning content is presented to students on the online platforms of colleges and universities. The *Moodle* and *Microsoft Teams* services, for example, are widely used. In addition to these tools, students also use other diverse offerings such as learning videos on *YouTube* and learning programmes from third-party providers such as *EcoReps* and *Studydrive*. Another tool worth mentioning is AI. Artificial intelligence has only been used increasingly in recent months. There is no consensus among students as to whether AI should be considered an e-learning tool. It should be noted that there is a greater range of e-learning tools at private universities than at state colleges and universities.



## K2 Advantages of e-learning

*"I find that e-learning confronts you much more with what needs to be learnt, and that learning is necessary."*

*(Student A)*

The advantages of e-learning include the wide range of learning materials available, e.g. in the form of learning videos on non-university platforms such as *YouTube*. These can be accessed on any day and at any time. Students are also fundamentally confronted by the e-learning offerings on university platforms with the fact that they have to learn and should structure the semester into meaningful learning units. If lectures are not attended or the content is not understood, the relevant knowledge can be acquired via another digital channel. Meetings in digital spaces are seen as a further advantage. In addition to meetings with lecturers, students can arrange to meet in digital rooms, for example, and learn or discuss with each other. This makes learning easier.

## K3 Additional commercial e-learning aids for students

*"If I don't understand a topic in the lecture, I have to google it because I can't ask anyone at home to explain it to*

*me." (Student E)*

In addition to the freely accessible, free e-learning programmes, fee-based offerings are also used alongside the study materials provided by colleges and universities. One example of this is the online student aid *EcoReps*. It summarises study content on economics topics in short units and also explains them in ready-made video clips. In addition, corresponding exercises with solutions are offered. The cost for one semester is currently €90. It should be emphasised that the learning materials are explicitly tailored to the structure of courses on specific degree programmes at certain universities. Even the names of the lecturers are given. Other providers such as *Studydrive*, *SimpleClub*, *EcoReps* or apps such as *StudySmart* offer ready-made exams on some topics or old exams from previous degree programmes and also help with learning.

## K4 Different uses of e-learning

*"It also depends on what form of examination you end up with." (Student F)*

The type of examination determines whether and to what extent e-learning tools are used. For exams, recorded learning videos, lectures, PDFs of PowerPoint presentations and lecturers' scripts are helpful. The approach differs when studying for ordinary exams and so-called open book exams as well as when writing term papers. In open book exams and when writing assignments, more emphasis is placed on understanding and applying the learning content. In standard exams, short summaries of the learning content are memorised so that they can be recalled quickly in the exam situation. However, this learning content is only memorised in the short term and is not acquired by the learner in the long term.

### 4.3.2 Lectures

## K5 Advantages of online lectures

*"I am not obliged to watch the lecture on a Tuesday or Wednesday at 10.15 a.m., but I can watch the video myself at some point during the week and set myself a schedule." (Student B)*

Some students prefer to learn independently using e-learning programmes. They are well organised and can motivate themselves to learn in the digital space. Apparently, many students find it difficult to motivate themselves to get up and go to the university for face-to-face lessons. These students prefer to watch a recorded online lecture on a day of the week and at a time of day of their choosing. They often do not watch the lecture from start to finish, but divide it into sections that make sense to them. If a topic cannot be understood, the lecture is stopped and the content that has not been understood is looked up in various e-learning programmes. Once the topic has been understood, the lecture continues. It is reported that during the coronavirus pandemic, the attendance rate at lectures was higher than at today's face-to-face events. This led to more subjects being attended.

### **K6 Advantages of face-to-face lectures**

It emerged that the majority of students prefer face-to-face teaching with interpersonal contact. This is despite the fact that some students find it difficult to get up and go to the university. The majority of the panellists believe that it is easier to learn in a community that physically meets at a university. This makes it much easier to stick to learning goals. However, the learner only has one chance to listen to the lecture in person. After 15 to 20 minutes, many can no longer concentrate, at least temporarily, and often switch on their smartphone for a few minutes. From this point onwards, some students would no longer follow the lecture and often physically leave the room. In this learning situation, it is an immense advantage if the lecture is interactive and the students are already discussing with the lecturers after 15 minutes. Smaller groups and a good learning atmosphere in which questions are asked and answered are therefore extremely important here. This form of interaction can only be provided by a face-to-face lecture. The lecturers can also see whether the students are still participating in the lecture or not and can then respond to the situation and take steps accordingly and encourage the students to join in.

### **K7 The role of the teacher in learning**

*"Well, first of all, I think the simplest, the biggest, the worst mistake that could easily be eliminated without any problems are the bad microphones currently in use." (Student B)*

Lecturers who manage to enthuse students for a subject have a major impact on their learning success, motivation and enjoyment of learning. These positive aspects are all the greater the more the lecturer's own interest is brought into the lesson. Short practical examples are particularly appreciated. The lecturer therefore plays a relevant role in imparting knowledge. It was noted that the lecturers' requirements for a good grade vary. Some lecturers tend to award better grades and some lower grades. The grade hardly reflects whether a topic has been learnt or not. Many consider the following practice to be useful for lectures: before the actual lecture, a video lasting only about 15 minutes is sent to the students. The actual lecture is then used as a practice session to ask questions. These lecturers therefore take on exactly the role of the *EcoReps* learning programme. In other words, what the professors and lecturers can actually do themselves. The gap in the market is so big that third parties are doing it.

### **K8 Hardware equipment for online events**

*"At EcoReps, the material is prepared explicitly for the individual course at a university, and I think that if they have managed to do that, then it is actually possible to implement it from the university." (Student G)*

In addition to the digital expertise of lecturers, including the provision of additional short learning videos and

presentations, hardware plays an important role in teaching. In online events, there are very often internet or microphone problems, which, according to the panellists, could easily be solved. At least 60% would listen better if a stand microphone was used. It is much more difficult to listen to someone if only a cheap clip-on microphone is used.

#### 4.3.3 Learning behaviour when using media

### **K9 Media that hinder learning and other factors**

*"I think the biggest thing that we can summarise as hindering concentration is social media itself. So TikTok, Instagram, WhatsApp etc. And then there's gaming." (Student F)*

During online lectures, students often play video games or talk on the phone at the same time. The inhibition threshold for doing this is lowered by the fact that it is possible to switch off the students' microphone and camera. If the camera were switched on, this would have a positive effect on concentration. In addition, the lectures can be received in any conceivable environment. For example, it would not be noticeable if the student fell asleep in their bed during the lecture. In concrete terms, social media is the main obstacle to learning and concentration. It usually takes no longer than five minutes to open *TikTok*, *Instagram*, *Snapchat*, *WhatsApp* or similar on a smartphone or tablet. However, this is more likely to create a guilty conscience in a classroom lecture than at home in an online lecture. The topic of *YouTube* and *Netflix* is controversial, as some even watch entire films during lectures. The overall focus changes here not just a little, but completely, as listening to and watching a video is just as important as watching a lecture. In this case, the student interrupts the lecture. A distinction must be made here between distraction and cancelling the lecture. During a round of *FIFA* or *League of Legends*, you can still concentrate on what is happening in the lecture and absorb information, even if this is not ideal. In this case, the student actually wants to listen, but is not very good at it. In addition to media, other things that lead to distraction are also relevant. These include, for example, going to the gym, cooking, eating or assembling a piece of furniture. To summarise, it can be said that all things that are easily and quickly available can also quickly lead to distraction, whether media or not.

### **K10 Secondary occupations in e-learning**

*"It's like a fidget spinner in your hand." (Student A)*

It is reported that some lectures do not require 100 per cent concentration. Online lectures in economics and social sciences are mentioned here. During this type of lecture, many students pursue side activities. Games such as *Minecraft* or *FIFA* are popular. In order to compensate for the lack of challenge during the lecture, such side activities would even optimise the absorption and processing of the material to be learned. It seems to resemble a kind of *fidget spinner*. These are often used as an outlet for poor concentration. What is important here is that the secondary activity should hardly require any concentration.

### **K11 Music promotes concentration**

*"It may be that you become conditioned to it if you learn with music over a longer period of time and the music you use evokes what you have learnt, so to speak." (Student A)*

Music is specifically integrated into the learning process when writing a term paper as a medium that promotes

learning and concentration. Music is usually played in the background. This involves accessing ready-made playlists, so-called learning playlists. *Apple Music* and *Spotify*, for example, provide such playlists, which are mainly instrumental and without vocals. Vocal songs tend to encourage people to sing along and are therefore less suitable for learning. Music genres that are popular are *LoFi*, *binaural beats* or *jazz*. For some, however, these slow beats are too much of a barrier to learning and they turn to even simpler music, such as a *deep focus playlist*. Here, monotonous sounds are played like frequencies, sometimes louder, sometimes quieter. Rain and nature sounds also stimulate concentration. Learners report that they condition themselves through the music. However, the use of music is a hindrance to pure memorisation. It can happen that the music becomes too closely associated with what has been learnt, making it more difficult to recall what has been learnt without music. The use of music in the learning process varies for each individual: on some days learning takes place with music and on some days without music. There are also differences in the type of subject or the type of examination.

### **K12 Learning partners as supporting factors**

"You first have to explain it to someone who hasn't learnt it so well, but who is studying with you, and then to someone from outside the subject. And as soon as that works, you've understood the subject." (*Student C*)

It doesn't just help when the lecturer explains the subject matter. The exchange with fellow students also supports the learning process immensely. This benefits both the person who is listening and the person to whom the subject matter is being explained. It is recommended that you first explain what you have learnt to someone on the same degree programme. The subject matter can then be explained to someone outside the subject area. It will be determined: If the person outside the subject has understood the content, then the person explaining it has also understood it.

#### *4.3.4 Characteristics of good learners*

### **K13 Self-discipline**

"But I think if you have the discipline to set yourself a schedule, then online learning is much more helpful than if you have the lecture in person." (*Student C*)

The panellists state that self-discipline is the key to time-effective, successful learning. However, many could not structure themselves enough. For those who have the discipline to set themselves a timetable and use the learning materials provided according to plan, online learning is much more efficient than face-to-face learning. However, most people do not manage this structural process in subjects that are difficult for them, such as accounting, maths or statistics. This is why face-to-face courses have a clear *raison d'être*. Students usually feel obliged to attend them and then acquire knowledge in dialogue with lecturers and fellow students.

### **K14 Other characteristics of good learners**

"I think the emotional aspect is also quite important. In other words, a certain fascination for a topic." (*Student D*)

In addition to self-discipline, there are other dispositions that good learners exhibit: Genuine interest in the subject, existing prior knowledge, good media skills, quick comprehension, ability to concentrate and determination. Quick comprehension and ability to concentrate in class are important. The panellists agree: if the basic knowledge or concept underlying the subject is already roughly understood at the beginning of the course, then it is much easier to

learn other key topics of a subject. The determination with which the course is pursued is also important. If students have their future career in mind, uninteresting and dry subjects may be easier to learn. It has been observed that particularly successful students exhibit a certain degree of desocialisation. They have less interest in socialising with other students and often pursue specific hobbies that are not to the taste of the majority. They are self-aware and live according to their own standards.

### **K15 Favourite place and time to study**

*"But when I'm not in my familiar surroundings, I just can't get into the learning process. That's why I prefer to study at home at my desk." (Student H)*

Favourite places to study are at home and at university. However, most people are of the opinion that they achieve the most at home and alone. Many people do not learn as well when others are around. This may be due to personal attitudes or the fact that studying with others can often and easily lead to distractions. At home, students can make their learning environment as comfortable as possible in their familiar surroundings. Their own comfortable desk chair, two screens and a complete set-up that can be switched on and off as required. Programming, for example, is a difficult subject to learn on a laptop. Others may prefer to study alone and in their own home, but have to leave their familiar room and can concentrate better at the living room table or elsewhere in the flat or house. This is because their own room and the PC in it are often associated with leisure time, *Netflix* and computer games. Other students favour a library as a place to study, for example the state library. There you are forced to concentrate on learning, as there are other students in the immediate vicinity who need peace and quiet. The time at which young people study best varies greatly. Some study best in the morning and/or in the afternoon. Others only study from 8 p.m. and late into the night.

### **K16 Learning practices**

*"I always set myself small goals. So at the beginning, I just do the outline so that I know what's coming up and which topics I have to work through." (Student E)*

Proven learning strategies are used to acquire knowledge for exams: summaries are written by hand on paper. Ballpoint pens and writing pads are preferred for this. A smaller proportion of students create the summaries on a laptop or tablet with a pen if their handwriting allows this. In most cases, handwriting and above all index cards are used for memorisation so that the material is easier to reproduce and remember. Important points are highlighted in colour on the index cards. *YouTube videos* are also used if individual terms and definitions are unclear. Third-party programmes and apps are also used here. For homework, small goals are set and a structure is followed: Outline, move on to research to get a rough outline and then work through point by point. Another approach to writing term papers is to write on the fly and do research in the meantime.

#### *4.3.5 Future and conclusion*

### **K17 Appropriate use of e-learning as a solution for better learning**

*"As there are visualisation options in the e-learning landscape that don't exist in a normal lecture, for example, it doesn't make the pure demands of an exam any easier or more difficult. The main focus is on the application of the*

*subject matter to be learnt." (Student D)*

It is noted that some colleges and universities use free or cheap but much more complicated and user-unfriendly software rather than the easier to understand but more expensive alternatives. The user-unfriendly *software R* and the more user-friendly *SPSS programme* are mentioned here. Learners then have to buy the more adequate learning materials privately. They realise that some *YouTube videos* are very well researched and designed and are very useful for acquiring knowledge. The good visualisations are particularly appreciated. The panellists noticed that the majority of lecturers and professors are increasingly engaging with digital media and using the opportunities that online lectures can offer. Hyperlinks are often packed into files that lead to a quiz, video or exercise. The gap widens here, however, as other lecturers give traditional lectures. The possibilities for integrating e-learning into lectures are great and, in the opinion of the panellists, should be seized.

### **K18 Entitlement to a college or university degree programme**

*"Well, I think the general point we wanted to make was that professors try not to take the self-learning aspect out of learning by not making their lectures too easy or too self-explanatory." (Student D)*

The panellists note that universities and colleges may deliberately not make teaching as easy and colourful as some students would like. A degree programme should still be a challenge that students should overcome. Studying is not just about learning something, but also about assessing individual performance. Students are also assessed on whether they are able to motivate and focus themselves. These dispositions are also important for their future career. Companies look at how confidently the student has completed their studies.

## **4. RESULTS**

E-learning programmes are currently an integral part of degree courses, and the trend toward digitalisation will continue to shape academic study programmes. The coronavirus pandemic significantly accelerated this development, prompting universities to adopt and expand digital delivery methods. Digital offerings are advantageous due to their flexibility, as they can be accessed anywhere and anytime. However, economic factors and the shortage of skilled workers have also influenced this shift, pushing institutions to prioritize scalable and cost-effective digital solutions.

The findings, segmented into main categories such as **E-learning**, **Lectures**, and **Learning Behaviour**, highlight the benefits and challenges of digital education. However, deeper critical analysis reveals important nuances. For instance, K13 emphasizes the role of self-discipline in e-learning, yet its interaction with digital tools warrants further exploration. While self-discipline is a critical individual trait, tools like progress trackers or gamified elements in e-learning platforms can support students in maintaining motivation and focus. Conversely, poorly designed digital environments may exacerbate distractions, undermining self-regulation. This interplay suggests that e-learning platforms should include adaptive features that accommodate varying levels of self-discipline among students.

The results align with the theoretical framework established in the literature review, particularly the distinction between internal and external learning conditions (Quast, 2011; Snow, 1989). The qualities of optimal

learners, such as an internal locus of control, high motivation, and the ability to adapt, were supported by participant insights. For example, flexible access to e-learning resources empowers students to take control of their learning process. However, the findings also underscore gaps in current e-learning tools, which often fail to provide the personalized support necessary for less autonomous learners.

Additionally, the hybrid model discussed in the findings reflects the theoretical emphasis on combining situational, social, and individual dimensions of learning. Face-to-face interactions offer social and situational engagement, while e-learning provides individualized pacing and content customization. This synergy aligns with Keil's (2010) perspective that pedagogy and technology are complementary rather than contradictory when properly integrated.

Visual aids, such as Figure 2 illustrate key theoretical concepts but require clearer integration into the narrative. For instance, Figure 2 could be explicitly referenced when discussing the role of internal traits, such as field independence, in successful e-learning. The figure supports the notion that hybrid models enable students to develop these traits by combining the structured guidance of in-person lectures with the autonomy of digital tools.

The study highlights students' preference for short, engaging e-learning formats, driven by changing media consumption habits (Lorenz-Spreen, Mønsted, Hövel, 2019). While these formats improve accessibility and initial engagement, they may hinder the development of deeper analytical skills needed for professional life. Degree programmes must therefore balance entertainment with rigor, fostering skills such as critical thinking, information synthesis, and independent knowledge acquisition.

A hybrid educational model emerges as a promising solution, blending the strengths of digital and face-to-face formats. In-person events encourage discourse, peer learning, and social interaction, while digital tools provide flexibility and scalability. Keil's (2010) assertion underscores this approach: "Only when the discussion moves from the product level, where knowledge and content are regarded as transferable artefacts, to the process level, where the formation of understanding, the constitution of meaning and the creation of meaning are at the forefront of consideration, does the actual challenge of digital media for pedagogy become visible." This perspective reinforces the importance of intentional design in hybrid education to meet diverse student needs.

## **5. RECOMMENDATIONS FOR TEACHERS AND LEARNERS**

The role of the teacher is at the centre of students' understanding of new teaching content. If the subject matter is explained clearly, this has a hugely positive impact on student performance. Teachers should have a high level of digital expertise. High-quality technical equipment, especially a good microphone, also leads to a better understanding of the teaching content. If a lecturer is highly motivated, they are also able to positively influence students. A lecturer who shortens long lectures to the core content, produces a video or podcast and makes it available before the actual lecture motivates students to follow it closely. Programmes such as 'Ecoreps', which offer summaries of certain university and college courses, could also be produced by specific university teams working with lecturers. This reveals a gap because, as already explained in the e-learning chapter, lectures only represent a small amount of material for the learner, which is supplemented with other, external e-learning materials. But should

lecturers hold online lectures, even if it turns out that they are hardly received? This raises the question of whether the information needs to be prepared differently in the digital space than in the classroom. If one comes to the conclusion that the most important content should be prepared in entertaining 15-minute videos, then lecturers would have to be provided with significantly more working time and better hardware and software. These requirements can only be met satisfactorily with more resources.

As a prerequisite for the successful realisation of these measures, the necessary resources would have to be made available by the colleges and universities: Budgets for cameras and microphones and even specially employed video editors who prepare lectures in an abridged and concentrated form. On top of this, there are the working hours that need to be planned for this and the further training in digital knowledge transfer that teachers need in order to be able to adapt to the changed circumstances.

A hybrid model can therefore be seen as a good approach for the future. Face-to-face events could increasingly be offered as a platform for an intensive learning exchange. In addition, necessary social interactions take place here. Online lectures, on the other hand, could lead to increased digital interactivity and a deeper understanding of the material. This would also improve self-discipline, which many students currently lack. Students often still have to find out which learning strategies lead them to success. Universities and colleges could also offer programmes for this, as they are usually not taught in schools with regard to current learning environments. The acquisition of individual learning strategies that lead to success should not only be offered by private organisations.

## CONCLUSION AND DISCUSSION

The current study's findings, based on a group discussion with eight panellists, are exploratory and cannot be considered representative of the broader student population. The participants were selected from a limited demographic, specifically young adults aged 20–24 studying at universities and universities of applied sciences in Germany. While this provides valuable insights into the learning behaviours and perceptions of this particular group, it does not capture the full diversity of experiences that may exist among students from different educational backgrounds, age groups, or cultural contexts.

To enhance the generalizability and robustness of the findings, future research should consider a more comprehensive approach. One potential avenue is to conduct a quantitative survey that includes a larger, more diverse sample. This survey could collect detailed demographic and academic data, such as participants' A-level grades, GPA, and prior academic performance, to evaluate their ability to study effectively. Including such variables would allow researchers to examine the relationship between academic achievement and the use of e-learning tools.

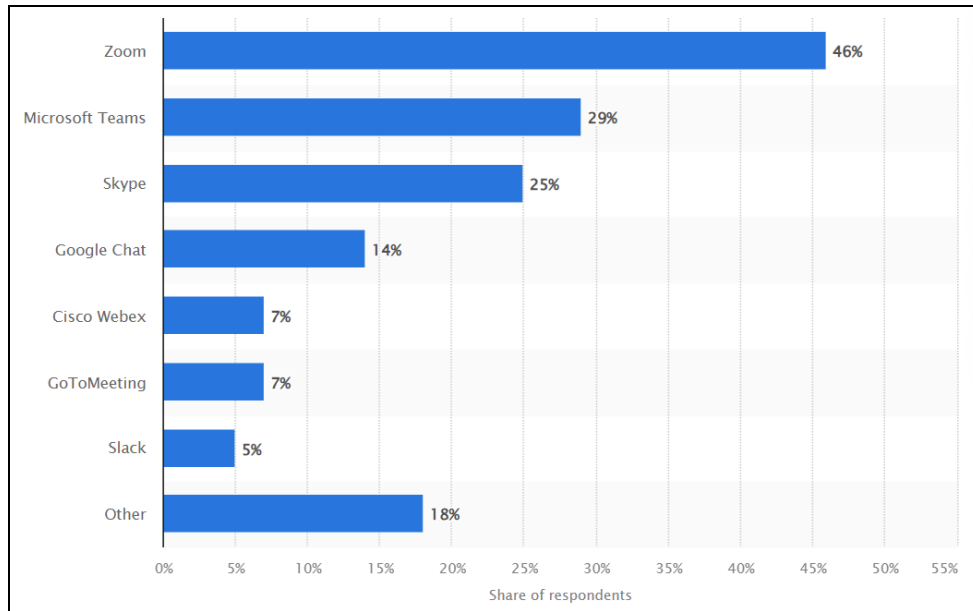
Additionally, it would be beneficial to design a survey that stratifies participants by their degree programmes and the types of institutions they attend (e.g., public universities, private universities, or vocational colleges). This stratification could help identify whether specific programmes or institutional characteristics influence students' e-learning experiences and preferences. For example, students in media management may have distinct needs compared to those in engineering or business administration.

Moreover, incorporating questions about students' socioeconomic background, access to technology, and prior exposure to digital tools could provide a more nuanced understanding of the factors influencing their learning

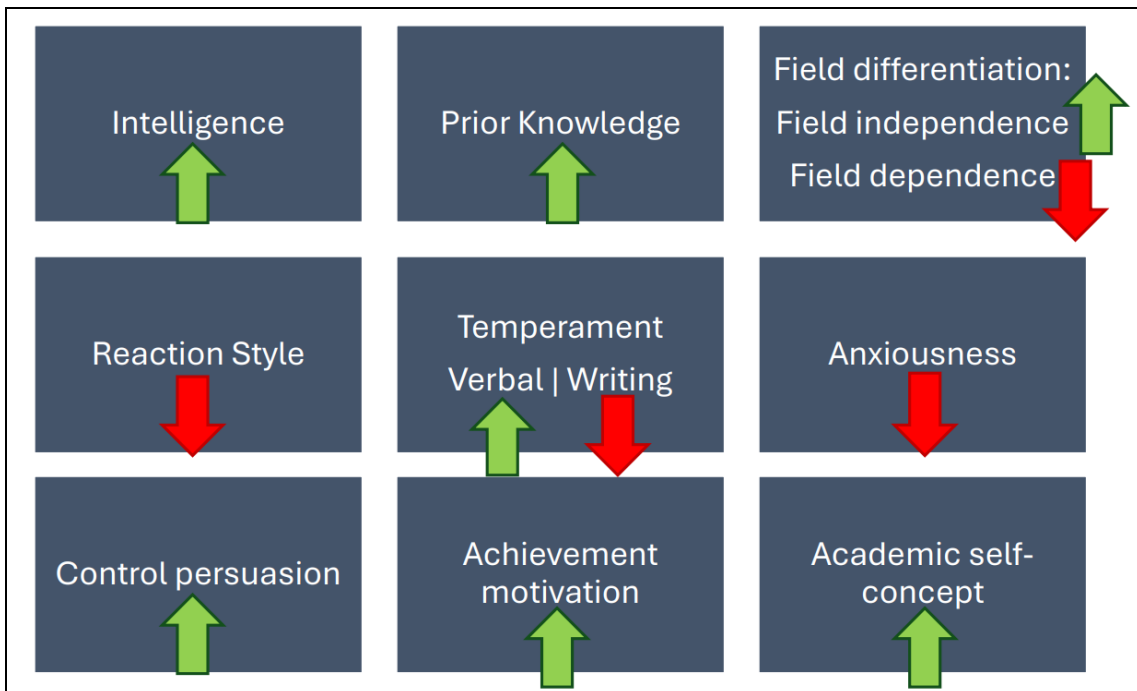


behaviours. The next phase of research could also examine how variables such as gender, resilience, and self-discipline interact with e-learning adoption and outcomes.

By extending the study in these directions, researchers could develop a clearer picture of the challenges and opportunities associated with e-learning across diverse educational contexts. This would contribute significantly to the development of tailored e-learning strategies that address the specific needs of different student groups, ultimately enhancing the efficacy of digital education in higher learning environments



**Fig. 1: Leading online communication services that are regularly used worldwide (as of March 2021). (Source: Statista, 2021)**



**Fig. 2: Characteristics of ATI research, the optimal learner (own illustration, 2022)**

## STATEMENT OF RESEARCHERS' CONTRIBUTION RATE

Authors' contribution rates to the study are equal.

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## CONFLICT OF INTEREST DECLARATION

There is no conflict of interest with any institution or person within the scope of the study.

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