HYBRID TEACHING IN HIGHER EDUCATION: CURRENT INSIGHTS AND FUTURE RESEARCH DIRECTIONS

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Abstract

The popularity of hybrid education, which blends campus and online instructions to accommodate students both physically present and engaged remotely, has surged in response to the COVID-19 pandemic. Students, having adapted to online learning during the pandemic, now desire the flexibility it offers. As educational institutions transition back to campus education, students continue to advocate for hybrid options. Recent research studies highlight the growing prevalence of hybrid education. Thus, this paper aims to present current research insights into hybrid teaching and learning in higher education and pinpoint areas for future research.

Key themes addressed in articles on hybrid education published between 2018 and 2024, systematically gathered from the Scopus and Web of Science databases, are presented. Among the benefits found are enhanced accessibility and inclusion, increased student attendance, improved quality of students' life, health safety, lower costs for commuting, individualized learning, or attracting new students' groups. Conversely, various challenges associated with hybrid education are recognized. Teachers face heavy workloads due to the need of course redesign, and higher cognitive load when managing hybrid classes. Furthermore, challenges encompass communication hurdles, difficulties in monitoring student progress, as well as potential unfamiliarity with interactive teaching designs. Challenges further include technical difficulties arising from poor infrastructure or technical problems, as well as issues of data privacy and surveillance. Students also meet difficulties, such as reduced interactions, altered social dynamics, a diminished sense of belonging and motivation. Online-only students are particularly at risk of disengagement, leading to feelings of isolation and impeding the development of essential soft skills. Challenges related to equitability and parity of experience between on-campus and online students can affect relationship building and social cohesion within the cohort.

Future research in the field of hybrid education shall further explore online students' sense of belonging, the social dynamics and performance comparison between online and on-campus students in hybrid learning environments and identify specific teaching and learning activities where hybrid education is most effective or less beneficial. Additionally, there is a need to address questions related to equity and parity in student experiences in hybrid education, considering who benefits and who may face disadvantages. Furthermore, future research is recommended to delve into the assessment of audio quality, acoustic testing, and the evaluation of spatial impacts on the learning environment in the hybrid settings. Yet another area to be examined regards ethical considerations related to students' privacy, surveillance, and data usage.

Keywords: Hybrid teaching, Higher education, Online learning, Challenges, Student engagement, Future research.

1 INTRODUCTION

The popularity of hybrid education, which combines campus and online instructions to accommodate students both physically present and engaged remotely, has significantly increased in response to the COVID-19 pandemic. Students, having adapted to online learning during the pandemic, now want the flexibility it offers. As educational institutions transition back to campus education, students continue to advocate for hybrid learning options. Recent research highlights the growing prevalence of hybrid education, showing the need for further exploration of this phenomenon.

This paper aims to provide current research insights into hybrid teaching and learning in higher education and to outline issues for future investigations. It begins by showing key themes addressed in articles on hybrid education published between 2018 and 2024, systematically retrieved from the Scopus and Web of Science databases. Following this, an overview of found advantages and disadvantages of hybrid education is presented. Drawing upon the analysis of preceding research findings, the paper concludes by outlining areas for future research in the field of hybrid teaching and learning.

2 METHODOLOGY

The literature search was initially conducted in October 2023 and subsequently updated in April 2024. Utilizing Scopus and Web of Science databases, a comprehensive search was performed using the following query: ("Hybrid education" OR "Hybrid teaching" OR "Hybrid flexible" OR "Hyflex") AND ("higher" OR "university") AND "education" within *Article Title, Abstract,* and *Keywords*. The search parameters were confined to journal articles, conference papers, and book chapters published in English between 2018 and 2024.

The search resulted in 487 documents from Scopus and 281 from Web of Science. After removing duplicates (181), retracted documents (3), and documents lacking full access (264), a total of 320 papers remained for screening based on their abstracts and keywords. While some papers mentioned *hybrid teaching, hybrid education* or *hybrid flexible* in their abstracts or keywords, they had a different focus than *hybrid teaching* or *hybrid education*. For the purposes of this paper, *hybrid education* entails a modality where some students attend classes on-campus while others participate remotely. This definition also encompasses the hybrid flexible (HyFlex) delivery method, which integrates online asynchronous activities with flexible-synchronous sessions, affording students the option to engage synchronously online, in person, or asynchronously through recordings, thereby facilitating optimal participation flexibility [1].

Consequently, papers focusing on *blended teaching and learning formats* (i.e., integrating face-to-face classroom interactions with ICT applications), purely remote/online modalities, or comparisons between traditional in-class instruction and e-learning during the Covid-19 pandemic were excluded from further analysis. Additionally, papers not centred on higher education contexts were excluded. Despite English language being a search criterion, several papers in other languages (accompanied solely by English abstracts) appeared in the search and were also excluded.

Following this rigorous screening process, 100 papers remained, and their abstracts and discussion and conclusion sections were coded in NVivo software, focusing on key themes such as their primary focus, strengths or benefits of hybrid education, challenges or weaknesses of hybrid education, and recommendations.

There are several limitations of this paper that are worth noting. Although explicit exclusion criteria were established, the selection of papers for inclusion and exclusion, as well as subsequent coding process, were conducted by a single researcher. Involving two independent researchers or coders would likely yield more robust results. Moreover, there is a possibility that some relevant papers written in languages other than English may have been overlooked, as only English-language papers were included. Additionally, papers that were inaccessible to the author in full text, despite their potential relevance, were also excluded. Finally, the analysis is based solely on papers' abstracts and discussion and conclusions sections, thus not encompassing theoretical standpoints, or assessing their research methodologies.

3 RESULTS

This chapter presents key themes explored in previous studies, highlighting the benefits and obstacles associated with hybrid education. Additionally, it offers recommendations drawn from existing research to address these challenges. Lastly, the chapter outlines potential directions for future research to further enhance our understanding of hybrid teaching and learning in higher education.

3.1 Primary focus of reviewed papers

The reviewed papers have various foci which have been categorized followingly. Studies centred on:

- Instructional design, pedagogical strategies and methods used for HyFlex courses [1], [2], [3], [4], [5], respectively a model for HyFlex classrooms that highlights 4Cs: Content, Collaboration, Community and Communication [6] and its evaluation [7],
- Instructional design to promote high-quality, equitable, and inclusive education in hybrid settings [8],
- Description of implementation of hybrid teaching in emergency state of Covid-19 pandemic [9], [10], [11],
- Student perceptions and experiences regarding e.g. their readiness, accessibility and quality of teaching, or learning effectiveness [12], [13], comparing different delivery modes [14], [15], [16], [17], [18],
- Student engagement and motivation [19], [20], [21],

- Student performance [14], [22], [23] – interestingly most of the studies show differences between performance of in-class and remote students, but some studies show no difference [23], [24],
- Students' satisfaction [25],
- Relation between cognitive learning styles and HyFlex modalities to promote equitable and inclusive learning [26], [27],
- Psychological factors (such levels of resilience, self-esteem, anxiety, depression, stress) [28], psychological well-being [29], mental health comparing online, hybrid, and face to face education in European and Latin American countries [30],
- Evaluation of hybrid learning and teaching practices/strategies by academics [31], their preparedness [30], teachers' experience [32], [13],
- Impact on teachers (e.g., workload, well-being) [33], professional development of teachers and their digital competencies [34], a course to enhance lecturers' hybrid teaching skills [35],
- Technostress in hybrid teaching or learning environments [36], [37],
- Adaptive learning and personalized education based on data mining [38], [39], [40],
- Hybrid teaching and learning assessment based on big data [41], data-driven teaching practice [42],
- Learning platforms [43], [44], [45],
- Use of telepresence robots [46], [47], virtual or extended reality / metaverse world [48], [49], [50],
- Infrastructural and technology improvements in classroom to help optimize the perceived sound quality for remote learners [51].

These studies are leading to identifying benefits and weaknesses of hybrid education and coming up with recommendations which are discussed further.

3.2 Benefits of hybrid education

Students generally hold a positive perspective on hybrid education [9], [18], [52]. The benefits include enhanced flexibility and convenience for students, allowing them to choose between on-campus or online participation [20], [52], [53]. This facilitates self-paced learning [15], [53], improves work-life balance, time management [52], and fosters independence in studying and self-analysis [53]. Additionally, hybrid education improves the quality of life for students by addressing their diverse needs [52], [54], [55], and ensuring health safety measures, while also reducing commuting costs.

From a societal and educational perspective, hybrid education promotes sustainability [56] (both environmental and social), enhances accessibility and inclusion [13], [54], increases students' attendance [54], and individualizes learning to meet specific educational goals [57]. Moreover, hybrid education attracts new target groups and broadens the reach of university education to a wider audience [57].

Certain individuals, groups, or social strata may prefer online/hybrid education, highlighting its potential to accommodate diverse learning preferences and needs [25]. Overall, offering students the choice to learn either in-person or virtually does not negatively impact engagement or success and may indeed support the success of students with flexible learning needs [24].

3.3 Challenges connected to hybrid education

Conversely, studies also highlight various challenges associated with hybrid education which have been categorized as challenges related to teachers, challenges related to students, and challenges related to infrastructure and technology.

3.3.1 Challenges related to teachers

Teachers face heavy workloads due to the need of course redesign, and higher cognitive load when managing hybrid classes [10], [31], [54], [58], [59]. Resolving the issues of coordinating a cohort spread across various locations presents another obstacle [10]. Moreover, difficulties arise in monitoring students' learning processes and implementing effective assessment methods to prevent cheating, especially for students participating remotely [59]. Navigating unfamiliarity with interactive teaching designs suitable for hybrid classes is also a challenge [58], [59]. This is compounded by the lack of guidance [60] and inadequate training for instructors [13], [58].

Furthermore, teachers may experience (techno)stress related to the integration of technology into their teaching practices [13]. The readiness of faculty members, their ICT competencies, and the system solutions introduced at the university are also factors that influence their engagement in hybrid education. Moreover, negative experiences related to distance teaching from Covid times as well as to student dishonesty can discourage teachers in implementing hybrid teaching modalities [17].

3.3.2 Challenges related to students

Hybrid education poses numerous challenges for students. Firstly, communication difficulties arise among students attending through different modes [12], [61], leading to less frequent and less impactful interactions with online students compared to those in the physical classroom [20], [62]. Consequently, students may experience decreased motivation, feelings of loneliness, and reduced engagement with both teaching staff and fellow students in hybrid classes [31], [59], [63], with online-only students showing a tendency to disengage over time [13].

Moreover, online students may struggle with focus, commitment, motivation, and activity levels in hybrid learning environments, leading to increased anxiety, stress, and irregular participation [7], [17]. Limited personal communication between students and teachers contributes to feelings of isolation and hampers the development of soft skills [17].

The issue of (social) presence poses significant challenges, as highlighted in various studies [10], [58]. Providing students with the option to participate remotely may inadvertently lead to a lack of full immersion in the university experience [54]. This could potentially deprive online-only students of valuable interpersonal interactions and relationships with both class peers and teachers, consequently impacting their sense of connection and engagement within the learning environment. Moreover, it may impede relationship building and social cohesion within the cohort [13]. Concerns regarding equity and parity of experience between on-campus and online students thus arise [13]. Furthermore, hybrid teaching formats may worsen existing inequalities, highlighting the need for educators to carefully consider their approach to designing learning activities and teaching methods in hybrid settings [20].

3.3.3 Challenges related to infrastructure and technology

Research also highlights technical challenges arising from inadequate infrastructure or technical equipment [13], [17], [60]. Both students and lecturers may encounter connectivity problems that hinder interactions between on-campus and online participants. Krasna and Bratina's study [64] identified that the limited success of hybrid classes is mostly due to the unsuitably equipped workplaces in the classrooms. The traditional classroom layout needs to be reevaluated to better suit hybrid teaching and learning, as the room design and technical equipment significantly impact the perceived sound quality for online students [51], consequently affecting their learning and engagement.

Moreover, studies highlight concerns regarding data privacy and surveillance [65]. An interesting discussion on the tension between surveillance and care related to webcams is presented by Aagaard et al. [58].

Another challenge for higher education institutions in implementing hybrid education is estimating the number of students who will attend on-campus to plan adequate room sizes. Some studies indicate that students tend to prefer online attendance, resulting in underutilization of campus resources [4].

3.4 Recommendations from previous research

Previous studies offer numerous recommendations, both general and specific, for implementing hybrid classes in higher education institutions.

General recommendations emphasize the importance of adequate infrastructure, technical equipment, and classroom redesign to support hybrid teaching and learning. Additionally, educators require appropriate technical and pedagogical training, as well as access to audio-visual and digital education support [10], [61], [66]. For detailed discussions on implications and recommendations for implementing HyFlex teaching and learning, refer to Detyna et al. [10], while Marey et al. [51] provide insights into sound quality recommendations.

Specific recommendations highlight the importance of an additional teaching staff helping during the hybrid classes [13]. This might involve appointing a moderator to address questions from online students and offer further assistance to both lecturers and students [61]. Creating spaces and activities that facilitate a sense of community and social cohesion is also recommended to support hybrid learning [13]. It is further advisable to outline preferred classroom behaviour during hybrid classes in student

course manuals [20], including rules for students participating online ("learning agreement"), such as keeping cameras on [53], [64].

Furthermore, Howell et al. [3] integrate theories on new media literacies, research, and practice to give guidance on course design for HyFlex model. They propose six pedagogical strategies for HyFlex course design, including utilizing chat as a backchannel for discussion, flipping the classroom, maximizing the effective use of asynchronous time, implementing scaffolding with protocols, intentional grouping, and considering classroom spatial arrangements.

3.5 Future research directions

Based on the analysis of previous research findings, this section outlines potential future research directions to enhance our understanding and improve hybrid teaching and learning in higher education.

Firstly, there is a need to address *questions related to equity and parity in student experiences within hybrid education* [13]. These include inquiries into online students' sense of belonging to both the student group and the study programme [20], as well as social dynamics between online and on-campus students. Future studies can investigate how students engage with each other and with their teachers, whether online or face-to-face, and explore questions concerning socio-cognitive learning and social cohesion [13]. Additionally, long-term engagement and performance comparisons between online and on-campus students in hybrid learning environments [20] need thorough examination since previous studies in this area have yielded inconclusive results. These questions are intertwined with the identification of specific teaching-learning activities where hybrid education proves most effective or less beneficial across various academic domains or for different groups of students [20], [59]. Moreover, differences in students' learning strategies in different educational modes deserve further investigation. Additional efforts should be directed towards devising suitable assessment methods tailored to diverse contexts in hybrid education [59].

Numerous studies conducted during the COVID-19 pandemic may possess a short-term perspective and may fail to capture the *long-term implications of hybrid education*. Longitudinal data tracking students' experiences over an extended period is often lacking, as is an assessment of the long-term sustainability and equity implications of hybrid education. This scarcity of longitudinal data makes it challenging to draw conclusions about the long-term impact of hybrid education. Additionally, future studies should thoroughly explore how hybrid education impacts underserved or marginalized student populations. Who benefits from hybrid education, and who may face disadvantages? [13] Can hybrid education lead to stratification among students? What demographic finds online study particularly appealing, and why?

In addition to longitudinal research, there is a pressing need for more *comparative research*. Many previous studies are single case studies, both qualitative and quantitative, yet their conclusions often advocate for similar research across different geographical and discipline boundaries [59], [67] to enable further generalisations.

Furthermore, future research is recommended to delve into the assessment of *audio quality, acoustic testing*, and the evaluation of *spatial impacts* on the learning environment in the hybrid settings [10]. Another area for further research is the effective implementation of *tele-presence robots and virtual realities* in hybrid education and their impact on learning [47].

Yet another area to be examined regards *ethical considerations* related to students' privacy, surveillance, and data usage [58], [65].

4 CONCLUSIONS

This paper has aimed to provide current research insights into hybrid teaching and learning in higher education and identify areas for future exploration. Hybrid education is after the pandemic becoming increasingly integral to the educational landscape, and with ongoing technological advancements, it aligns with the goals of the 2030 Agenda, which seeks, among other things, a more sustainable world and greater equity in education [54]. Appropriately designed hybrid education has the potential to contribute to these goals.

Consequently, higher education institutions and faculty must deepen their understanding of implications of hybrid education for diverse student groups and develop effective teaching strategies to foster equitable learning and inclusive education. Despite several limitations outlined earlier, this paper can

serve as a guiding resource for those seeking to understand current research in hybrid education and pursue further research in this field.

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AI DISCLOSURE

This paper's language has been enhanced for clarity through the utilization of ChatGPT 3.5.

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