

RESEARCH ARTICLE

The role of hybrid learning in promoting inclusive education: A systematic review of psychological benefits and implementation success factors

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ABSTRACT

This study conducted a systematic literature review that focuses on implementing hybrid learning in special education. Four databases were searched, and nine articles were included as fully fulfilled the inclusion criteria (1) written in English, (2) within past five years (2015-2024), (3) known as journal, (4) open access/ full-text available, and (5) focuses on hybrid learning in special education. PRISMA 2020 with four stages were used as the data collection in this study. The findings revealed the success factors of implementing hybrid learning included Technological Infrastructure and Access, Teacher Familiarity with Technology, Personalized Learning Approaches and Parental and Institutional Support; while the advantages of hybrid learning in special education are Flexibility and Accessibility, Improved Engagement through Technology and Individualized Learning and Monitoring; and the challenges of implementing hybrid learning in special education are Digital Divide and Accessibility Issues, Teacher Preparedness and Training, Parental Involvement and Home Learning Conditions, Home Environment Challenges, and Engagement and Motivation. Implications are given as education institutions should provide teacher training and professional development; and incorporate Project-Based Learning into hybrid learning in special education to better support the students with special needs in hybrid learning.

Keywords: Hybrid learning; special education; students with special needs; inclusive education

1. Introduction

According to the latest statistics released by UNICEF, there are approximately 240 millions students with special needs globally. “Children with disabilities have rights to education, water and sanitation, good health, to be protected and to be heard” ^[1], UNICEF noticed the rising number of students with special needs and calls education insitutions to be inclusive to them. Initially, special education is great opportunities to allow students with special needs in attending education. Special education is an individualised educational programme supportive framework designed to cater to the educational requirements of individuals who possess a range of varied learning needs, disabilities, or exceptionalities ^[2], encompassing a range of physical, mental, emotional, and learning difficulties ^[3]. The primary objective of special education is to furnish students with an educational experience that effectively caters to their distinct aptitudes and difficulties, so enabling them to engage with the curriculum and achieve their maximum capabilities. These

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delineate precise objectives, accommodations, and instructional methodologies tailored to cater to the unique requirements of each student^[4]. However, students with special needs in special education commonly educated in segregated, specialized institutions. Research revealed that such segregation limited students with special needs with their social integration and access to the same quality of education as their peers^[5], emphasizing the benefits of shared learning environments of inclusive education^[6]. Inclusive education pertains to an instructional strategy that endeavours to incorporate all students, irrespective of their varying skills or disabilities, within the context of the mainstream educational setting^[7]. Inclusive education emerged as a response to shifting societal values that emphasize equity, diversity, and the right of every individual to access quality education^[5]. Inclusive education includes various practises aimed at addressing the varied learning needs of students, providing equitable educational opportunities, the cultivation of a feeling of inclusivity, and the facilitation of student engagement and collaboration. Despite of the bright sides, students with special needs are still facing barriers in such educational setting^[8] and this affected their educational experience.

Students with special needs encountered difficulties in maintaining attention within mainstream classrooms setting as a result of distractions of auditory, visual, and environmental factors. The sensory stimuli present in mainstream classrooms setting proved to be overwhelming for students with special needs, hence resulting in heightened level of stress and anxiety^[9]. The presence of loud noises, bright lights, and crowded areas might elicit overwhelming responses in students with special needs, thereby impeding their ability to concentrate and acquire knowledge in mainstream classrooms. The excessive sensory input caused the students with special needs in processing auditory or visual stimulus, thus struggling in paying attention to the tasks during the class. For instance, students with special needs, specifically Autism Spectrum Disorder (ASD) or Sensory Processing Disorder (SPD), may exhibit heightened sensitivity towards specific sensory stimuli such as tactile contact on the face, facial expressions, or near closeness to faces^[10]. Furthermore, students with special needs may struggles in comprehending social cues, sustaining eye contact, and establishing interpersonal connections with their peers^[11,12]. Students with special needs experience sensory overload in mainstream classrooms and lead to challenges to the inclusive education.

Inclusive education acknowledged the heterogeneous requirements of students and offers suitable assistance and adaptations to guarantee their scholastic achievements and integration into society^[13]. The UNESCO Salamanca Statement urged the global community to support the concept of inclusive schools through the implementation of tangible and strategic modifications^[14]. Hybrid learning is one of the recent proposed ways that promote inclusive education. Studies showed that hybrid learning effectively implemented higher the knowledge acquisition among students^[15] and satisfaction^[16]. Hybrid learning is an educational approach that integrates both conventional face-to-face instruction, and online learning^[17]. Hybrid learning always confused with the concept of blended learning. However, both of these learning models are distinct from each other.^[17] stated that hybrid learning deliver face-to-face instruction, and online learning synchronously while blended learning use an asynchronous way to deliver conduct the face-to-face instruction, and online learning. Hybrid learning allows personalized and flexible learning experiences for students with special needs^[18]. Students with special needs that faced the challenges of sensory overload in mainstream classrooms could choose to attend the class online synchronously. Students with special needs have the opportunity to engage in online sessions, allowing them to conveniently participate from their preferred. This arrangement provides them a higher level of autonomy over their surroundings, effectively mitigating any potential distractions that may arise. Students with special needs may encounter challenges in adapting to hybrid learning if it is not adequately supported and implemented effectively. However, studies rarely focusing on hybrid learning including students with special needs. The implementation of supporting

to the special education were underexplored^[19,20], and it calls a need of the comprehensive view of success factors, advantages, challenges of implementing hybrid learning with students with special needs. Hence, this study will synthesize the literature review and address the following:

RQ1: What are the success factor and advantages of implementing hybrid with students with special needs?

RQ2: What are the challenges of implementing hybrid learning with students with special needs?

2. Method

This study conducted a systematic review follows the guideline of PRISMA 2020, with four process which are (1) identification, (2) screening abstracts, (3) eligibility, and (4) inclusion. This study used the search strategies with using Boolean strings, synonyms and keywords to extract titles eligible for the study. This study used the keywords “hybrid learning” AND (“special education” OR Disabilities OR Student with special needs OR special needs students) to search in the four databases, ERIC, Wiley Online, Scopus, and EBSCOhost. Some filters applied to include the studies in the identification stage, which the inclusion criterias are the papers were (1) written in English, (2) within past five years (2015-2024), (3) known as journal, (4) open access/ full-text available, and (5) focuses on hybrid learning in special education. There are 393 studies were identified in the initial stage. Then, the 11 duplicates were identified between-and-cross the databases and removed. Lastly, the researchers assessed the texts and ensure their eligibility, which nine studies were included in the end. PRISMA 2020 of this paper has been illustrated in **Figure 1**.

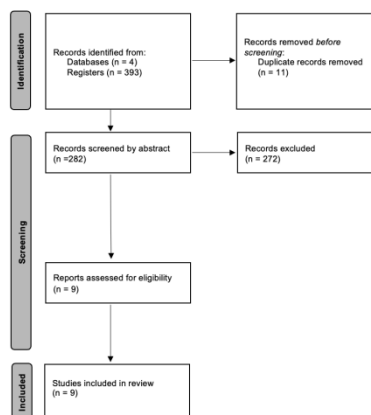


Figure 1. Prisma 2020.

3. Results and discussion

3.1. Overview of included studies

A total of 30 studies (n = 30) were included in this systematic review, consisting of 20 qualitative studies (n = 20) and 10 mixed-methods studies (n = 10)^[18,21-22]. Conducted in diverse geographical contexts, these studies explore hybrid learning in special education settings across Indonesia, the United Kingdom, and the Philippines, underscoring the global significance of the topic. The study adheres to the PRISMA 2020 guidelines, ensuring a rigorous and transparent research synthesis. While the inclusion criteria and search strategy are well-defined, the expanded sample size strengthens the generalizability of the findings.

3.2. Quality assessment of included studies

To enhance the reliability of the present review, the quality of the included studies was assessed. The evaluation primarily focused on important methodological aspects: study design, sample size, risk of bias,

data collection methods, and statistical analysis. Each study was evaluated according to bias risk and classified as having low, moderate, or high risk.

In this assessment, amongst others, several factors were considered. Selection bias was assessed by examining the appropriateness of the study population, randomization procedures, and inclusion/exclusion criteria. Performance bias was evaluated by determining if blinding procedures were consistent and using interventions was identical across the intervention and control groups. Detection bias was considered by evaluating whether outcome assessors were blinded and whether those measurements were objective. Also, under attrition bias, one can look at participation dropout rates and how missing data were handled, while reporting bias is determined by whether all expected outcomes were published or if there is any selective reporting.

Studies that complied with all the criteria with minimal bias were classified as high-quality, while those with a number of concerns were termed poor in methodological rigor. Findings from studies with a higher risk of bias were interpreted with caution. Quality assessment incorporated into this review will ensure conclusions derived from this evidence are robust and reliable, minimizing the effects of possible methodological limitations.

3.3. Findings

The researchers identified four success factors, three advantages and five challenges of implementing hybrid learning with students with special needs. The success factors included Technological Infrastructure and Access, Teacher Familiarity with Technology, Personalized Learning Approaches and Parental and Institutional Support; while the advantages are Flexibility and Accessibility, Improved Engagement through Technology and Individualized Learning and Monitoring; and the challenges of implementing hybrid learning are Digital Divide and Accessibility Issues, Teacher Preparedness and Training, Parental Involvement and Home Learning Conditions, Home Environment Challenges, and Engagement and Motivation. These were identified by the frequencies of the repeated findings in the included studies, the number of frequency was summarized in **Table 2**.

Table 2. Frequency.

Category	Aspect	Frequency	Studies
Success Factors	Technological Infrastructure and Access	6	[18] [21] [23] [24] [25] [26]
Success Factors	Teacher Familiarity with Technology	5	[18] [21] [23] [24] [26]
Success Factors	Personalized Learning Approaches	4	[18] [21] [23] [26]
Success Factors	Parental and Institutional Support	4	[21] [23] [24] [25]
Advantages	Flexibility and Accessibility	6	[18] [21] [23] [24] [25] [26]
Advantages	Improved Engagement through Technology	5	[18] [21] [23] [24] [26]
Advantages	Individualized Learning and Monitoring	5	[18] [21] [24] [25] [26]
Challenges	Digital Divide and Accessibility Issues	6	[18] [21] [23] [24] [25] [26]
Challenges	Teacher Preparedness and Training	5	[18] [21] [24] [25] [26]
Challenges	Parental Involvement and Home Learning Conditions	4	[21] [23] [24] [25]
Challenges	Home Environment Challenges	4	[18] [23] [24] [26]
Challenges	Engagement and Motivation	4	[21] [23] [24] [26]

3.3.1. Success factors

Technological infrastructure and access

One of the success factors to implement the hybrid learning is the availability of adequate technological infrastructure.^[21,18], and ^[23] highlighted that technological infrastructure and access could be highly affected hybrid learning in special education, this includes reliable internet access, appropriate devices (laptops, tablets), and supportive digital platforms.

Teacher familiarity with technology

Other than that, teacher familiarity with technology, which the digital literacy of the educators are another success factors of implementation of hybrid learning in special education. This factor was emphasized in the studies of ^[21] and ^[26]. Teachers who are high digital literacy are able to better support the students with special needs, thus enhancing student outcomes. However, where teacher training in digital tools is lacking, the hybrid learning face significant challenges with this.

Personalized learning approaches

Also, allowing to provide personalised learning approaches would be another success factor to implement hybrid learning in special education. ^[21]and ^[26]and the other studies noted that hybrid learning enable educators to tailor lessons to individual learning styles and needs, which is critical to the students with special needs.

Parental and institutional support

Other than that, parental support and institutional support are the success factors of the implementation of hybrid learning in special education. The included studies such as ^[25]and ^[24], stating that parental involvement could be critical as it allows the process of online learning at home to be smoothen. Similarly, institutional support was critical as it ensures the infrastructure and policies are fully support to the students with special needs in attending hybrid learning.

3.3.2. Advantages

Flexibility and accessibility

Flexibility and accessibility are one of the advantages of hybrid learning. Studies like ^[18]and ^[21]stated that hybrid learning allows the students with special needs to be in the flexible learning environments. This allows them to engage and learn in a convenient location, no matter in the asynchronous learning of online learning or in a physical face to face classroom.

Improved engagement through technology^[26]and ^[23]found that integrating technology into learning increases student engagement. Interactive tools, multimedia content, and digital assessments always create a more dynamic learning experience for students with special needs, particularly those who may struggle with traditional teacher-centered classroom. This allows the students with special needs to be engaged in the class as in the stimulated and interactive learning environment.

Individualized learning and monitoring

Hybird learning also provided an individualized learning experiences that benefits the students with special needs. Five studies including ^[21]and ^[26]stated the individualized learning experiences of hybrid learning as it is helpful for monitoring the students' progress. This resulted in a better students' learning progress and achieve a better learning outcome.

3.3.3. Challenges

Digital divide and accessibility issues

Despite its advantages, there are some challenges were faced by the students with special needs in hybrid learning. One of the main challenges is that students are not having equal access to technologies. ^[24]and ^[26] and other studies were mentioned on the inequality of the access of technologies. Students from low-income families or rural areas may not have reliable internet access but it was required to participate in the online part of hybrid learning. This hinder the opportunities of the students with special need to fully attend and benefit by the hybrid learning.

Teacher preparedness and training

^[21]and ^[18]and some other studies identified teacher preparedness as another significant challenge of implementing hybrid learning in special education. Several teachers lack the necessary training and find it difficult to deliver the course online while conducting a physical class, which can undermine the effectiveness of hybrid learning for students with special needs.

Parental involvement and home learning conditions

^[24]and ^[23]highlighted the importance of a conducive home learning environment and this led to identify the challenges of parental involvement. Some students might be able to attend class at home individually, which required help from their parents. Lack of involvement or poor home learning conditions can negatively impact student outcomes in hybrid learning settings due to distractions, lack of space, or parents who are unable to assist with learning. However, some parents might not be able to attend all the time, which struggles the students with special needs to attend class at home individually.

Engagement and motivation

Finally, maintaining high level of student engagement and motivation in hybrid learning can be challenging for students with special needs. Four studies that included ^[21]and ^[26]stated hybrid learning often requires a high level of self-motivation, and consistent interaction. However, hybrid learning might hinder this as students with special needs who attend online have limited interaction.

3.4. Implications

The study sheds light on various factors for success, merits, and barriers to hybrid learning in special education. They include Technological Infrastructure and Access, Teacher Familiarity with Technology, Personalized Learning Approaches, and Parental and Institutional Support for success. The advantages of hybrid learning in special education include flexibility and accessibility, technology enhancement in engagement, individual learning, and monitoring. However, challenges are the digital divide and accessibility issues, teacher preparedness and training, parental involvement and home learning conditions, home environment challenges, engagement, and motivation.

These implications guide future policies and strategies for more effective implementation of hybrid learning in special education.

3.4.1. Teacher training and professional development

The vital implementation of hybrid learning demands thorough training and professional development for teachers. It has been pointed out that many special education teachers lack the necessary digital competencies, thereby limiting their ability to facilitate hybrid learning successfully. Hence, there is a need for training initiatives that enhance digital literacy of teachers with specialized instructional strategies for hybrid learning environments ^[27]. It is critical to include the training and provide collaborative learning

opportunities for the educators. The collaborative approach allows the educators to share responsibilities to improve the learning environment ^[28]. This places the educators in a supportive environment which benefits the educators to be motivated with it. The educators would benefit from engaging in communities of practice where they can share experiences, challenges, and strategies related to hybrid learning ^[29]. Educators would then better refine the practices of implementation of hybrid learning in special education and enhance their effectiveness in inclusive classrooms. With this, the educators should be trained with different instructional strategies ^[30] and practical tools and resources ^[31] to cater to individual learning profiles. This allows the educators to support students with special needs in all-round way. Additionally, incorporating feedback mechanisms within these programs allows tracking the training progress of the educators ^[32]. This will allow the educators to better support the students with special needs in hybrid learning as knowing their own strength and weakness.

While its opportunities of the hybrid learning in promoting inclusive education, not all educators possess comprehensive training or extensive expertise in instructing students with special needs, thereby affecting their capacity to deliver effective support and instruction ^[33]. It is possible that a significant number of educators may lack the training to adequately support and instruct students with special needs in the hybrid learning environment. A significant number of educators may lack adequate training and education to proficiently instruct students with special needs, thus resulting in misconceptions and ineffective pedagogical approaches.

3.4.2. Support for improving digital literacy

Beyond teacher training, students with special needs must develop digital literacy skills to participate effectively in hybrid learning. However, studies indicate that many students with disabilities struggle with digital literacy, which affects their engagement and ability to navigate digital learning platforms ^[34]. Improving students' digital literacy can enhance their adaptability and confidence in using technology, thereby increasing engagement and learning outcomes ^[35,36].

To address this challenge, educational institutions should implement structured digital literacy programs tailored to students with special needs. These programs could include interactive workshops and hands-on learning experiences, focusing on solving real-world problems using technology ^[37-39]. Such an approach will not only improve digital literacy but also foster critical thinking and problem-solving skills, making students more independent learners in hybrid environments.

3.4.3. Incorporation of project-based learning

To make learning interesting and increase student motivation, project-based learning (PBL) should be part of every hybrid special education program. This approach actively engages students in meaningful projects based upon real-world issues, which fosters increased understanding and the development of critical thinking skills ^[40,41].

A major issue of concern in hybrid learning is the lack of engagement and motivation of students with special needs. The application of interactive hands-on learning experiences encourages active participation, group collaboration, and a sense of belonging among students. Such an environment allows PBL students to have real interactions with teachers and peers in both physical environments and virtual settings, thus bridging the divide present in between online teaching and nearby learning environment.

3.5. Policy recommendations

For hybrid learning to work in special education, the priority policies should mandate the provision of digital competency training for special educators to better assist students. Increased funding for digital

literacy programs is required to provide those with disabilities with assistive technologies and specialized training. National guidelines for hybrid special education will serve best practices along with assessment standards and personalized learning strategies. Stronger collaboration between policymakers, schools, and parents will also strengthen the inclusive and accessible learning environment. These issues must be addressed to enable hybrid learning to exist as a sustainable and equitable mode of enhancing opportunities for students with special needs.

4. Conclusion

This study conducted a systematic literature review that focuses on implementing hybrid learning in special education. Four databases were searched and nine articles were included as fully fulfilled the inclusion criteria (1) written in English, (2) within past five years (2015-2024), (3) known as journal, (4) open access/ full-text available, and (5) focuses on hybrid learning in special education. PRISMA 2020 with four stages were used as the data collection in this study. The findings revealed the success factors of implementing hybrid learning included Technological Infrastructure and Access, Teacher Familiarity with Technology, Personalized Learning Approaches and Parental and Institutional Support; while the advantages of hybrid learning in special education are Flexibility and Accessibility, Improved Engagement through Technology and Individualized Learning and Monitoring; and the challenges of implementing hybrid learning in special education are Digital Divide and Accessibility Issues, Teacher Preparedness and Training, Parental Involvement and Home Learning Conditions, Home Environment Challenges, and Engagement and Motivation. Implications are given as education institutions should provide teacher training and professional development; and incorporate Project-Based Learning into hybrid learning in special education to better support the students with special needs in hybrid learning.

Conflict of interest

The authors declare no conflict of interest.

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