

The evaluation of a hybrid, dual study program based on students' experiences

La valutazione di un programma di studio ibrido e duale basata sulle esperienze degli studenti

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Abstract

Hybrid learning is central in higher education, balancing innovation and tradition to meet diverse and global student needs. This study evaluates *New Study* – Germany's first hybrid dual Bachelor's program in Computer Science, combining online theory with structured industry training. Based on qualitative case study research, it explores what supports effective learning, how it compares to on-site study, and why students choose online formats. Semi-structured interviews with five students revealed six themes: enrolment motivations, social learning, teaching satisfaction, flexibility and study habits, and multicultural experiences. Flexibility improves accessibility, while strong teacher-student relationships drive engagement. Challenges include inconsistent digital pedagogy and limited informal peer exchange. Recommendations include structured in-person sessions, improved virtual platforms, and student-centred teaching. Hybrid dual education emerges as a flexible, sustainable model for the future of higher education.

Keywords: Dual Education; Online Higher Education; Student Engagement; Teacher-Student Interaction; Self-Regulated Learning.

Sintesi

L'apprendimento ibrido è centrale nell'istruzione superiore, bilanciando innovazione e tradizione per rispondere alle esigenze di studenti globali e diversificati. Questo studio valuta "New Study" – il primo programma duale ibrido per un corso di laurea in Informatica in Germania, che combina teoria online con formazione strutturata in azienda. Basato su una ricerca qualitativa, esplora ciò che supporta un apprendimento efficace, come si confronta con lo studio in presenza e perché gli studenti scelgono i formati online. Le interviste semi-strutturate con cinque studenti hanno rivelato sei temi: motivazioni all'iscrizione, apprendimento sociale, soddisfazione rispetto alla didattica, flessibilità e abitudini di studio, esperienze multiculturali. La flessibilità migliora l'accessibilità, mentre solide relazioni docente-studente stimolano il coinvolgimento. Le sfide includono una pedagogia digitale incoerente e una limitata interazione informale tra pari. Le raccomandazioni includono sessioni in presenza strutturate, piattaforme virtuali migliorate e insegnamento centrato sullo studente. L'educazione duale ibrida emerge come un modello flessibile e sostenibile per il futuro dell'istruzione superiore.

Parole chiave: Istruzione Duale; Istruzione Superiore Online; Coinvolgimento degli Studenti; Interazione Docente-Studente; Apprendimento Autoregolato.

1. Introduction

1.1. Hybrid Learning Models

Hybrid learning, often referred to as blended learning, encompasses a spectrum of educational approaches that integrate online and face-to-face instruction. According to Hrastinski (2019), hybrid learning represents a convergence of traditional classroom-based education and digital learning, designed to leverage the strengths of both formats. These models vary significantly in structure and implementation, offering institutions flexibility in meeting diverse learner needs.

One common model involves combining asynchronous online activities, such as discussion forums or self-paced modules, with periodic in-person sessions for collaborative or hands-on learning (Garrison & Vaughan, 2008). Another approach alternates between fully online and physical presence phases. This model integrates remote academic instruction with on-campus activities and practical, industry-based work, providing students with the flexibility to balance professional and personal commitments alongside their studies.

Hybrid learning models are characterized by their adaptability, enabling institutions to tailor learning experiences to different contexts. For instance, some programs emphasize a flipped classroom approach, where students engage with content online before applying concepts in interactive, face-to-face settings (Staker & Horn, 2012). Others focus on merging real-time virtual instruction with occasional on-site participation, enhancing accessibility for geographically dispersed learners.

The versatility of hybrid learning allows it to address a range of educational needs, making it a cornerstone of modern pedagogical innovation. Its flexibility supports lifelong learning and aligns with evolving student expectations in a globalized, technology-driven world.

1.2. The Global Shift to Hybrid Learning Environments

The COVID-19 pandemic accelerated the adoption of online and hybrid learning environments worldwide. Educational institutions quickly transitioned to remote learning, adopting new technologies to ensure continuity. Research highlights positive impacts on learning outcomes, particularly for students who adapted well to these changes (Schmälzle & Berkling, 2023).

Initially seen as a temporary measure, hybrid learning has become a permanent fixture in higher education. Blended environments combining online and on-site participation offer flexibility for diverse learning preferences, schedules, and needs. These models are particularly beneficial for students in remote areas, enabling access without relocation or rigid schedules.

Digitalization has broadened access to education, engaging students across demographics. Hybrid models empower working professionals to pursue lifelong learning while balancing responsibilities. The European Union's initiatives promoting virtual mobility and international cooperation have further supported inclusive global education environments, allowing seamless transfers and participation in hybrid courses.

Research underscores the importance of flexibility in hybrid models, which empower students to control their learning process, enhancing motivation and success. Collaboration also plays a key role, with digital tools fostering interactive environments for knowledge sharing and problem-solving, regardless of location.

Advanced technologies like AI-driven systems and adaptive tools further enhance hybrid learning. These innovations provide personalized learning experiences, real-time feedback, and stronger student-instructor engagement, improving outcomes and satisfaction. As universities invest in these tools, hybrid education continues to evolve as a scalable and inclusive model for modern learners.

1.3. Dual Education

In dual education students alternate between theoretical coursework and hands-on training with partner companies, gaining valuable industry experience while earning their degrees. This approach equips graduates with both theoretical knowledge and practical skills essential for today's workforce. Collaboration with industry partners ensures curricula remain aligned with sector needs, providing students with in-demand skills and real-world insights. Traditional campuses offer in-person education, fostering peer collaboration, direct engagement with lecturers, and alternate internships on location with industry partners.

Duale Hochschule Baden-Württemberg (DHBW) is such a dual education higher institution. Students study for three years in a quarter-based system. Each quarter alternates between theoretical phase on campus and practical phase on location with their employer. DHBW expands into hybrid learning through the first initiative of its kind, with *New Study*, a Computer Science Bachelor degree pilot that has shifted the theoretical phase to online study. From here on, *hybrid* refers to this model for the purpose of this paper and "online" refers to the theoretical phase that has only one week on location per semester. It faces the challenge of balancing its emphasis on in-person education with the opportunities of digital formats. This shift addresses the global demand for more accessible and inclusive education while ensuring the pilot retains its foundational emphasis on combining theory with real-world application and the commitment to values of connection and community

Despite the growth of dual education models and hybrid learning, little research has explored their intersection-hybrid dual study programs that merge online academic learning with structured on-site industry training. This study is among the first to qualitatively analyse a real-world hybrid dual study pilot, providing critical insights into student experiences and potential institutional challenges. In this exploratory study, we seek to assess its effectiveness and potential drawbacks, learn about inclusivity and accessibility in hybrid dual education, offering practical recommendations for designing equitable, effective learning environments and find out how hybrid models foster seamless interaction between students, teachers, and industry partners, a critical element of success for such programs.

By studying the New Study pilot program as an example of hybrid dual education, this research contributes to shaping future models of flexible, scalable, and inclusive higher education that integrate academic and professional learning experiences in an area, where little is known today. At the same time, virtual mobility, lifelong learning and industry-academic cooperation are key to Europe's imminent development in a rapidly changing world.

1.4. Research Questions and Significance

This research is significant as it highlights the evolving needs of modern learners, who require flexible, inclusive, and skill-oriented education. Pilot programs like New Study offer valuable insights into how hybrid models can support lifelong learning while

maintaining the rigor and relevance of traditional academic structures.

To explore these dynamics, the study poses the following research questions:

- Research Question 1: Does the dual online learning program offer a safe and effective environment for achieving learning goals?
- Research Question 2: How do the students perceive learning in the New Study pilot compared to on-site learning?
- Research Question 3: Who thrives in online learning, and why do they choose to study online?

These questions aim to provide evidence on how this hybrid model including online learning components can address academic and practical needs, demonstrating that innovation and tradition can successfully coexist in dual higher education.

2. Literature Review

2.1. Overview of Relevant Literature

The literature on online learning is extensive, encompassing studies on the effectiveness of online programs, students' motivations, teaching methodologies, and technological tools. Much of this research focuses on fully online or traditional, on-site learning environments, often highlighting their respective benefits and challenges. For instance, studies have shown that online learning offers flexibility and accessibility, while on-site education excels in fostering interpersonal connections and direct engagement.

Hybrid learning models, which aim to combine the advantages of both approaches, have also gained attention. These models typically blend online instruction with in-person components, offering flexibility alongside opportunities for real-time interaction (Hrastinski, 2019). Some frameworks, such as flipped classrooms or blended learning, integrate asynchronous online activities with occasional physical presence, enhancing collaborative and experiential learning (Staker & Horn, 2012). These examples illustrate the diversity within hybrid learning approaches, making them increasingly relevant in the context of modern education.

2.2 Key Theories or Concepts

This study is informed by several key theoretical frameworks and concepts that explain student engagement, motivation, and the effectiveness of hybrid and online learning:

- *Interaction Equivalency Theorem* (Anderson, 2003; Miyazoe & Anderson, 2010): This theory posits that high-quality learning outcomes can occur when at least one of three types of interaction – student-teacher, student-student, or student-content – is emphasized at a high level. The presence of all three is not necessary, as a strong focus on one type can compensate for lesser emphasis on the others. In hybrid and online models like New Study, this balance becomes critical to fostering effective and satisfactory learning experiences;
- *Self-Determination Theory* (Ryan & Deci, 2000): This framework highlights autonomy, competence, and relatedness as essential elements for fostering intrinsic motivation. Online learning, with its emphasis on flexibility and self-directed study, offers significant autonomy. However, it also places greater responsibility

on students to develop self-regulation and study skills;

- *E-learning Readiness* (James, 2021): This concept evaluates how students' attitudes, technological skills, and preparedness influence their success in online learning environments. The New Study pilot requires students to navigate online coursework and real-world work experience, making readiness a critical factor. Students' ability to self-regulate and their comfort with digital tools significantly impact their ability to thrive in this hybrid program.

By grounding the evaluation in these frameworks, the study highlights the interplay between theoretical underpinnings and practical application in hybrid learning. The theories provide a lens to understand how the program supports diverse learners, emphasizes interaction and autonomy, and leverages students' preparedness to achieve its goals. Section 5.2 Interpretation of Findings will extend the literature embeddings with respect to the findings in this study.

2.3. Gaps in the Literature

Significant gaps in the literature on hybrid learning highlight the need for this study:

- *Focus on Traditional Models*: Research predominantly examines fully online or traditional on-site education, with minimal attention to hybrid formats that integrate online learning with work-based education, such as New Study;
- *Limited Exploration of Dual Education Systems*: The unique challenges of balancing academic theory with real-world industry experience in hybrid programs remain underexplored, particularly in dual-education contexts like DHBW;
- *Collaboration Across Stakeholders*: Few studies investigate how hybrid models foster seamless interaction between students, teachers, and industry partners, a critical element of success for such programs;
- *Diverse Learner Needs*: There is a lack of research on how hybrid environments accommodate varying learning preferences, self-regulation skills, and motivations.

These gaps provide the foundation for this study, which evaluates the New Study pilot to address how hybrid models can balance flexibility, academic rigor, and practical engagement. This focus contributes to advancing the understanding of hybrid education's potential within dual-education frameworks.

The theoretical frameworks discussed highlight key factors influencing the success of hybrid learning. These frameworks emphasize the role of student-teacher interaction, autonomy, and digital preparedness in shaping student experiences in online education. Guided by these insights, this study employs a qualitative case study approach to explore how students navigate and perceive hybrid dual education. The following section details the study's methodological choices, including participant selection, data collection, and thematic analysis, all of which are informed by these theoretical foundations.

3. Methodology

3.1. Research Design

To address the research questions, a qualitative research design was employed, utilizing semi-structured interviews with 5 students (29% of the cohort) from the New Study pilot

program, unique in the German higher education landscape. At the time of data collection, the program had only 17 enrolled students. A qualitative approach was chosen to assess the pilot for its ability to provide in-depth insights into students' motivations, challenges, and perceptions, particularly within the context of hybrid learning in a dual education.

As noted by Mantula et al. (2024), qualitative methods are well-suited for capturing the nuanced personal experiences essential for understanding how an educational program impacts students from diverse backgrounds. In particular, this assessment study is best characterized as a qualitative case study, focusing on an in-depth exploration of students' lived experiences. This approach aligns with phenomenological research tradition common in studies aiming to understand how participants experience a phenomenon, rather than to generalize to a larger population (Creswell & Poth, 2016; Poth & Shannon-Baker, 2022).

Considering the highly specific context of evaluating a single hybrid dual study program, five interviews provide rich, context-bound insights. In such focused case studies, smaller samples are not only acceptable but often preferred to maintain depth and manageability of data analysis. In qualitative research, purposive sampling was used to select participants who could provide the most relevant and in-depth information about the phenomenon under investigation (Ahmed, 2025; Bekele & Ago, 2022; Mantula et al., 2024). The number of participants was further limited by the number of volunteers for the interview.

Due to data protection constraints and the participants' request for anonymity, thematic analysis was conducted by a single researcher. While this ensured confidentiality, it also meant that no inter-coder reliability checks were conducted. This methodological limitation is acknowledged and further discussed in Section 5.1 Limitations.

3.2. Data Collection Methods

Data collection was conducted through semi-structured interviews in June 2024, with each interview lasting approximately one hour. The interviews were facilitated and recorded using the Teams application to ensure accessibility and convenience for participants. The interviewer was an external evaluator due to the expertise but also to introduce a level of privacy to the students being interviewed and the possibility to aggregate the data in order to fully anonymise it. Recordings were used solely to identify thematic patterns during data analysis. Interviewees were instructed to be specific in their responses and to differentiate between their general learning experiences, experiences as dual-model students, and those specific to online learning environments. This level of guidance ensured depth and clarity in the data collected.

3.3. Sample Selection

The sample consisted of 5 out of 17 students enrolled in the New Study pilot, selected to reflect the diversity of the program's student body. Participants were aged between 20 and 30 and included both women and men from various academic and professional backgrounds. The group comprised individuals of German origin as well as those who had relocated to Germany from other countries, highlighting the multicultural and inclusive nature of the program.

All participants had prior university experience, either in Germany or internationally, or both. This diversity ensured a broad spectrum of perspectives, capturing variations in students' motivations, experiences, and challenges. While the sample size was small, it allowed for in-depth exploration of individual experiences. Thematic saturation – where no

new themes emerge from additional data – was prioritized to ensure the robustness of findings.

3.4. Data Analysis Techniques

Thematic analysis (Braun & Clarke, 2006) was employed to analyse the interview data. This method was chosen for its flexibility and suitability in identifying and interpreting patterns within qualitative data. The analysis followed a systematic process, beginning with familiarization with the interview transcripts.

The interviews were guided by the following questions:

1. Why did you want to learn online in the New Study pilot?
2. Would you have studied without the possibility to learn online (New Study)?
3. Please compare your online learning experiences to previous classroom study experiences: a. Related to learning habits and learning achievements. b. Related to relationships with teachers and peers;
4. If possible, would you switch to in-class style learning? If yes, why?
5. How would you develop the teaching or learning in the New Study pilot?
6. If you could decide, would you maintain or close the online learning program? Why?

For question 3, if interviewees did not address subpoints a and b in their initial responses, the interviewer followed up with additional questions. This structured yet flexible approach allowed participants to share detailed insights while ensuring the data aligned with the study's objectives.

After familiarizing themselves with the data, the evaluator employed an inductive coding process. The themes emerged inductively, allowing the findings to be grounded in the data. This iterative and rigorous process ensured that the analysis captured the complexity of students' experiences while maintaining alignment with the study's objectives. An example of an emergent theme is the flexibility of online learning, which was consistently linked to students' ability to balance academic, personal, and professional responsibilities. Figure 1 summarizes the steps involved in the data analysis process

Step	Description
1. Data Familiarization	Review of interview recordings and transcripts to identify key ideas and patterns.
2. Initial Coding	Identification of 170 meaningful data segments and assignment of preliminary codes.
3. Theme Development	Grouping of codes into 28 initial themes, reflecting recurring patterns across participants' responses.
4. Theme Consolidation	Refinement of initial themes into six main themes that address the research questions.
5. Interpretation	Detailed analysis and interpretation of themes to align with study objectives.

Figure 1. Data analysis process.

By employing thematic analysis and ensuring methodological transparency, this study provides a robust foundation for evaluating the New Study pilot and its potential to redefine

hybrid learning in higher education.

4. Results

A total of 170 meaningful segments were identified from the interview transcripts. Summaries capturing the core ideas of these segments were created and coded to represent themes or patterns corresponding to the research questions. As a result, 28 initial themes emerged from the data. These were consolidated into six main themes, providing a comprehensive framework for understanding students' experiences in the New Study pilot.

The six main themes are:

1. Students chose the New Study pilot for various reasons;
2. Social learning environment is different from on-site learning and the teaching staff is caring;
3. Satisfaction with teaching is high, but there is a desire for more student-oriented pedagogy and modern solutions;
4. Online learning is more flexible and requires proficient study skills from students which suits for the New Study students;
5. The multicultural aspect of learning in the New Study pilot contributes to the learning experience;
6. Online learning programs should be included in universities' offerings.

4.1. Why did students choose the New Study pilot?

The main theme *Students chose the New Study pilot for various reasons* includes five themes and 12 sub themes. The themes are:

- Student chose the New Study pilot because it was online;
- The dual model program was one of the reasons to choose the New Study pilot;
- Student chose the program because it is in English;
- Student chose the New Study pilot because the student group was more heterogeneous than in other study programs;
- Student feels that having this degree would benefit later in life.

Some of the interviewees had other options to get into a degree program and they chose the New Study pilot. The reasons behind choosing the New Study pilot were related to learning online, dual model, learning in English, the heterogeneity of the student group and because having the degree felt an important opportunity for the interviewee. Some interviewees would have chosen the program even if it had not been conducted online, while for others, online learning was the primary reason for their choice.

Regarding online learning, interviewees mentioned their preferences and needs related to their own learning styles, as well as issues related to the temporal and locational flexibility of online learning and balancing study with other aspects of life.

Another reason for enrolling in the New Study pilot was its dual model, seen as an interesting opportunity to combine studying with work and to finance one's studies. The opportunity to study in English offered by the New Study pilot appealed to interviewees for multiple reasons: some because their native language was other than German, and others because they wanted to improve their English language skills. Interviewees also mentioned

the diversity in age and cultural background of the New Study pilot's student group as reasons to enroll in the program, as well as the opportunity to advance in life through education in general.

4.2. The social learning environment in the New Study

The main theme *Social learning environment is different from on-site learning and the teaching staff is caring* includes seven themes with 23 sub themes considering the social aspects in the New Study. The themes are:

- Students feel that teachers care about them, support them, and have a good connection with them;
- Learning online enhances the relationships between student group and teaching staff;
- The New Study students have good and meaningful relationships between other students;
- Friendships are not that deep in online learning community because communication is more difficult;
- The student does not seek more from the social learning environment in the New Study pilot;
- The student longs for immediate in-person interaction with other students related to on-site learning;
- Communication culture and channels require special attention in online programs.

Overall, the interviewees are quite happy with the social learning environment and the relationships inside the student group and between the teaching staff.

All the interviewees thought that the teaching staff is on their side and students are having a good connection with them. Compared to the on-site experiences, the interviewees think that the New Study teachers are more interested in them and more present. Interviewees feel they receive more support from teachers due to teaching staff's attitude, the accessibility enabled by online environments, and smaller group sizes. One of the interviewees described the teacher-student relationship as "really like friendship between students and teachers." One of the reasons speculated for a good relationship was online learning, which speeds up and lowers the barrier for communication with teachers. The personal and open relationship was thought to promote students' well-being and motivation to participate.

According to interviewees, good and meaningful friendships have been formed within the student group. Some mentioned that online environments have contributed to better relationships with fellow students compared to their previous studies. All the interviewees also thought that the friendships are not that deep than the ones they had formed earlier in their on-site studies or elsewhere in live situations. The difference was believed to be because of lack of free time outside of studying with other students. The digital environments don't offer the possibilities to hang out with others as easily and so the relationships might end up being shallow.

On the other hand, most of the interviewees aren't seeking more from the social relationships in the New Study as they are more focused on studying and they already have sufficient social life outside their studies. So, the relationships between the other students met their needs. As some interviewees are satisfied with the situation, the others prefer on-site learning specifically for the opportunity to be more with other students. Some of the

interviewees would like to have the possibility to see other students face-to-face occasionally in their free time and some thought it would benefit learning in some more practical subjects and group assignments if there were a possibility to see others.

The common view about online social learning environments is that communication needs special attention. It should be managed carefully considering the appropriate channels for different kinds of communication needs but also the communication behaviours. Forming smaller groups might increase the communication between the student groups and interviewees wished for more effort from the other students in communication. The effort the interviewees were longing for included being more initiative in asking questions and commenting during the lectures and being in touch and forming study groups outside the formal learning occasions.

4.3. Students are mostly satisfied with teaching in the New Study

The main theme *Satisfaction with teaching is high, but there is a desire for more student-oriented pedagogy and modern solutions* includes five themes with 22 sub themes. The themes are:

- Students are mostly satisfied with the New Study pilot's pedagogical solutions and teaching staff's skills;
- The learning load is high, which affects the student's well-being;
- The high volume of group assignments and the difficulties in group work feel challenging;
- Students wishes for more modern and transparent pedagogical solutions;
- Students have suggestions for supporting and facilitating learning in the New Study.

The interviewees thought the teachers are skilled, and the pedagogical solutions were satisfactory, but there were some suggestions for improvements too. The interviewees thought that the subject is appropriate for an online program, as the projects are easy to work together online. The courses incorporate numerous project-based and hands-on learning methods, which were perceived to enhance understanding of topics and support learning. The New Study pilot was perceived to emphasize more practical applications and hands-on learning than on-site programs. The teachers with work-life connections were thought to enrich learning. Also, the teaching approaches were perceived to encourage self-directed learning and motivate students to study better. "I also like I'm starting to notice that there's some motivation to do stuff by myself, like outside the lectures, sit down, do something myself, because it's very encouraged in New Study --. They encourage you to sit down in your own time, like take your own time whenever it suits you and do something, study, work or whatever. And they didn't do that in the on-site classes."

Overall, the interviewees are mostly happy with the teaching staff's pedagogical skills. "I'm very happy with all of our teachers right now. I think they do a very good job, especially teaching online and they try to adapt that way of teaching." The New Study pilot was perceived as less intense than on-site programs. The reasons behind this experience were the practical approach in learning and focusing on essential topics and learning materials. Interviewees thought that less rigid scheduling makes learning easier and more motivating.

Even though the interviewees are pleased with the teachers and the programs, the learning load and the amount of group assignments were considered excessive. Interviewees also

wished for transparency and more modern pedagogical solutions. Interviewees hoped for teachers to consider students' varying initial competence levels in their teaching, as it influences student's perception of the course's difficulty. The studies are perceived intensive and include a lot of learning material and assignments. The pace is fast both lecture and course levels leaving students little time for thorough and effective learning. The interviewees thought that the matter applies to all the programs in DHBW, and the dual model was seen as one of the reasons for the intensity.

The high amount of group assignments was perceived as another challenge. Some of the interviewees hoped for less group assignments, which could be partly replaced by smaller individual ones. The group assignments were perceived challenging because of possible conflicts between the students and uneven distribution of workload.

The interviewees would improve teaching to a more modern and transparent pedagogy. This would contain more applications of digital tools and less traditional teaching styles as some of the teaching is perceived as very traditional. For example, some of the lectures don't differ from on-site lectures at all. The interviewees also hoped for more information about the curriculum and courses and the justifications for the pedagogical solutions. The interviewees thought they didn't always understand the solutions related to teaching or curriculum. The interviewees had also felt that their suggestions to improve the teaching haven't been always heard in the New Study pilot. The rapid changes during the courses were perceived challenging, and the interviewees would improve the planning and communication about the learning process.

There were also other ideas to improve teaching and learning in the New Study pilot. The interviewees hoped for investing in the development of a clearer and more functional virtual learning environment. One of the interviewees suggested in the future the New Study pilot could implement a tutor student activity to help new students with learning and studying.

4.4. Online learning is more flexible but requires proficient study skills

The main theme *Online learning is more flexible and requires proficient study skills from students which suits for the New Study students* includes five themes and 24 sub themes. The themes are:

- Online learning saves time and energy, which balances the learning load and makes studying easier
- The student is committed to the studies and puts in effort towards their learning
- Online learning suits the student's learning style
- Student prefers studying alone and it helps focusing on learning
- Online learning requires different study skills compared to on-site learning

The interviewed students highlighted several advantages of online learning. The common issue was the flexibility, which allows them to organize and optimize their study habits and schedules. They mentioned that online learning allowed them to balance their studies with other aspects of their life more effectively. They thought online studying saves time and energy because they don't have to commute between university and home, which might be far apart.

The flexibility was perceived to lead to deeper learning achievements and improving focus on topics of interest without classroom distractions. The interviewees described being self-oriented and active as a learner. For example, they mentioned searching for and using

additional materials to enhance their learning and utilizing digital tools to better understand lectures during and after class.

Additionally, some of the interviewees reported that they were more motivated in the New Study pilot compared to their previous studies. Some of the interviewees expressed a preference for online learning over on-site learning, as it suited their learning habits better and allowed for greater comfort and concentration. For some of the interviewees, online learning had positively changed their attitude towards studying.

Interviewees found online studying as demanding as on-site learning. Studying online was perceived as requiring more self-discipline and study skills. Interviewees thought that inexperienced online learners might struggle if they lack sufficient learning skills and the right attitude towards studying.

4.5. Multicultural Aspects in the New Study

The main theme *The multicultural aspect of learning in the New Study pilot contributes to the learning experience* includes three themes and six sub themes. The themes are:

- The student values the multicultural student group and staff;
- Multiculturalism can make collaboration and forming friendships within a group more challenging;
- A degree program in English facilitates learning if all parties involved have a sufficient level of proficiency.

The New Study pilot brings together students and faculty from diverse cultural and linguistic backgrounds. These aspects were perceived to affect learning, teaching, and social environment in many ways. Even though this aspect is not connected to the research questions directly, it has an indirect effect on perceived learning and social learning environment. For example, the use of English as a common language was perceived to facilitate studying, yet language barriers were seen as a challenge to learning. The interviewees expressed a desire for the New Study pilot to focus on improving teachers' proficiency in spoken English. Similarly, interviewees believed that assessing students' proficiency in English should be considered during the application phase.

Language dynamics influenced the learning experience. The use of English as a common language was perceived to facilitate studying, yet language barriers were seen as a challenge to learning. To address this, interviewees recommended improving the spoken English proficiency of both students and faculty. One suggestion was to assess students' English skills during the application process to ensure they are adequately prepared for an English-medium program.

The interviewees noted that the common language and multicultural environment made the program more inclusive and accessible. As one interviewee shared, "The New Study community was easier to be part of because the students and teachers are from different countries". However, the challenges of multiculturalism were also evident. Interviewees observed that cultural diversity could sometimes hinder deeper connections within the group. "In a multicultural student group, cultural diversity may lead to friendships remaining more superficial," noted one participant, reflecting on the difficulties of forming close relationships in a heterogeneous online environment. Additionally, collaboration within diverse groups occasionally proved challenging due to differing communication styles and cultural norms.

4.6. Online programs expand university offerings and enable diverse degree paths

The main theme *Online learning programs should be included in universities' offerings* answered the question about maintaining the New Study pilot. The main theme took shape from three themes from eight sub themes. The themes are:

- The New Study pilots should be maintained but it needs development;
- Students would like to have more opportunities learning online for themselves and others;
- The online programs benefit diverse people and dual partner organizations.

All the interviewees would maintain the New Study pilot. Interviewees, however, identified the need for development so that the online study program could reach its full potential. Those issues are discussed in chapter 4.7.

Some of the interviewees would not switch to an on-site program even if it were possible without any other changes, such as language issues or moving from another location. They have recommended the New Study pilot to other people. They hoped for the opportunity to continue studying online later in their studies as well.

The interviewees thought that online study programs would benefit especially “outsiders,” who might struggle with on-site studies for reasons like family situations, location, or neurodivergent conditions. The online program is perceived as an opportunity for these people to achieve life goals by obtaining a degree and securing employment with reputable companies. Additionally, dual partner organizations benefit from the New Study pilot by gaining access to talented individuals from around the world.

4.7. Findings for Improvements

Suggestions for improvement focused on addressing the perceived challenges and enhancing the overall learning experience. Interviewed students emphasized the importance of developing a clearer and more functional virtual learning environment, tailored to the needs of hybrid and online learners. Additionally, the implementation of a tutor program for new students was proposed, aiming to support their transition into online learning and foster a sense of community. Participants also called for more modern and transparent pedagogical approaches, incorporating innovative digital tools and moving away from traditional teaching styles that mirror on-site formats too closely. For example, some lectures were perceived as indistinguishable from on-site classes, highlighting the need for pedagogical adjustments better suited to online education. Furthermore, providing more information about the curriculum and clearer justifications for teaching methods were identified as critical to enhancing student engagement and satisfaction. Finally, the multicultural aspects of New Study broaden perspectives and enhances inclusivity while also necessitating targeted efforts to overcome linguistic and cultural barriers.

By addressing these areas, the program can better support its diverse student body, ensuring a balance between flexibility and the need for stronger connections and modernized teaching practices. This comprehensive presentation of findings provides a detailed understanding of the students' experiences in the New Study pilot, highlighting both its strengths and areas for improvement.

4.8. Support for Research Questions

The findings from this study align closely with the three research questions formulated to

evaluate the New Study pilot. These questions guided the exploration of the program's effectiveness and its potential to meet the diverse needs of modern learners.

- Research Question 1: Does the dual online learning program offer a safe and effective environment for achieving learning goals?

The analysis revealed that the online learning program provides a safe and effective environment for achieving learning goals. The program emphasized practical, hands-on learning methods, which were viewed as effective for understanding complex concepts and applying them in real-world contexts. Interviewees highlighted flexibility and autonomy as key strengths, enabling them to balance academic, personal, and professional responsibilities. Some stated that this autonomy led to deeper engagement and improved learning outcomes.

The supportive and accessible teaching staff further contributed to creating an effective learning environment. Additionally, the availability of online resources and lecture recordings allowed students to revisit complex topics and reinforce their understanding, enhancing overall learning outcomes. It is important to acknowledge that additional characteristics of the group, formed by educators, students, and stakeholders, can influence the social learning environment and the learning experience. For instance, multiculturalism was perceived to contribute learning experience. There were calls for more transparency in course planning, as well as for modern pedagogical solutions that would better address the diverse needs of online learners.

- Research Question 2: How do the students perceive learning in the New Study pilot compared to on-site learning?

The findings suggest that the online program can match—and in some areas exceed—the effectiveness of on-site programs. Students praised the program's practical, hands-on learning methods and the quality of teaching. While the lack of casual, in-person interactions posed challenges for collaboration and peer bonding, students believed that hybrid components, such as occasional in-person sessions, could help bridge this gap.

Interviewees noted that the teaching staff was more supportive and accessible in the online format, fostering stronger teacher-student relationships. One student described this dynamic as “really like friendship between students and teachers.” Some interviewees reported forming meaningful friendships within the student group, though these relationships were often less deep compared to those formed in on-site programs due to the lack of informal interactions outside of study contexts.

While students attributed the program's intensity to DHBW's dual structure (not the online format), hybrid components like asynchronous resources helped mitigate workload pressures. These insights highlight the program's potential to deliver comparable educational outcomes in a hybrid learning format.

- Research Question 3: Who thrives in online learning, and why do they choose to study online?

The study found that students who thrive in online learning are those with strong self-discipline and motivation. These students were particularly drawn to the program for its flexibility, which allowed them to optimize their schedules and balance multiple responsibilities. Other students appreciated the dual model, which combines studying and working, enabling them to finance their studies while gaining practical experience. The program's inclusivity and international appeal were additional factors, attracting students who sought diverse learning environments and the opportunity to study in English. By

offering a flexible and inclusive framework, the program effectively catered to the needs of working professionals and individuals with caregiving responsibilities. The interviewees' common perspective is that the online programs provided by universities enhance the accessibility of education for diverse student populations and effectively broaden the scope of university offerings, meeting the increasing demand for more online learning opportunities.

By addressing these research questions, the study provides a comprehensive evaluation of the New Study pilot. These insights advance the design of hybrid dual programs, ensuring they meet academic, professional, and equity goals while preserving the values that define DHBW. As the first hybrid dual program in Germany, these findings provide foundational insights into balancing academic rigor with workplace integration, offering a model for institutions adopting similar frameworks.

5. Concluding Remarks

5.1. Limitations

This study provides exploratory insights into the New Study pilot, but several limitations must be acknowledged. Thematic analysis was conducted by a single researcher due to data protection constraints, which ensured confidentiality but limited opportunities for inter-coder validation. Additionally, as a pilot study, the findings are context-specific and not intended for broad generalization.

Future research should adopt a mixed-methods approach, incorporating quantitative surveys, longitudinal tracking, and comparative studies to enhance generalizability. Expanding the sample size and including students across multiple program phases would provide a more comprehensive understanding of learning outcomes and student engagement. Further, alternative validation techniques—such as member checking or independent coding of anonymized excerpts—could strengthen the reliability of qualitative findings while maintaining ethical confidentiality.

A longitudinal study tracking students' academic and professional trajectories would also be valuable in assessing the long-term impact of hybrid dual education on career development and lifelong learning.

5.2. Interpretation of Findings

This study highlights the potential of hybrid dual education to provide a flexible, student-centred, and globally connected learning experience. While online learning environments require different pedagogical strategies than traditional settings, the New Study pilot successfully integrates structured, work-based education with digital accessibility.

The findings align with the Interaction Equivalency Theorem (Anderson, 2003; Miyazoe & Anderson, 2010), demonstrating that strong engagement in student-teacher interactions can compensate for lower levels of peer interaction in online settings. This reinforces the importance of accessible and engaged instructors in online and hybrid programs. To enhance the social learning environment and cognitive presence in online studies, the teaching staff must facilitate the interaction and learning. The facilitation produces the better quality of learning and teaching situations enhancing the meaningful and deep learning (Garrison & Cleveland-Innes, 2005).

Schmälzle and Berkling (2023) found that hybrid formats improved motivation and mental health due to the flexibility and comfort they offer. In accordance with general findings in research, students felt the programme has increased their motivation for learning and they valued the autonomy and flexibility. This aligned with Self-Determination Theory (Ryan & Deci, 2000), which emphasizes the role of autonomy in fostering motivation and deep learning. However, the study also underscores the challenge of self-regulation in online learning. Studying online does require more study skills and self-regulation since students are more responsible for their own learning (Özen & Karaca, 2021). This highlights the need for institutions to assess e-learning readiness (James, 2021; Chaw & Tang, 2023) when designing online and hybrid programs.

While students generally appreciated the practical and industry-oriented nature of the program, they also expressed a desire for more modern and transparent pedagogical approaches, including clearer course structures and improved digital tools and environments. In online learning, planning and designing learning experiences in a learner-oriented manner, considering virtual learning environments, are crucial to supporting students in achieving learning objectives and reducing barriers for all types of learners (Al-Azawei, Serenelli, & Lundqvist, 2016; Huhtanen, 2019; Kandemir & Kiliç Çakmak, 2021). These findings align with the European Framework for Digital Competence of Educators (DigCompEdu), which calls for increased digital proficiency among teaching staff (European Commission, 2017).

The study further suggests that hybrid programs are particularly well-suited for non-traditional students, including working professionals, caregivers, and neurodiverse learners. This supports broader efforts to increase educational inclusivity and lifelong learning opportunities.

5.3. Scalability and Future Directions

Beyond its impact on individual learners, the New Study pilot serves as a scalable model for hybrid and dual education. For policymakers, this study suggests the need for institutional frameworks that formalize hybrid dual models as scalable, inclusive pathways for non-traditional learners. The program's structure aligns with global higher education trends, including virtual mobility, lifelong learning and industry-academic cooperation. To support the scalability of hybrid dual education, universities and policymakers should develop institutional policies for hybrid learning, ensuring pedagogical models integrate digital tools effectively. Investing in faculty training is important to enhance digital teaching competencies, following frameworks like DigCompEdu (European Commission, 2017). By refining pedagogical strategies, enhancing digital engagement, and embedding hybrid learning into national and EU policy frameworks, models like New Study can contribute to a future-proofed, accessible, and inclusive higher education landscape.

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