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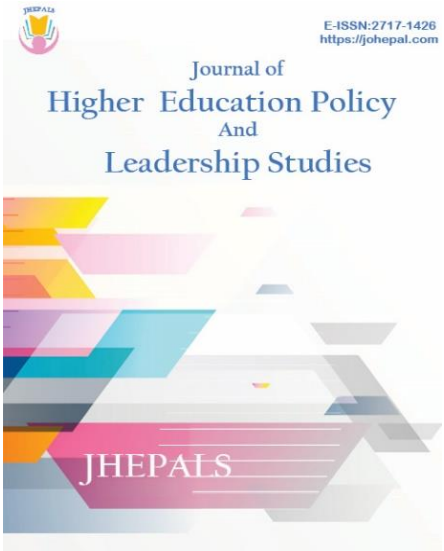
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Student Onboarding as a Strategic Tool for Student Success: A Comparative Study of Germany and the United States

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Abstract

Student onboarding can support academic adjustment, social integration, and student success. This comparative cross-sectional study examines onboarding experiences at DHBW Mannheim in Germany and the University of Houston-Downtown in the United States. An online survey of 350 undergraduate business students (200 in Germany and 150 in the United States) assessed transition challenges, institutional support, and use of digital and artificial intelligence (AI) tools. Students in both settings identified academic workload, time management, and performance pressure as prominent challenges. Respondents in the United States rated mentoring, networking opportunities, and the organization of onboarding more favorably than respondents in Germany. Students also reported using digital platforms and AI for information retrieval and academic support. The findings suggest that onboarding should coordinate academic guidance, social connections, organizational information, and digital support across the first year. Institutional leaders can strengthen transition support through structured mentoring, clear communication, and guidance on responsible AI use. Because the study draws on self-reports from two institutions at one point in time, the observed differences should not be interpreted as causal effects or generalized to all students in either country.

Keywords: Student Onboarding; Student Success; First-Year Experience; Higher Education Leadership; Germany and United States; Artificial Intelligence

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Introduction

The transition from secondary education to higher education represents a decisive phase in students' educational development and is widely regarded as one of the most critical stages in the course of academic life. Entering university is not simply a continuation of previous educational experiences, but rather a profound change in learning culture, institutional expectations, and personal responsibility. Students are expected to take greater ownership of their learning processes, organize their time independently, manage more complex workloads, and navigate unfamiliar academic and administrative structures. These challenges must also be understood within the broader transformation of higher education systems, characterized by massification, increasing diversity of student populations, and global competition (Altbach et al., 2009).

This transition is often associated with considerable uncertainty. Compared with school environments, higher education institutions typically provide less structured guidance and require students to demonstrate higher levels of self-regulation, autonomy, and initiative. As a result, the first months at university can be experienced as demanding and disorienting, especially for students who have entered higher education directly from high school and have had limited opportunities to develop academic coping strategies in advance (Timmis et al., 2024).

A substantial body of research has shown that the first year of study plays a decisive role in shaping students' academic success, engagement, and persistence (Pascarella & Terenzini, 2005; Tinto, 2012). Students' early experiences within this phase often influence whether they develop a sense of belonging, confidence, and academic orientation, or whether they experience insecurity, overload, and detachment from the institution. Difficulties encountered during the transition phase are frequently associated with lower academic performance, reduced engagement, and an increased likelihood of dropout (Yorke & Longden, 2004).

Importantly, these difficulties are often not the result of inadequate academic ability. Rather, they tend to emerge from insufficient orientation, unclear institutional expectations, fragmented communication structures, and a lack of experience with self-regulated learning (Reason et al., 2006). This perspective shifts the focus away from viewing transition problems solely as deficits on the part of individual students. Instead, it underlines the responsibility of higher education institutions to create structures that actively support students during the entry phase (Timmis et al., 2024). In this context, the concept of onboarding has become increasingly relevant for higher education research and practice. Borrowed from organizational research, onboarding refers to structured processes through which newcomers acquire the knowledge, skills, and social connections necessary to function effectively within a new environment (Bauer et al., 2007). In organizational settings, onboarding is understood as an intentional process that helps newcomers adapt to their new role, understand expectations, and become integrated into the social and cultural environment of the institution.

Transferred to higher education, onboarding can be understood as a strategic institutional process that supports students' transition into university life. It goes beyond traditional orientation events by encompassing a broader range of academic, social, organizational, and digital support measures. In this sense, onboarding includes institutional

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practices that foster students' academic integration, their sense of social belonging, and their understanding of institutional procedures and support structures during the early stages of study. Moreover, contemporary onboarding in higher education is increasingly shaped by digital technologies. Learning management systems, communication platforms, mobile applications, and, more recently, artificial intelligence tools have become part of the infrastructure through which students access information, organize their learning, and seek support (Timmis et al., 2024). These developments raise new questions about how digital environments and AI-based tools influence transition experiences and how universities can integrate them meaningfully into onboarding strategies (Noroozi et al., 2025).

Against this background, the present study examines onboarding in higher education from a comparative perspective, focusing on Germany and the United States. These two higher education contexts differ substantially in how they structure transition processes and in the degree to which they institutionalize support for first-year students. By combining theoretical insights with empirical survey data, the study aims to identify the key challenges faced by first-year students, evaluate the perceived effectiveness of onboarding practices, and derive practical implications for higher education institutions. To guide the analysis, the study addresses the following research questions:

- RQ_1: What challenges do students experience during the transition from school to university?
- RQ_2: How do students evaluate institutional onboarding practices?
- RQ_3: How do onboarding experiences differ between Germany and the United States?
- RQ_4: What role do digital technologies and artificial intelligence play in students' transition experiences?

Given the exploratory nature of this study, no formal hypotheses are formulated. Instead, the analysis is guided by the research questions outlined above. Based on the literature, it can be assumed that differences in institutional structure influence students' perceived transition challenges and their evaluation of onboarding measures. These research questions provide the conceptual foundation for examining how universities can design more effective and sustainable onboarding strategies that respond to both traditional transition challenges and the changing conditions of digitally mediated higher education.

This study contributes to the literature in three important ways. First, it advances existing research on student transition and onboarding by integrating perspectives from transition theory, organizational socialization, and digital learning into a unified conceptual framework. In doing so, it conceptualizes onboarding as a multi-dimensional integration process that extends beyond traditional orientation approaches. Second, the study provides empirical insights into students' onboarding experiences through a comparative analysis of two distinct higher education systems, Germany and the United States. Comparative evidence in this field remains limited, and the study contributes to a better understanding of how institutional structures shape students' transition experiences across different contexts. Third, the study extends current research by explicitly incorporating digital and artificial intelligence–related dimensions into the analysis of student transition. By highlighting the role of AI tools and digital environments in shaping onboarding experiences,

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the study addresses a rapidly evolving but still underexplored area in higher education research.

Literature Review

The transition into higher education has been extensively examined in educational research and is commonly understood as a complex adjustment process involving academic, social, and organizational dimensions. The literature highlights that successful transition depends not only on individual student abilities but also on institutional structures that facilitate orientation, engagement, and integration (Timmis et al., 2024). In this context, several research streams are particularly relevant: studies on student transition, the First-Year Experience (FYE), organizational onboarding, and the increasing role of digital technologies and artificial intelligence in higher education.

Transition from School to University

The transition from school to university has been widely conceptualized as a multidimensional adjustment process involving academic, social, and psychological dimensions (Gale & Parker, 2014). Entering higher education requires students to adapt to new learning environments characterized by increased autonomy, self-regulated learning, and higher expectations regarding critical thinking and academic performance.

Compared with school environments, universities typically provide less structured guidance and place greater responsibility on students to manage their own learning processes. Students must adapt to cumulative assessment formats, independent study phases, and unfamiliar institutional procedures. These structural differences often lead to challenges during the early stages of study (Timmis et al., 2024). Empirical research indicates that many first-year students struggle with time management, academic writing, and understanding evaluation criteria during their first semester (Credé & Niehorster, 2012). In addition, students often experience uncertainty regarding institutional expectations and administrative processes, which can further complicate the transition process. Consequently, the transition into higher education represents a critical stage that requires both individual adaptation and institutional support (Bashir, 2025).

First-Year Experience and Student Engagement

The concept of the First-Year Experience (FYE) has emerged as an important framework for understanding how institutions can support students during the early stages of study. Research in this field emphasizes the importance of structured institutional support during the first year of university education (Kuh et al., 2008). FYE research highlights that early academic and social experiences significantly influence students' engagement, sense of belonging, and persistence (Kuh, 2009). A strong sense of belonging is considered a key determinant of student success, as it enhances motivation, engagement, and retention, particularly during the first year (Thomas, 2012). Universities that implement comprehensive first-year programs—including mentoring systems, academic advising, skills development courses, and structured orientation programs—report positive effects on student engagement, learning outcomes, and retention rates.

Kift et al. (2010) argue that effective transition strategies should integrate academic, social, and organizational dimensions. Rather than focusing solely on orientation events at

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the beginning of the semester, universities should implement holistic transition pedagogies that accompany students throughout their first year. Such approaches aim to foster both academic competence and social integration, thereby strengthening students' connection to the institution. This perspective has been further developed in the concept of transition pedagogy, which emphasizes the need for institution-wide, coordinated approaches to supporting students throughout their first year (Kift, 2015).

Organizational Onboarding

A complementary perspective on student transition can be derived from organizational research on onboarding and organizational socialization. Organizational socialization theory explains how newcomers integrate into new institutional environments and acquire the knowledge and skills necessary to function effectively within an organization (Van Maanen & Schein, 1979). In organizational contexts, onboarding refers to structured processes designed to facilitate newcomers' adjustment to new roles and environments. Effective onboarding programs typically focus on three central dimensions: role clarity, social integration, and organizational knowledge. Role clarity refers to understanding expectations, responsibilities, and performance standards. Social integration involves building relationships and networks within the organization. Organizational knowledge includes understanding institutional procedures, communication channels, and available support structures. Beyond initial orientation, onboarding should be understood as an ongoing process that includes continuous support, feedback, and socialization mechanisms (Klein & Polin, 2012).

Meta-analytic research demonstrates that structured onboarding processes significantly improve performance, job satisfaction, and retention among newcomers (Bauer et al., 2007). Translating this concept to higher education suggests that universities can enhance students' transition experiences by implementing systematic onboarding strategies that support academic integration and institutional orientation.

Digital Learning and Artificial Intelligence

Learning management systems, communication platforms, and digital collaboration tools have become central components of modern learning environments (Selwyn, 2016). Recent research further highlights that students increasingly expect structured digital onboarding tools that support their transition into higher education and facilitate access to relevant information and support services (Schilling et al., 2024). In recent years, artificial intelligence (AI) applications have also begun to influence students' academic practices. AI-based tools can assist students in tasks such as information retrieval, summarizing complex texts, generating ideas, and structuring academic writing. As a result, AI technologies are increasingly integrated into students' study routines (Castillo-Martínez et al., 2024). Research indicates that AI applications can enhance efficiency in information processing and support students in managing academic workloads (Zawacki-Richter et al., 2019).

At the same time, the integration of AI technologies raises important questions regarding digital literacy, responsible use, and the pedagogical implications of AI-supported learning environments (Noroozi et al., 2025). From an institutional perspective, these developments highlight the importance of integrating digital technologies and AI tools into onboarding strategies in a way that supports students' academic development while

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maintaining academic integrity and critical thinking (Bashir, 2025). Overall, the literature suggests that effective onboarding in higher education requires a combination of academic support, social integration mechanisms, institutional orientation, and digital learning infrastructure.

Conceptual Framework: Onboarding as a Multi-Dimensional Integration Process

This study conceptualizes onboarding in higher education as a multi-dimensional integration process that combines elements from transition theory, First-Year Experience (FYE) research, and organizational socialization. Building on Vincent Tinto's (2012) model of student integration, onboarding is understood as a structured process that supports three core dimensions of student adjustment:

- Academic integration, including understanding academic expectations, managing workload, and developing effective learning strategies
- Social integration, encompassing peer interaction, the development of a sense of belonging, and participation in academic and social networks
- Organizational integration, referring to the ability to navigate institutional structures, access relevant information, and understand administrative procedures

Extending existing models, this study introduces a fourth dimension: Digital integration, which captures students' ability to effectively use digital platforms, learning management systems, and artificial intelligence tools as part of their academic practices. Within this framework, onboarding is conceptualized as an interactive process between institutional support structures and individual student adaptation. The effectiveness of onboarding depends on the degree of alignment between institutional design (e.g., onboarding programs, mentoring structures, and digital tools) and students' needs during the transition phase (Noroozi et al., 2025). The framework assumes that successful onboarding facilitates the development of academic competence, social belonging, and organizational orientation, while also enabling students to engage effectively with digital learning environments. Consequently, onboarding is not viewed as a single event but as an ongoing, systemic process that unfolds throughout the early stages of higher education. This conceptualization provides the analytical foundation for interpreting the empirical findings and deriving evidence-based implications for the design of onboarding strategies in higher education institutions (Timmis et al., 2024). Furthermore, successful integration across these dimensions is expected to positively influence student engagement, academic performance, and retention.

Comparative Context and Methodology

Comparative Context

Higher education systems differ substantially in how they structure and support the transition from school to university, particularly with regard to the availability and design of institutional support mechanisms for first-year students. These differences become especially evident when comparing higher education systems in Germany and the United States. Comparative OECD research documents differences in student support systems and higher education policies across national contexts (Golden et al., 2021).

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In Germany, higher education institutions traditionally emphasize early academic independence. Students are expected to take responsibility for navigating institutional structures, organizing their learning processes, and developing self-regulated learning strategies from the outset of their studies. Orientation activities are typically limited to short introductory sessions focusing on administrative procedures and study regulations (Teichler, 2017). In contrast, universities in the United States tend to provide more structured transition support during the first year. Many institutions implement comprehensive First-Year Experience (FYE) programs that include extended orientation formats, academic advising, mentoring systems, and first-year seminars (Kuh et al., 2008). These programs aim to support students academically, socially, and organizationally by fostering early integration, clarifying expectations, and strengthening learning strategies.

Recent research further suggests that blended onboarding formats—combining digital and face-to-face elements—can significantly enhance students' transition experiences and engagement (Smalley & West, 2026). These structural differences provide an important analytical context for examining onboarding practices and transition experiences across higher education systems (Timmis et al., 2024). The comparative perspective allows for the identification of system-related effects on student adjustment processes and onboarding effectiveness.

Research Design

This study adopts a quantitative cross-sectional research design to examine students' onboarding experiences during their transition into higher education. A comparative approach was applied to analyze differences between Germany and the United States. The design enables the systematic investigation of perceived transition challenges, evaluation of onboarding measures and the use of digital and AI-based tools. Data were collected at a single point in time, focusing on students in early semesters, thereby capturing experiences during or shortly after the transition phase.

Sample and Data Collection

Data were collected in Spring 2026 through an online survey administered to undergraduate students enrolled in business-related programs at two higher education institutions: DHBW Mannheim in Germany and the University of Houston Downtown in the United States. The selection of these institutions reflects two distinct higher education systems that differ in their approaches to student onboarding and transition support.

Participation in the study was voluntary and anonymous. Respondents were informed about the purpose of the study and assured that no personally identifiable information would be collected or stored. This approach ensured compliance with common ethical standards for survey-based research in higher education. The final sample consists of N = 350 students. Of these, 200 students (57.1%) were enrolled at DHBW Mannheim, while 150 students (42.9%) studied at the University of Houston Downtown. The gender distribution of the sample was relatively balanced, with 52.3% identifying as female and 47.7% as male.

With regard to academic stage, the majority of participants were in the early phases of their studies, which is particularly relevant for analyzing onboarding experiences. Specifically, 28.6% of respondents were in their first semester, 23.7% in their second semester, and 47.7% in their third semester. This distribution ensures that the data capture

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experiences during or shortly after the transition phase into higher education. Overall, the sample provides a suitable empirical basis for analyzing onboarding experiences and transition challenges across two different higher education contexts, allowing for meaningful comparative insights.

Measurement and Variables

The survey instrument was developed based on established literature on student transition, onboarding processes, and digital learning environments. The design of the questionnaire aimed to capture both traditional dimensions of student integration as well as emerging digital aspects, including the use of artificial intelligence in academic contexts.

All items were measured using five-point Likert scales ranging from 1 (very low or strongly disagree) to 5 (very high or strongly agree), allowing for the quantification of subjective perceptions and experiences.

The study operationalizes four central constructs. First, academic challenges capture students' perceived difficulties in adapting to higher education, including aspects such as academic workload, time management, and performance pressure. Second, onboarding evaluation refers to students' assessments of institutional support measures, including the quality of mentoring programs, the organization of onboarding activities, the transparency of information, and opportunities for networking. Third, digital integration reflects the extent to which students are able to effectively use digital tools and platforms, such as learning management systems, communication tools, and AI-based applications, as part of their academic practices. Finally, frequency of AI usage measures how often students use artificial intelligence tools in their academic work. The related survey items were analyzed individually to describe students' responses to each aspect and compare patterns between the two institutions.

Data Analysis

Data analysis was conducted using descriptive and comparative statistical methods to identify patterns in students' onboarding experiences and to examine differences between the two national contexts. Means (M) and standard deviations (SD) were calculated for each survey item to summarize average ratings and variation in responses. The results were then compared descriptively between students at DHBW Mannheim and the University of Houston-Downtown.

These comparisons focus on perceived academic challenges, evaluations of onboarding measures, and the use of digital tools and artificial intelligence. In addition, challenges experienced during the transition to higher education were ranked according to their mean values within each group. This ranking shows which challenges students rated most highly at each institution. The reported differences are descriptive and do not establish statistical significance or causal effects. Overall, the analytical approach provides a structured and comparative understanding of onboarding processes and their relationship to student experiences in different higher education systems.

Reliability and Validity

The survey items were developed with reference to established theoretical frameworks, including transition theory, First-Year Experience research, and organizational onboarding

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theory. Items were derived from and adapted based on existing empirical studies to support their conceptual relevance to the aspects of onboarding examined in this study. As the items were analyzed individually rather than combined into composite scales, internal consistency measures such as Cronbach's alpha were not calculated for the reported results.

Results and Comparative Analysis

This section presents the empirical findings of the study. The results are based on descriptive statistical analyses and focus on students' transition experiences, the evaluation of onboarding programs, and the role of digital and AI-supported learning tools. Particular attention is given to differences between students studying in Germany and the United States.

Academic Challenges During the First Year (Germany vs. USA)

Students were asked to evaluate typical challenges experienced during the transition from school to university using a five-point Likert scale (1 = very low challenge, 5 = very high challenge).

Table 1.
Perceived Challenges During the First Year (Germany vs. USA)

Challenge	Germany (M)	Germany (SD)	USA (M)	USA (SD)
Academic workload	4.12	0.88	3.74	0.91
Time management	4.05	0.90	3.61	0.94
Performance pressure	3.98	0.92	3.69	0.95
Orientation difficulties	3.71	0.97	3.28	1.01
Social integration	3.22	1.05	3.41	1.02
Digital tools / systems	2.89	1.02	2.75	1.04

Note. Scale from 1 (very low) to 5 (very high).

Table 1 presents the perceived challenges reported by students in Germany and the United States. The findings indicate that students in both countries report high levels of academic workload and time management difficulties, with slightly higher values observed in Germany. Performance pressure is rated at a comparable level in both groups, while social integration is generally rated as less challenging. A closer comparison shows that students at DHBW Mannheim report higher ratings for academic workload, time management, and orientation difficulties than students at the University of Houston-Downtown. These patterns may reflect differences in academic expectations and the support students encounter during their transition to higher education.

Students at the University of Houston-Downtown report lower ratings for most of the challenges listed in Table 1. However, they rate difficulties with social integration slightly higher than students at DHBW Mannheim. This suggests that a comparatively favorable assessment of some aspects of onboarding does not necessarily mean that forming social connections is easy for all students. Overall, the results show differences in how students at the two institutions experience academic demands, orientation, and social integration. Because the analysis is descriptive, it cannot establish whether institutional support structures caused these differences.

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Evaluation of Onboarding Programs (Germany vs. USA)

Students also evaluated different onboarding measures offered by their universities.

Table 2.
Evaluation of Onboarding Elements (Germany vs. USA)

Onboarding Element	Germany (M)	Germany (SD)	USA (M)	USA (SD)
Introduction courses	3.52	0.91	3.94	0.88
Digital onboarding tools	3.55	0.92	3.87	0.89
Organization of onboarding	3.41	0.95	3.89	0.90
Mentoring programs	3.33	0.96	3.82	0.91
Information transparency	3.28	0.99	3.76	0.93
Networking events	3.18	1.01	3.67	0.94

Note. Scale from 1 (very low) to 5 (very high).

As shown in Table 2, students at the University of Houston-Downtown rate all the onboarding measures examined more favorably than students at DHBW Mannheim. The largest differences are observed in mentoring programs, networking opportunities, and the overall organization of onboarding activities. These ratings suggest that students at the two institutions have different experiences of structured support and opportunities for social connection. Students at DHBW Mannheim give particularly low ratings to mentoring and networking, indicating areas in which additional support may be useful.

The results are consistent with the view that academic guidance, mentoring, and opportunities to build peer networks are relevant components of onboarding. However, because the study includes only one institution in each country, the observed differences cannot be attributed to the German and U.S. higher education systems as a whole. Overall, the findings point to the potential value of coordinating these forms of support to address students' academic, organizational, and social needs during the transition to higher education.

Digital Learning Environment (Germany vs. USA)

Students evaluated the usability of different digital tools provided by their universities. Table 3 summarizes students' evaluations of digital tools used during the onboarding phase. Overall, both groups report relatively high usability of learning management systems and communication platforms, with learning management systems receiving the highest ratings in both countries.

However, students in the United States consistently report slightly higher usability ratings across most digital tools, particularly for communication platforms and mobile applications. These differences may reflect variations in digital infrastructure and the degree to which digital systems are integrated into teaching and administrative processes.

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Table 3.
Usability of Digital Tools (Germany vs. USA)

Digital Tool	Germany (M)	Germany (SD)	USA (M)	USA (SD)
Learning management systems (LMS)	3.94	0.88	4.12	0.84
Email communication	3.87	0.90	3.98	0.87
University websites and video platforms	3.56	0.96	3.72	0.92
University mobile app	3.41	1.01	3.70	0.95
Social media services	3.38	1.03	3.59	0.97
AI chat tools	3.21	1.05	3.41	1.02
Virtual reality services	2.94	1.12	3.18	1.06

Note. Scale from 1 (very low) to 5 (very high).

Overall, the findings suggest that more integrated and user-friendly digital environments can contribute to a smoother and more effective onboarding experience.

Frequency of AI Use (Germany vs. USA)

Students were asked how frequently they use artificial intelligence tools in their academic work.

Table 4.
Frequency of AI Use by Country

Country	M	SD
Germany	3.74	0.96
USA	3.89	0.92
Total	3.81	0.94

Note. Scale from 1 (very low) to 5 (very high).

Table 4 presents the frequency of AI tool usage among students. The results indicate that artificial intelligence tools are widely used in both Germany and the United States, with slightly higher usage reported by students in the United States. This suggests that AI technologies may be somewhat more integrated into academic workflows within U.S. universities. Across both contexts, AI tools are primarily used to support tasks such as information search, text summarization, and writing assistance. Overall, the findings demonstrate that AI has already become an integral part of students' academic practices and highlight the growing importance of digital competencies and AI literacy in higher education.

Ranking of First-Year Challenges (Germany vs. USA)

To further examine the most relevant transition difficulties experienced by students, perceived challenges were ranked based on their mean values for each country. This approach enables the identification of those issues considered most critical during the transition from school to university. As shown in Table 5, the ranking analysis reveals both similarities and differences between students in Germany and the United States. In both countries, academic workload emerges as the most significant challenge during the first year of study, reflecting the substantial adjustment required when moving from structured high school environments to more autonomous and academically demanding higher education contexts.

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Table 5.
Ranking of First-Year Challenges (Germany vs. USA)

Rank	Germany	USA
1	Academic workload (4.12)	Academic workload (3.74)
2	Time management (4.05)	Performance pressure (3.69)
3	Performance pressure (3.98)	Time management (3.61)
4	Orientation difficulties (3.71)	Social integration (3.41)
5	Social integration (3.22)	Orientation difficulties (3.28)

Note. Scale from 1 (very low) to 5 (very high).

As illustrated in Table 5, differences become apparent in the relative importance of subsequent challenges. For German students, time management ranks as the second most significant challenge, followed by performance pressure. This pattern suggests that the transition into self-regulated learning environments may be particularly demanding where institutional guidance is limited. In contrast, students in the United States rank performance pressure second and time management third. This may indicate that academic expectations remain a primary source of stress in both contexts. Social integration ranks fourth in the United States and fifth in Germany, while orientation difficulties rank fourth in Germany and fifth in the United States. U.S. students nevertheless report slightly greater difficulty with social integration, underscoring the importance of social belonging and the potential role of peer networks and mentoring programs. Overall, the findings suggest that academic adaptation, particularly managing workload, time, and performance expectations, is a central challenge in the transition to higher education.

Synthesis of Findings: Cross-Dimensional Insights

The results across the dimensions show differences between the two institutions in students' ratings of transition challenges, onboarding measures, and digital tools. Students at the University of Houston-Downtown rate onboarding measures more favorably and report lower ratings for most academic challenges than students at DHBW Mannheim. These patterns are consistent with the possibility that institutional support matters during the transition to higher education, although the descriptive data cannot establish its effects. The higher challenge ratings in the German sample likewise cannot be attributed solely to differences in student autonomy or institutional guidance. A key consideration is the interdependence of onboarding dimensions. Academic challenges such as workload and time management may be related to how clearly students understand institutional procedures and where they can find support. Social connections may also help students navigate academic demands. Digital tools and AI applications form another part of students' transition experiences, but their role in addressing gaps in institutional guidance was not tested in this study. Overall, the findings support considering academic, social, organizational, and digital needs together when designing onboarding measures—a holistic and system-oriented approach.

Discussion and Practical Implications

The findings of this study provide important insights into the transition experiences of first-year students and underline the central role of structured onboarding processes in higher

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education. By combining a comparative perspective with empirical data, the results demonstrate that onboarding should be understood as a multi-dimensional and institutionally embedded process rather than a one-time introductory event.

Academic Integration as the Core Challenge

A key finding of this study is the dominance of academic challenges during the transition phase. Students in both Germany and the United States identified academic workload, time management, and performance pressure as the most significant difficulties during their first year of study. These results are consistent with prior research emphasizing that the transition to higher education requires substantial adjustments in learning strategies and self-regulation. From the perspective of the conceptual framework, these findings highlight the central importance of academic integration. Students are required to quickly adapt to new expectations, more complex learning environments, and less structured guidance compared to school contexts. The higher levels of perceived difficulty reported by students in Germany suggest that early academic independence, while beneficial in the long term, may intensify short-term transition challenges. This finding implies that universities should place stronger emphasis on structured academic onboarding elements, such as introductory courses focusing on time management, academic writing, and self-regulated learning. Embedding such components within the curriculum, rather than offering them as optional support, may enhance their effectiveness and reach.

The Role of Institutional Structure in Onboarding Effectiveness

The comparative results show that students at the University of Houston-Downtown rate the onboarding measures examined more favorably than students at DHBW Mannheim. In particular, mentoring programs, networking opportunities, and the overall organization of onboarding activities receive higher ratings. From the perspective of organizational socialization theory, structured onboarding may help reduce uncertainty, clarify expectations, and support students' integration into the institution. The differences observed here may also reflect how students at the two institutions experience academic independence and access to guidance during their transition. The present data do not establish whether these factors caused the differences in ratings.

Overall, the findings suggest that the organization of onboarding may be relevant to students' transition experiences. Universities may therefore benefit from coordinated strategies that combine academic guidance, mentoring, and transparent communication. The results also raise the question of how onboarding structures relate to students' perceptions of academic workload and stress, which could be examined in future research.

Interdependence of Onboarding Dimensions

An important insight emerging from the study is the interdependence of the different onboarding dimensions. Academic challenges such as workload and time management are closely linked to organizational clarity and access to information. Similarly, social integration—although rated as less critical overall—plays a significant role in shaping students' ability to cope with academic demands.

This finding supports the multi-dimensional conceptualization of onboarding proposed in this study. Academic, social, and organizational integration should not be

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treated as isolated components but as mutually-reinforcing elements of a broader onboarding system. Effective onboarding strategies, therefore, require a holistic design that integrates these dimensions. For example, mentoring programs can simultaneously support social belonging and academic orientation, while clear communication structures can reduce both organizational uncertainty and academic stress.

Digital Integration and the Role of Artificial Intelligence

The results of this study highlight the growing importance of digital integration as a central dimension of onboarding. Students in both countries reported frequent use of digital tools, particularly learning management systems and communication platforms, confirming their role as essential components of contemporary learning environments. AI applications are primarily used for information search, summarization, and support in academic writing. This indicates that students actively integrate AI into their learning strategies, even in the absence of formal institutional frameworks. From an institutional perspective, this reveals a significant gap: while digital infrastructures are well established, the pedagogical integration of AI remains underdeveloped. Within the conceptual framework, this suggests that digital integration is currently driven more by student initiative than by institutional design. To address this gap, universities should adopt a proactive approach to AI integration in onboarding. This includes:

- Implementing AI-supported onboarding assistants that provide personalized guidance
- Offering structured AI literacy programs for first-year students
- Defining clear and responsible use cases for AI in academic contexts

Such measures would not only enhance students' digital competencies but also promote critical thinking and academic integrity. Integrating AI into onboarding strategies can therefore contribute to aligning institutional expectations with actual student practices.

Immersive Technologies and the Future of Onboarding

Although not directly investigated in this study, immersive technologies such as virtual reality (VR) represent a promising avenue for the future development of onboarding strategies in higher education. Within the proposed framework, VR can be understood as an advanced form of digital integration that enables experiential and interactive learning (Makransky & Lilleholt, 2018). VR-based onboarding environments could simulate campus structures, introduce academic procedures, and provide opportunities for students to practice communication, teamwork, and problem-solving skills in realistic settings.

Such applications may be particularly valuable during the transition phase, when students often experience uncertainty and a lack of orientation. Research suggests that immersive learning environments can enhance motivation, engagement, and emotional involvement, which are important factors for successful adaptation to new learning environments (Makransky et al., 2021). In addition, virtual onboarding experiences may offer flexible and scalable support for diverse student populations, including international and distance-learning students.

From a strategic perspective, the integration of VR reflects a broader shift toward hybrid learning ecosystems that combine physical, digital, and immersive elements. While further empirical research is needed to evaluate the effectiveness of VR-based onboarding

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interventions, immersive technologies may complement existing onboarding practices and contribute to more engaging and student-centered transition experiences (Makransky & Lilleholt, 2018; Makransky et al., 2021).

Implications for Higher Education Practice

The findings of this study suggest that onboarding should be conceptualized as a strategic, multi-dimensional, and continuous process. Based on the empirical results and the conceptual framework, several key implications for higher education institutions can be derived: First, onboarding should extend beyond initial orientation events and be embedded throughout the first year of study. Longitudinal onboarding structures can better support students' ongoing adaptation processes. Second, universities should adopt a holistic approach that integrates academic, social, organizational, and digital dimensions. Fragmented support structures are unlikely to address the complexity of the transition phase. Third, digital and AI-based tools should be systematically integrated into onboarding strategies. Rather than leaving students to navigate these technologies independently, institutions should provide guidance and structured learning opportunities. Fourth, mentoring and peer-support systems should be strengthened to foster social belonging and reduce uncertainty (Castillo-Martínez et al., 2024). And, finally, universities should explore innovative approaches, such as immersive learning environments, to enhance engagement and experiential learning during the transition phase.

Synthesis

Overall, the findings reinforce the central argument that onboarding in higher education is not a peripheral activity but a critical institutional function. Effective onboarding requires a close alignment between institutional structures and student needs and must continuously adapt to technological developments and evolving learning environments. Universities that successfully integrate academic support, social integration, organizational clarity, and digital innovation are more likely to create supportive and effective environments for first-year students, thereby enhancing engagement, academic performance, and long-term retention. Furthermore, the findings suggest that onboarding should be understood as a strategic institutional capability that influences not only student outcomes but also overall institutional effectiveness.

Implications for Higher Education Leadership and Policy

The findings highlight that onboarding should be viewed as a strategic institutional process rather than a one-time orientation activity. Universities seeking to improve student success and retention should implement coordinated onboarding strategies that combine academic support, social integration, organizational guidance, and digital services. This recommendation is consistent with research emphasizing the importance of institution-wide approaches to student transition and engagement (Kift et al., 2010; Kift, 2015; Tinto, 2012). The comparative results suggest that structured support mechanisms, such as mentoring programs, networking opportunities, and transparent communication, contribute positively to students' transition experiences. Higher education leaders should therefore promote institution-wide onboarding standards to ensure consistent support across programs and departments. Such approaches have been associated with stronger

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student engagement, belonging, and persistence (Kuh et al., 2008; Thomas, 2012; Reason et al., 2006).

The growing use of digital technologies and artificial intelligence also requires clear institutional strategies. Recent international guidance emphasizes that higher education institutions should actively develop policies for the responsible and human-centered integration of generative AI into teaching, learning, and student support services (UNESCO, 2023). In addition, recent research highlights the increasing importance of AI literacy as a core competence for students in higher education (Zhou et al., 2025). Universities should therefore integrate AI literacy training into onboarding processes, enabling students to use AI tools critically, ethically, and effectively as part of their academic work. Furthermore, universities increasingly require institution-wide AI adoption policies and governance frameworks to ensure responsible implementation across academic and administrative functions (Jin et al., 2025; Noroozi et al., 2025).

Overall, the study suggests that effective onboarding is an important leadership and policy issue. Institutions that systematically support students during the transition phase and strategically integrate digital and AI-related competencies are more likely to enhance engagement, strengthen retention, and improve long-term educational outcomes (Kuh, 2009; Tinto, 2012). Consequently, onboarding should be recognized as a strategic component of institutional quality development and student success initiatives.

Conclusion, Limitations and Future Research

This study examined onboarding practices in Germany and the United States and demonstrated that effective onboarding extends beyond traditional orientation activities. Consistent with previous research on student transition and the First-Year Experience, the findings show that academic workload, time management, and performance pressure are among the most significant challenges during the transition into higher education (Kift et al., 2010; Tinto, 2012). At the same time, structured onboarding measures can support students' academic, social, organizational, and digital integration and contribute to stronger engagement and belonging (Kuh et al., 2008; Thomas, 2012).

The results further highlight the growing role of digital technologies and artificial intelligence in supporting student transition and engagement. As students increasingly rely on digital platforms and AI-supported tools in their academic work, universities should integrate digital and AI-related competencies into onboarding strategies and provide guidance for their responsible use (UNESCO, 2023; Noroozi et al., 2025; Zhou et al., 2025). From a leadership and policy perspective, onboarding should therefore be understood as a strategic institutional process that contributes to student success, retention, and positive first-year experiences (Jin et al., 2025).

Several limitations should be acknowledged. The study is based on data from two higher education institutions and focuses exclusively on business students, limiting the generalizability of the findings. Furthermore, the cross-sectional design captures students' perceptions at a single point in time and does not allow conclusions about long-term effects. Future research should therefore include a broader range of institutions and disciplines, apply longitudinal research designs, and further investigate the impact of digital and AI-

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supported onboarding strategies on student success and retention (Timmis et al., 2024; Castillo-Martínez et al., 2024).

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Human Participants

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Originality Note

The authors confirm this is an original research adhering to the principles/ practices of academic publishing. Proper citations are also included when others' works are used.

Use of Generative AI/ AI-assisted Technologies Statement

OpenAI ChatGPT was used to assist with language editing and revision of the abstract and declaration wording. The authors reviewed the resulting text, made the necessary changes, and take full responsibility for the final article.

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