

The Impact of Blended Learning on K-2 Education

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Abstract. Blended learning, characterised by integrating traditional face-to-face instruction with online educational resources, has gained significant attention in recent years as a promising approach to enhancing learning experiences across various academic levels. The current study presents a comprehensive review of blended learning methodologies tailored specifically for early childhood education, focusing on kindergarten through second grade (K-2) learners. It examines young learners' unique developmental characteristics and learning needs, considering how blended learning models can be effectively designed and implemented to optimise educational outcomes. Blended learning has been observed to possess more positive impacts while bearing in mind its flexibility and adaptability to meet the academic needs of diverse learners at their own pace. Therefore, the successful implementation of blended learning in K-2 settings requires careful consideration of the technological infrastructure available and teachers who are central to the success of blended learning.

Keywords: Blended learning; Face-to-learning; online learning; K-2 education; kindergarten.

INTRODUCTION

The 21st century marked an increase in E-learning with technological advancement; the lockdown due to COVID-19 placed a demand on E-learning as the primary education means. However, the increase in electronic learning has not displaced traditional face-to-face learning, thus ushering in a blended learning hybrid form. This hybrid learning has gained popularity worldwide as it is seen as an ideal form of incorporating e-learning into traditional face-to-face learning [1]. Authors [2] defined blended learning as an approach that fuses modern e-learning alongside conventional face-to-face learning with the advantage of removing the challenge of distance in education and ensuring flexibility, improving the education standard [2]. Authors [3] noted that this approach to schooling represents a paradigm shift in the orthodox form of education that was previously known, as it has aided in overcoming some of the challenges encountered in classrooms.

Despite blended learning gaining popularity within the last two decades, this learning approach has always existed. The approach has been known by other names, such as web-based instruction, hybrid learning, mediated learning, web-enhanced instruction, and web-assisted in-

struction [4]. Blending learning came into play at the dawn of the launch of the World Wide Web, which revolutionised the technological approach to every form of human living. Although, during the 1990s, this form of education was not known as blended learning, the term blended learning rose to prominence from the declaration of the president of Pennsylvania State University on the convergence of traditional face-to-face classroom-based teaching alongside computer-mediated teaching in 2002 [5]. This declaration sparks a blended learning approach trend across several educational institutions, most significantly, tertiary education. Although blended learning is readily implemented in tertiary institutions across several countries, limited studies have been conducted on the impact of blended learning in early child development, most specifically, those in the K-2 level of education, while bearing in mind that this class represents a foundational period in the education of children.

K-2 education typically refers to the early years of primary education, covering Kindergarten (K) through second grade. This phase is crucial for laying the foundation for a child's future academic success. In K-2 education, children typically learn basic literacy and numeracy skills and social and emotional development. The curriculum

often includes activities and lessons that are age-appropriate and designed to engage young learners in various subjects such as language arts, mathematics, science, social studies, and arts. Additionally, K-2 education focuses on fostering curiosity, creativity, critical thinking, and problem-solving skills to prepare students for their academic journey, which signifies the importance of this level of education in an individual's life. More so, the majority of learners within this category of education fall between the ages of 4 and 6 years, representing a period in the life of children that is always filled with exploration, development of interest and also a quest for independence in some aspect of their learning.

A major significance of blended learning as it pertains to foundational learning in K-2 learners is the flexibility that can be afforded to this learning approach to accommodate various learning categories irrespective of the learner's ability. The author [3] noted that blended learning could afford diverse learners with available choices, thus ensuring quality education to learners, notwithstanding their circumstances and limitations [6]. Authors [7] noted the significance of blended learning in alleviating the challenges associated with online or traditional face-to-face learning, which impacts all categories of learners.

Therefore, the current study dives into the impact of blended learning on K-2 Education, given that most studies about blended learning have targeted higher education. As such, less attention is placed on early education. The scope of this study will focus on the following: 1) The context of blended learning and K-2 education; 2) The challenges associated with the usage of only traditional face-to-face learning; 3) Current challenges that have hampered the usage of blended learning; 4) The impact of blended learning on K-2 education.

Literature review

Blended learning has received immense attention from scholars within the last two decades as it combines the traditional face-to-face approach and electronic/online learning. The author [3] noted the importance of this style of education as it revamps both the roles of the teacher and students in the learning process. He further said students would not solely depend on pencil use but greatly benefit from their digital tools and technology exposure. This advantage would significantly improve the knowledge of foundational learners (K-2) as it would harness their inquisi-

tiveness of the digital space and redirect their curiosity to (the direction) that would benefit the students.

The author [8] observed in his study of the significance of blended learning in education that this approach harnesses the advantages of both the traditional teaching method and E-learning, as well as overcoming the challenges associated with using just one of the teaching methods. Authors conducted the study [9]. The blended learning approach was applied in two K-12 international schools in Japan. Their research findings indicate that blended learning should be contextualised to align with the goal and mission of the school to improve academic performance. More so, they concluded that attention should be placed on teachers' training to ensure the successful implementation of blended learning.

Authors [10] carried out an in-depth review of the challenges of the online component of blended learning with their focus centred on students, teachers and educational institutions. They concluded that a lot of attention has been placed on the student component of blended learning while mostly ignoring other aspects, such as the teachers and educational institutions. However, the study noted that the major challenge confronting students is their inability to use technology as a means of instruction. At the same time, teachers are affected by their unwillingness and negative perception towards the use of technology. Finally, educational institutions battle the challenge of a lack of infrastructure or incorrect use of these facilities.

Authors [11] researched the impact of blended learning on improving undergraduate students' academic achievement. Their study sample consisted of 196 students split into two groups: the experimental and control groups. The experimental group was taught a concept using blended learning, while the control group was taught the same concept using the traditional teaching method. The result of their study indicated that the experimental group performed better than the control group in terms of academic achievement.

RESULTS AND DISCUSSION

Challenges of Traditional (face-to-face) learning. The issue of only one learning approach has ushered in blended learning as a learning approach that combines the advantages of face-to-

face and online learning. However, it is imperative to highlight the challenges that are associated with the use of one of the approaches to be able to appreciate the development and impact that has been made by blended learning.

Traditional learning represents a face-to-face interaction with the students, which usually involves memorising and reciting [2]. Authors [12] noted that this technique has a shortcoming of limiting pupils' problem-solving skills, their ability to think critically and their overall decision-making, thus leading to rather passive-based participation in learning, as against active participation. It is more problematic for young learners, as keeping them engaged and focused during extended periods of face-to-face learning can be challenging. Young children have shorter attention spans and may struggle to concentrate without breaks or varied activities. Engagement and participation may not be accessible without additional interactive or multimedia resources. Other challenges that affect the sole use of face-to-face learning for young learners in particular include:

Limited flexibility: Face-to-face teaching typically follows a fixed or rigid schedule and structure, with limited flexibility to adapt to changing circumstances or individual student needs, especially in an inclusive education setting, which would require meeting the needs of diverse learners, which at a young age could prove problematic. This form of individualised education would require the teacher to develop instructions tailored towards meeting not only the needs of this learner but also considering the learner's learning styles, places and interests [2]. In contrast, blended learning or online learning environments may offer more pacing, scheduling, and resource access flexibility, allowing for greater customisation and responsiveness to students' needs [13].

Limited Resources and Materials: Face-to-face teaching often relies on physical resources and materials, such as textbooks and notebooks. While these materials can be beneficial, they may also be limited in scope and variety, restricting the range of learning experiences available to students [2].

Less involvement of Parents: For children in their early foundational education, the role/guidance of their parents cannot be over-emphasised. Face-to-face teaching may limit parental involvement in their child's education, particularly for parents who may be unavailable to visit the

school or participate in classroom activities. Therefore, face-to-face learning limits the collaboration/partnership that can be formed between parents and teachers in the educational and developmental needs of the students, but this can prove challenging without additional avenues or platforms for communication and engagement. Overall, while face-to-face teaching remains a valuable and essential component of K-2 education, it is vital to recognise its limitations and explore complementary approaches, such as blended learning, that can enhance learning experiences and better meet the diverse needs of young learners.

The challenge of reliance on online instruction for K-2 Learners. Online instruction has emerged and gained popularity during the COVID-19 pandemic, which has created a situation that limits face-to-face interaction. This educational platform has been used in higher education but has not been actively used as the sole instruction for young K-2 learners, which cannot be far from some of its limitations that have hampered its usage. Some of the challenges that have limited the use of online learning for K-2 learners include:

Short attention duration of Young learners: Young children in K-2 have shorter attention spans and may struggle to stay engaged with online lessons or activities for extended periods, bearing in mind how easy it is for them to get distracted or bored. Sitting in front of a screen for too long can lead to restlessness and reduced focus, making it challenging for them to absorb and retain information effectively.

Developmental inappropriateness: Online teaching materials and activities may not always be developmentally appropriate for young learners. Complex interfaces, text-heavy content, or abstract concepts presented without concrete examples may be difficult for K-2 students to understand. Additionally, young children often learn best through hands-on, interactive experiences, which may be lacking in purely online environments.

Impact on social interaction: The development of young K-2 learners is not only dependent on the learning from their interaction with their teachers but also from interaction with their colleagues. Online teaching can limit opportunities for social interaction and peer collaboration, essential for young children's social and emotional development. Face-to-face interactions with

teachers and peers provide crucial opportunities for building communication skills, empathy, and cooperation, which may be lacking in an online-only setting.

Parental support: K-2 learners whose age group typically falls between 4 and 6 years require significant parental supervision and support to navigate online learning platforms and complete online activities independently. This reliance on parental assistance can be burdensome for families, particularly those with limited time, resources, or digital literacy skills.

Accessibility to Online Resources and Technical Challenges: Not all K-2 students have equal access to technology and reliable internet connectivity at home. Families from low-income backgrounds or rural areas may face barriers to accessing online learning resources, leading to disparities in educational opportunities and outcomes [10]. At the same time, those with access to this technology may be hampered by technical glitches and issues such as internet outages, software glitches, or hardware malfunctions, which can disrupt the learning process and cause frustration for students and teachers.

Impact from excessive screen exposure: Excessive screen time can have adverse effects on young children's eyesight, sleep patterns, and cognitive development. Prolonged screen exposure, particularly without adequate breaks or supervision, may contribute to eye strain, fatigue, and difficulty concentrating [14].

Blended Learning and K-2 Education. Blended learning in K-2 education is a teaching approach that integrates traditional face-to-face instruction with online or digital learning experiences [8]. In the context of early childhood education (Kindergarten through second grade), blended learning can be implemented in various ways to support young learners' development while leveraging technology appropriately. Blended learning has been implemented across K-12 education in developed nations. However, little attention has been paid to its usage in K-2 student learning. Some of the advantages of this new approach to learning have become obvious as it enables personalised learning tailored towards meeting the needs of diverse learners and makes it possible for different learning styles to be implemented simultaneously [13]. Digital tools and online platforms can provide inclusive learning experiences, allowing students to progress at their own pace and receive targeted support and enrichment ac-

tivities as needed. More so, the interactive and multimedia nature of blended learning can enhance student engagement, particularly for young learners who may tend to be drawn to technology [13]. Educational games, videos, and interactive activities can make learning more enjoyable and motivating, increasing participation and interest in academic subjects.

While also placing into consideration the high technological revolution that exists in the 21st century, with almost all age groups seizing the vast potential that is available in the use of technology, blended learning environments introduce young learners to technology from an early age, helping them develop digital literacy skills essential for success in the 21st century [15, 16]. Students learn to navigate online platforms, collaborate with peers using digital tools, and responsibly consume and create digital content, preparing them for future academic and professional endeavours. This collaboration also extends to the students and their parents in their children's educational journey, as blended learning can facilitate more excellent communication and collaboration between teachers and parents. Online platforms and communication tools allow parents to stay informed about their children's progress, access resources and materials to support learning at home and communicate with teachers more easily. The resources provided by blended learning may be more readily available and flexible than traditional face-to-face learning.

While we might have sieved through the benefits of using blended learning from a young education level, such as K-2, it is essential to note the disadvantages of blended learning to seek proper ways to overcome these challenges. For instance, the challenge of accessibility to technological tools is more common in poorer families than in wealthy ones, bearing in mind that not all students have equal access to technology and reliable internet connectivity outside of school [10]. Ensuring equitable access to devices and online resources is essential to prevent further exacerbating disparities in educational outcomes. Implementing blended learning effectively would depend on adequate training and support for teachers to effectively integrate technology into their instruction. Providing ongoing professional development opportunities and technical assistance ensures teachers feel confident and competent in using digital tools to enhance learning [10].

Diverse educational institutions have implemented different models of blended learning in schools. Some of these models include:

Rotational Model: In this model, students rotate between different learning stations, including teacher-led instruction, small group activities, independent practice, and computer-based learning activities [18]. For K-2 students, these stations might involve hands-on learning centres, storytelling, guided reading groups, and educational games or interactive activities on tablets or computers.

Flipped Classroom: While less common in early childhood education, a flipped classroom model can involve assigning short educational videos or interactive online lessons as homework, freeing up class time for hands-on activities, discussions, and individualised support from the teacher [15].

Station Rotation: Like the rotation model, students move through various stations throughout the classroom or learning space. These stations may include traditional learning activities facilitated by the teacher and technology-based activities such as interactive educational apps, digital storytelling, or virtual manipulatives [18].

Online learning Platforms: Schools can utilise online learning platforms specifically designed for early childhood education to provide personalised learning experiences for K-2 students. These platforms may offer adaptive learning games, digital storybooks, math and literacy activities, and progress-tracking tools to support personalised learning.

Hybrid Instruction: Teachers can integrate digital resources and tools into their daily lessons to enhance instruction and meet the diverse learning needs of their students. This might include using interactive whiteboards for whole-group instruction, educational apps for small-group activities, and digital portfolios or assessment tools to track student progress [19].

Impact of blended learning on K-2 learners.

The effect of blended learning in early childhood education is immense and on the increase. The increase could be attributed to the growing importance of blended learning, with the popularity of this form of learning increasing in the aftermath of the global pandemic that placed every member of society on lockdown. As such, many parents relied on online education during that period, and when the lockdown was over, it became easier for schools to integrate online learn-

ing alongside traditional face-to-face learning. Authors [20] noted the advantage of teaching children through technology, which would aid in their developing understanding of new words and the meaning of such words through additional screen time or online programs. However, for it to be successful, especially among preschool children, the content from educational media must first be attended to and comprehended. As such, traditional face-to-face learning represents where the content would first be learnt before adopting online options for further comprehension. The author [21] also sheds light on the impact of blended learning as it is intended to allow the student to obtain knowledge from the teacher while working on applying the concepts they are learning via online apps and educational websites. More so, it is essential to note that online education has always been part of children's educational journey from the point of the preschool period, with the highest views on YouTube being educational children rhymes, thus proving that blended learning has an immense impact on k-2 learners.

Authors [22] carried out a study on blended learning in K-12 learners, and they noted that it positively affected students' academic achievement in mathematics. They also said that children in elementary school performed better than those in secondary school, which shows the impact of blended learning on the educational achievement of K-2 learners. It is, therefore, essential to note that successful implementation of blended learning requires careful planning, continuous support for teachers, access to technology, and consideration of the developmental needs of young learners. Additionally, not all students may have equal access to technology and online resources, which can create equity concerns that need to be addressed. Overall, while blended learning has the potential to be impactful for K-2 learners, it's essential to approach its implementation thoughtfully and with consideration for the unique needs of young students.

CONCLUSIONS

It is essential to approach blended learning in early childhood education cautiously, ensuring that screen time is balanced with hands-on; developmentally appropriate learning experiences and technology are used to enhance learning rather than replace meaningful face-to-face interactions and hands-on activities. Additionally, teach-

ers play a crucial role in scaffolding young learners' digital literacy skills and providing guidance on responsible technology use from an early age [22]. Overall, when implemented thoughtfully and carefully considering the unique needs of

young learners, blended learning can positively impact K-2 education, fostering personalised inclusive learning experiences, increasing engagement, and preparing students for success in an increasingly digital world.

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