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Effectiveness of Hybrid Learning Approaches - A Case Study of a Few Selected Edtech Companies

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ABSTRACT

With the emergence of advanced technologies, education has undergone a significant transformation over the years. Edtech firms have played a crucial role in the development of online and digital learning platforms that have revolutionized the traditional education system. Hybrid learning approaches are some of the models that have been adopted by edtech firms to enhance the learning experience of students. This research paper aims to explore the effectiveness of Hybrid learning approaches implemented by edtech firms. The study will examine the benefits of using these models, their limitations, and the challenges faced by edtech firms in their implementation. The research will involve a comprehensive review of relevant literature, case studies of edtech firms that have implemented Hybrid learning, and a survey to gather the perspectives of students and educators on the effectiveness of these approaches.

Keywords: *Learning; Edutech; Technology; Education.*

1.0 Introduction

Hybrid learning approaches are alternative models of delivering education that combine traditional face-to-face instruction with online and digital learning experiences. These approaches have become increasingly popular in recent years, particularly with the rise of EdTech firms and the need for flexible and personalized learning experiences. Hybrid learning is a model that combines traditional classroom learning with online learning (Doering, 2006).

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In this approach, students attend classes in person and also participate in online learning activities, such as watching instructional videos, participating in online discussions, and completing online assignments. This model offers students the benefits of both face-to-face interaction and the flexibility of online learning.

The objectives of the research are:

1. To review relevant literature on Hybrid learning approaches, including their definitions, benefits, limitations, and effectiveness in enhancing student learning outcomes.
2. To analyze case studies of Edtech firms that have implemented Hybrid learning approaches and to identify the strategies they have used to enhance their effectiveness.
3. To investigate the perspectives of students and educators on the effectiveness of Hybrid learning approaches in enhancing student learning outcomes.
4. To identify the challenges faced by Edtech firms in implementing Hybrid learning approaches.
5. To provide recommendations for Edtech firms and educators on the effective implementation of Hybrid learning approaches.

When educators use the term "hybrid learning" to elucidate the notions of blended learning or dual-mode learning, they run the risk of creating confusion due to the absence of a precise definition for this concept (Lin, 2008). As outlined by (Linder, 2017), hybrid learning is characterized as a purposeful application of technology to substitute scheduled classroom sessions, with the aim of fostering an effective learning environment.

Based on the above discussion the benefits of hybrid learning are:

1. Flexibility: Hybrid learning approaches provide students with greater flexibility in terms of where, when, and how they learn. They can access online learning materials at their own pace and convenience, while also receiving the support and guidance of a teacher in a traditional classroom setting.
2. Personalization: Hybrid learning approaches allow for more personalized learning experiences that cater to individual student needs and preferences. This can result in higher levels of student engagement, motivation, and academic achievement.
3. Increased Access: Hybrid learning approaches can help to overcome barriers to education, such as geographical distance or physical disabilities, by providing access to educational resources and opportunities online.
4. Improved Teaching: Hybrid learning approaches can also provide opportunities for teachers to enhance their teaching practices and reach a wider range of learners through the use of technology (Kulkarni *et al.*, 2022).

The limitations of the hybrid learning are as:

1. Technological Challenges: Hybrid learning approaches rely heavily on technology, which can pose challenges for both students and teachers. Technical issues such as internet connectivity or software compatibility can impact the quality of learning experiences.
2. Lack of Interaction: Online learning can be isolating and may lack the social interaction and collaboration that traditional classroom environments provide. This can impact student motivation and engagement.
3. Student Accountability: Hybrid learning approaches require students to take a greater level of responsibility for their own learning, which may be challenging for some students.
4. Teacher Training: Teachers need to be trained to use technology effectively and adapt their teaching strategies to the Hybrid learning environment. This can require additional time and resources.

The effectiveness of Hybrid learning approaches by edtech firms in enhancing student learning outcomes has been the subject of several research studies. Overall, the research suggests that these approaches can be effective in improving student learning outcomes, but the results can vary depending on the specific implementation and context. For example, a meta-analysis conducted by the U.S. Department of Education (Means *et al.,* 2013) found that blended learning environments that incorporated online learning components had positive effects on student learning outcomes compared to traditional classroom.

Challenges faced by edtech firms in implementing hybrid learning:

1. Access to Technology: Hybrid learning approaches rely heavily on technology, which can pose a challenge for edtech firms that lack the necessary infrastructure and resources to provide students with the required technology.
2. Teacher Training: Edtech firms need to ensure that their teachers are adequately trained to use technology and adapt their teaching strategies to the Hybrid learning environment. This can require additional time and resources.
3. Quality of Online Learning Materials: The quality of online learning materials can have a significant impact on the effectiveness of Hybrid learning approaches. Edtech firms need to ensure that their online learning materials are of high quality and provide a level of interactivity and feedback that is equivalent to in-person instruction.
4. Student Engagement: Online learning can be isolating, and edtech firms need to ensure that their students remain engaged and motivated throughout the learning

process. This can be a challenge, especially for students who may be less motivated or self-directed.

5. Technical Challenges: Technical issues such as internet connectivity or software compatibility can impact the quality of learning experiences, and edtech firms need to ensure that they have the necessary support systems in place to address these issues when they arise.
6. Cost: Implementing Hybrid learning approaches can be costly, especially for edtech firms that are just starting out. Edtech firms need to ensure that they have a sustainable business model and can generate sufficient revenue to cover the costs associated with these approaches.

India has a growing edtech industry, with several companies offering Hybrid learning solutions. Here are some edtech firms in India that provide Hybrid learning:

1. Byju's: Byju's is one of India's leading edtech companies, offering a range of digital learning solutions, including live online classes, video lessons, and adaptive practice modules.
2. Vedantu: Vedantu is an online tutoring platform that offers live online classes and personalized learning solutions for students in grades 1-12.
3. Simplilearn: Simplilearn is an online learning platform that offers a range of courses and programs in areas such as digital marketing, data science, and cloud computing, with a blend of online self-paced learning and live online classes.
4. Toppr: Toppr is an online learning platform that offers personalized learning solutions for students in grades 5-12, with a blend of online self-paced learning and live online classes.
5. Upgrad: Upgrad is an online learning platform that offers professional development programs in areas such as data science, management, and technology, with a blend of online self-paced learning and live online classes.
6. Talentedge: Talentedge is an edtech firm that offers live online executive education programs in collaboration with top institutions and industry experts.
7. iNurture: iNurture is an edtech firm that offers industry-relevant undergraduate and postgraduate programs in collaboration with universities and industry partners, with a blend of online self-paced learning and live online classes.
8. Emeritus: Emeritus is an online learning platform that offers executive education programs in collaboration with top institutions such as MIT, Columbia, and INSEAD, with a blend of online self-paced learning and live online classes.
9. Meritnation: Meritnation is an online learning platform that offers personalized learning solutions for students in grades 1-12, with a blend of online self-paced learning and live online classes.

10. Adda247: Adda247 is an edtech firm that offers online coaching for competitive exams such as banking, SSC, and railway recruitment, with a blend of online self-paced learning and live online classes.

Case studies of edtech firms that have implemented Hybrid learning show that these approaches can be effective in improving learning outcomes for students. Here are some key takeaways from case studies of edtech firms that have implemented Hybrid learning:

1. Byju's: The company's blended learning approach combines self-paced learning with live online classes, allowing students to learn at their own pace while still receiving guidance and support from teachers. Case studies show that Byju's blended learning approach has been effective in improving learning outcomes for students, with students reporting increased engagement, motivation, and confidence in their ability to learn.
2. Vedantu: Case studies show that Vedantu's hybrid learning approach has been effective in improving learning outcomes for students, with students reporting increased engagement, motivation, and performance on assessments.
3. Simplilearn: Case studies show that Simplilearn's blended learning approach has been effective in improving learning outcomes for students, with students reporting increased knowledge, skills, and confidence in their ability to apply what they have learned.
4. Talentedge: Case studies show that Talentedge's hybrid learning approach has been effective in improving learning outcomes for students, with students reporting increased knowledge, skills, and confidence in their ability to apply what they have learned.
5. Upgrad: Case studies show that Upgrad's blended learning approach has been effective in improving learning outcomes for students, with students reporting increased knowledge, skills, and confidence in their ability to apply what they have learned.

2.0 Literature Review

The literature on Hybrid learning approaches has grown significantly in recent years, with many studies exploring their effectiveness in enhancing student learning outcomes. This literature review will focus on the key findings from recent research on the effectiveness of Hybrid learning approaches adopted by Edtech firms.

A study by (Singh *et al.*, 2022) found that hybrid learning approaches can improve student access and equity in education, particularly for students from disadvantaged backgrounds.

The current literature on hybrid learning approaches focuses on their long-term impact on student outcomes, as well as their potential for improving access and equity in education. A study by (Dziuban *et al.*, 2018) found that hybrid learning approaches can improve student outcomes, including higher levels of engagement and achievement.

A study by (Hodges *et al.,* 2020) found that hybrid learning approaches can be effective in improving student outcomes, particularly when combined with strong pedagogical practices. (Omari *et al.*, 2023) suggested that the effectiveness of Hybrid learning approaches depends on the quality of implementation, the teacher's ability to facilitate online and offline learning, and the willingness of both teachers and students to adapt to new technologies and teaching methods. A literature review by (Bhutoria, 2022) found that Edtech firms that adopt Hybrid learning approaches provide more personalized learning experiences, which can lead to increased student motivation and academic achievement. Another literature review by (Dontre, 2021) reported that Edtech platforms that incorporate blended learning approaches can improve student engagement, performance, and retention. Another study by (Hodges *et al.,* 2020) explored the impact of *pedagogical design* on student engagement in online learning. The authors found that active learning strategies, such as group work, problem-solving, and discussion, were effective in promoting student engagement. In addition, the authors noted that asynchronous learning, which allows students to learn at their own pace, was also associated with higher levels of engagement.

Hybrid learning environments offer several advantages over traditional classroom or online-only environments, they also present unique challenges that can impact *student success*. One challenge is the need for students to have access to reliable technology and internet connectivity, particularly for synchronous online activities (Hodges *et al*., 2020). One study conducted by (Gamage *et al.*, 2022) examined the effectiveness of using learning objectives in online education. The authors found that learning objectives can help to create a clear and coherent learning experience, and that they can also be used to promote student engagement. Specifically, students who were provided with clear learning objectives were found to be more engaged with the course content and more likely to complete the course. Teacher support has also been identified as a key factor in promoting student engagement and success. A study by (Park & Shea 2020) found that teacher feedback and communication were important predictors of student engagement in online learning. Specifically, students who received frequent

feedback from their teachers were more likely to be engaged with the course material and more likely to complete the course.

Infrastructure resources, such as access to technology and learning management systems, are also critical in promoting student engagement and success. A study by (Shukor *et al.*, 2015) found that access to technology and learning management systems was positively associated with student engagement in online learning. In addition, the authors noted that the availability of support services, such as technical support and tutoring, was also important in promoting student engagement. The concept of blended learning or hybrid learning, with its goal of reducing the physical distance between schools and students, has its roots in the previous century (Flynn-Wilson *et al.*, 2021). According to the definition provided by (Ferdig & Kennedy, 2014), hybrid learning involves the incorporation of both online and in-person learning within structured educational programs. (Koşar, 2016) defines hybrid learning as a configuration that combines various instructional modalities, delivery mediums, teaching approaches, and web-based technologies.

Numerous studies have explored hybrid or blended learning from various perspectives. For instance, a research project conducted by (Raes, 2022) with a sample of fifty university students revealed that those who pursued their education online achieved superior outcomes compared to their counterparts who exclusively experienced face-to-face instruction. Remarkably, the students who engaged in hybrid learning outperformed both of these groups in terms of their results. (Klimova & Kacetl,2015) undertook a research study with the objective of examining the elements and explanations of hybrid learning, utilizing an analytical research design. The findings pointed to hybrid learning being identified as one of the most efficacious educational strategies in the past decade, contributing to a more interactive learning environment. A significant contribution of the blended learning approach to education seems to be its role in promoting collaborative learning (Garrison & Vaughan, 2018).

3.0 Research Methodology

3.1 Research design

The present study is based on the primary data collected from the learners (UG & PG Students) from North Karnataka region. For this purpose, the pre-structured questionnaire was canvased among the respondents. The data was collected from 285 learners. The respondents were selected on random basis. To analyses and interpret the data various statistical tools are used like: Exploratory factor analysis, Regression model,

structural equation model, Confirmatory factor analysis, Validity Analysis, HTMT Ratio, hypothesis testing, Standardized regression (direct effect) and Mediation effect are used. IBM AMOS (Analysis of Moment Structures) is used in the analysis. AMOS is a statistical software package designed to perform structural equation modeling (SEM). SEM is a statistical method that allows researchers to test complex theoretical models that involve multiple dependent and independent variables.

3.2 Study Hypothesis

H1: Learning objectives have significant positive effect on perception of the models and framework of the Hybrid setup of the Edtech firms.

H2: Teaching objectives have significant positive effect on perception of the models and framework of the Hybrid setup of the Edtech firms.

H3: Pedagogical design have significant positive effect on perception of the models and framework of the Hybrid setup of the Edtech firms.

H4: Teachers support have significant positive effect on student engagement in the Hybrid setup of the Edtech firms.

H5: Infrastructure resources have significant positive effect on student engagement in the Hybrid setup of the Edtech firms.

H6: Models and framework effects student engagement significantly in the Hybrid setup of the Edtech firms.

H7: Models and framework and student engagement effects significantly to student success in the Hybrid setup of the Edtech firms.

The detailed theoretical model is presented in Figure 1.

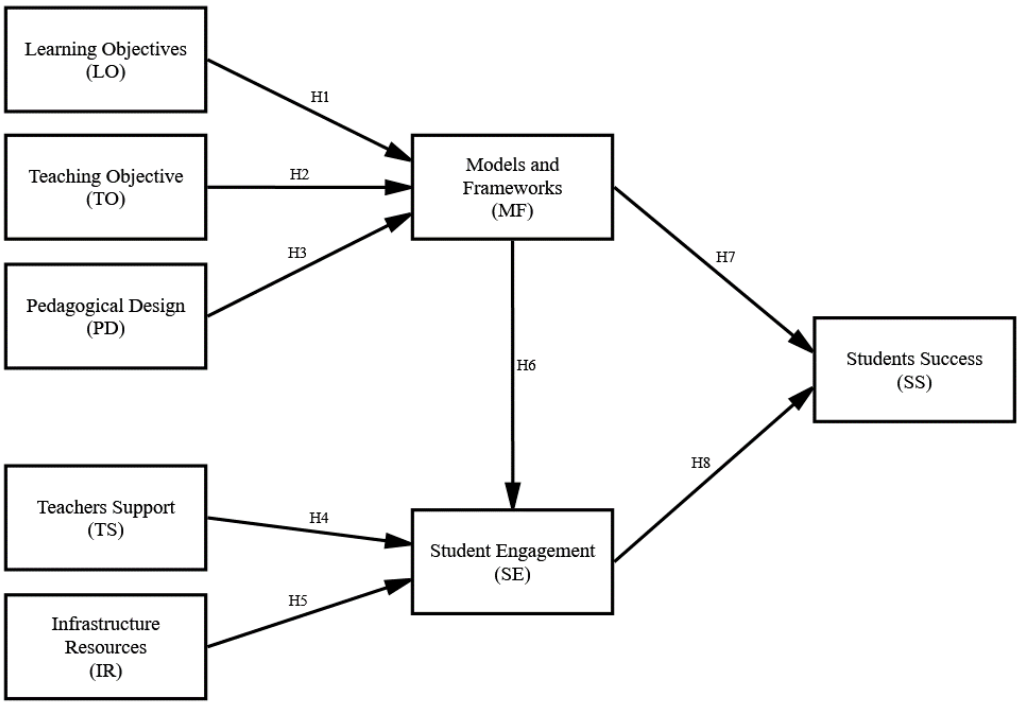
3.3 Mediation effect testing

H8: Learning objectives, teaching objectives and pedagogical design have significant positive effect on students' success through models and framework in a Hybrid setup of the Edtech firms. [(H1xH7) (H2xH7) (H3xH7)]

H9: Learning objectives, teaching objectives and pedagogical design have significant positive effect on students' success through models and framework and student engagement in a Hybrid setup of the Edtech firms. [(H1xH6xH8) (H2x H6xH8) (H3x H6xH8)]

H10: Teachers support, and infrastructure resources have significant positive effect on students' success through student engagement in a Hybrid setup of the Edtech firms. [(H4xH8) (H5xH8)]

Figure 1: Theoretical Model (Hybrid Edtech Model)



Source: Researchers own

4.0 Analysis and Discussion

Exploratory factor analysis: Kaiser-Meyer-Olkin (KMO) value references are 0.70 to 0.79 adequate, 0.80 to 0.89 meritorious, and 0.90 to 1.00 magnificent for standard interpretations. The Kaiser-Meyer-Olkin measure of sample adequacy in this study is 0.895 with a significance level less than 0.05. As a result, we believe the data is adequate and the factor analysis test can be analyzed. Using principal component analysis and Varimax rotation, 38 questions are factored. To create the eight factors that explain a total of 72.412% of the variation for the whole set of variables. Considering this, the KMO score of 0.895 and the Bartlett's Test of Sphericity result of less than 0.05 both suggest that the set of variables is sufficient. The eight factors derived based on the eigenvalues (>1) are as follows: All the factor loading scores of the items were greater than .680 and communalities were greater than .600. (Table 1)

Table 1: List of Factors and Their Abbreviations

S. No.	Constructs/factors	Abbr.
1	Learning Objectives	LO
2	Teaching Objective	TO
3	Pedagogical Design	PD
4	Teachers Support	TS
5	Infrastructure Resources	IR
6	Models and Frameworks	MF
7	Student Engagement	SE
8	Students Success	SS

Source: Researchers own.

A theoretical model is verified through SEM analysis, which should adhere to the goodness of fit principle (Byrne, 2010). According to the research of the academics, acceptance or rejection of the concept is supported by these investigations. Numerous fit indices, including the 2 test, the 2 to degree of freedom ratio, the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), the Root Mean Square Error of Approximation (RMSEA), the Non-Normed Fit Index (NNFI), the Incremental Fit Index (IFI), the Comparative Fit Index (CFI), and the Standardized Root Mean Square are used to base the studies (SRMR) (Table 2).

Table 2: SEM Goodness of Fit Measures

Model-Fit Criterion	Acceptable	Level Interpretation
Chi-square	Tabled $\chi 2$ value	Compares obtained $\chi 2$ value with tabled value for given df
Goodness-of-fit index (GFI)	0 (no fit) to 1 (perfect fit)	Value close to .90 or .95 reflect a good fit
Adjusted GFI	(AGFI) 0 (no fit) to 1 (perfect fit)	Value adjusted for df, with .90 or .95 a good model fit
Root-mean square residual (RMR)	Researcher defines level	Value less than .08 indicates a good model fit
Standardized RMR (SRMR)	< .05	Value less than .05 indicates a good model fit
Root-mean-square error of approximation (RMSEA)	.05 to .08	Value of .05 to .08 indicate close fit
Tucker–Lewis Index (TLI)	0 (no fit) to 1 (perfect fit)	Value close to .90 or .95 reflects a good model fit
Normed fit index (NFI)	0 (no fit) to 1 (perfect fit)	Value close to .90 or .95 reflects a good model fit

Source: A Beginner's Guide to Structural Equation Modeling, Randall E. Schumacker and Richard G. Lomax, Third edition, 2010.

Since the value of Chi-Square is compared to determine the statistical significance. However, the Chi-square statistic is extremely sensitive to sample size, which means that when the model comprises big samples, the Chi-Square statistic almost always rejects. Similar to the Chi-Square statistic, models with tiny samples may not be able to distinguish between models that fit the data well and those that don't. Owing to the Model Chi-limitations, Square's researchers have looked for alternate metrics to judge model fit. The relative/normed chi-square (2/df) is an illustration of a statistic that minimises the effect of sample size on the Model Chi-Square. The goodness of fit is also achieved when values of GFI and AGFI are over 0.8. For confirmatory factor analysis (CFA), a minimum of 100 samples is recommended. The suitable size of a sample to be between 30 and 500. Minimum requirements were, therefore, satisfied in the current study (Table 3).

Table 3: Overall Model Fit (CFA)

Model-Fit Criterion	Acceptable	Model values
Chi-square (χ2)		
Chi-square	Tabled χ2 value	1020.163 (p=0.000)
Degree of freedom (df)		637
Absolute Fit Measure		
Goodness-of-fit index (GFI)	0 (no fit) to 1 (perfect fit) (ideal 0.90)	0.860
Root-mean square residual (RMR)		0.097
Root-mean-square error of approximation (RMSEA)	<.05	0.042
90% confidence interval for RMSEA		(0.37, 0.47)
Standardized RMR (SRMR)	< .05	0.0504
Normed chi-square (CMIN/df)	< 2	1.602
Incremental Fit Indices		
Normed fit index (NFI)	0 (no fit) to 1 (perfect fit) (ideal 0.90)	0.879
Non-normed fit index Tucker–Lewis Index (TLI)	0 (no fit) to 1 (perfect fit) (ideal 0.90)	0.945
Comparative fit index (CFI)	0 (no fit) to 1 (perfect fit) (ideal 0.95)	0.950
Related fit index (RFI)	0 (no fit) to 1 (perfect fit) (ideal 0.90)	0.886
Parsimony Fit indices		
Adjusted goodness of fit index (AGFI)	(AGFI) 0 (no fit) to 1 (perfect fit) (ideal 0.90)	0.837

Source: Table structure from Hair at. al (2017)

All these measurements fall within the range that is considered to be a good match (Multivariate data analysis, 7e) by Hair *et al.*, (2017). These diagnostics indicate that the model offers a good all-around fit. All of the regression weights are significant and greater than 0.70 between the constructs. This indicates that the constructs are valid and have a logical relationship. (Table 4).

Table 4: Validity Analysis

	CR	AVE	SE	TS	MF	SS	IR	LO	PD	TO
SE	0.933	0.698	0.835							
TS	0.9	0.644	0.264***	0.803						
MF	0.887	0.611	0.200**	0.064	0.782					
SS	0.9	0.643	0.397***	0.246***	0.472***	0.802				
IR	0.894	0.629	0.427***	0.169**	0.188**	0.398***	0.793			
LO	0.875	0.636	0.148*	0.084	0.358***	0.342***	0.131*	0.797		
PD	0.861	0.608	0.148*	0.118†	0.434***	0.520***	0.251***	0.182**	0.779	
TO	0.827	0.544	0.076	0.076	0.394	0.369	0.168	0.231	0.204	0.737
Significance of Correlations: * p < 0.050, ** p < 0.010, *** p < 0.001										

Source: Data analysis (Gaskin et al., 2019, "Master Validity Tool", AMOS Plugin)

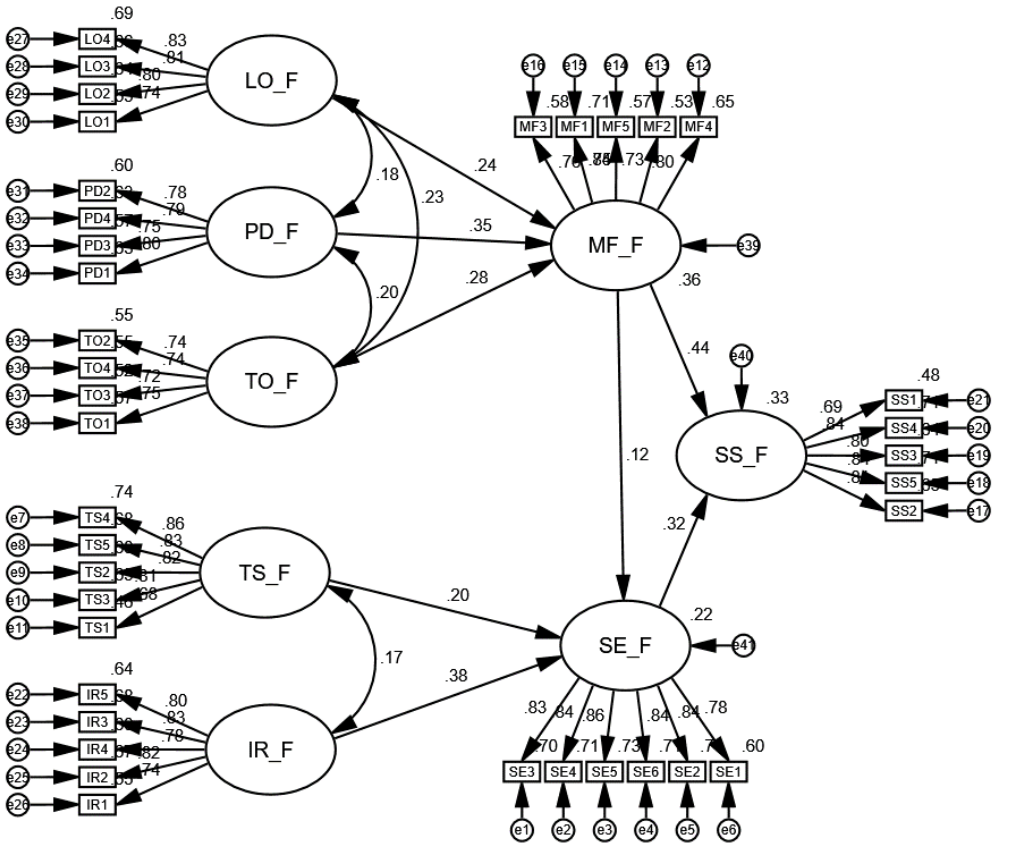
The average variance extracted, all AVE's are greater than 0.5 and all the CR values are greater than 0.8. According to Hair *at al.*, (2017) the AVE's estimates of factor should be greater than the corresponding intercorrelation squared correlation estimates, in this study the AVE's are greater than the corresponding intercorrelation squared correlation estimates, therefore, this test indicates that there is no problem with discriminant validity. All the values are less than 0.900 and hence the discriminant validity is achieved. (Table 5)

Table 5: HTMT Ratio

	SE	TS	MF	SS	IR	LO	PD	TO
SE								
TS	0.298							
MF	0.193	0.071						
SS	0.412	0.282	0.45					
IR	0.447	0.189	0.18	0.406				
LO	0.161	0.092	0.369	0.354	0.141			
PD	0.156	0.129	0.418	0.511	0.255	0.191		
TO	0.078	0.079	0.388	0.349	0.16	0.236	0.195	

Source: Data analysis (Gaskin et al., 2019, "Master Validity Tool", AMOS Plugin)

Figure 2: Path Diagram of the Theoretical Framework (Hypothesis Testing)



Source: Researchers own.

Table 6: Standardized Regression (Direct Effect)

Constructs			Estimates	P value	Hypothesis	Results
MF	<---	LO	0.241	***	H1	Accepted
MF	<---	PD	0.354	***	H2	Accepted
MF	<---	TO	0.278	***	H3	Accepted
SE	<---	TS	0.197	***	H4	Accepted
SE	<---	IR	0.380	***	H5	Accepted
SE	<---	MF	0.119	0.028	H6	Accepted
SS	<---	SE	0.320	***	H7	Accepted
SS	<---	MF	0.443	***	H7	Accepted
Note: all the effects are significant at the level of .05						

Source: Data analysis.

Table 7: Mediation Effect

Hypothesis	Paths	Estimate	Lower	Upper	P
H8	H1xH7	.104	.057	.164	.001
	H2xH7	.187	.103	.290	.001
	H3xH7	.174	.087	.282	.001
H9	H1xH6xH8	.016	.003	.037	.021
	H2x H6xH8	.015	.003	.036	.022
	H3x H6xH8	.043	.005	.089	.031
H10	H4xH8	.057	.024	.101	.001
	H5xH8	.126	.070	.202	.001
Note: all the effects are significant at the level of .05					

Source: Data analysis.

All the hypotheses are signifying that the paths are positive and significant. The above model proves that the dimensions identified are proper describing the cause for the students' success (Table 6 and Figure 2).

5.0 Discussion

The effectiveness of Hybrid learning approaches adopted by edtech firms is a topic of significant interest, as these approaches have become increasingly popular in recent years. Based on the available literature and case studies, the results and discussion of the effectiveness of these approaches can be summarized as follows:

- Improved Student Outcomes: Many studies and case studies have shown that Hybrid learning approaches have a positive impact on student outcomes. Students in Hybrid learning environments tend to perform better academically than those in traditional classroom settings. This may be due to the increased flexibility and personalization of learning that these approaches offer, as well as the ability to access a variety of resources and learning modalities.
- Increased Engagement: Hybrid learning approaches often lead to increased student engagement, as they provide students with more opportunities for active learning and interaction with course material., This can be particularly beneficial for students who may not thrive in traditional classroom settings.
- Improved Accessibility: Hybrid learning approaches can make education more accessible to a wider range of learners. By providing online components, students

who may not be able to attend traditional classes in-person, such as those with disabilities, can still participate and benefit from the course.

- Implementation Challenges: Despite the many benefits of Hybrid learning approaches, there are also challenges that edtech firms face when implementing them. These challenges include issues related to technology, training and support for both teachers and students, and the need to ensure that learning outcomes are consistent across different learning modalities.
- Customization and Personalization: One of the key advantages of Hybrid learning approaches is the ability to customize and personalize the learning experience for individual students. This can be achieved through the use of adaptive technologies and other tools that allow students to learn at their own pace and in ways that best suit their individual learning styles.

The specific types of Hybrid learning models being used by edtech firms, such as flipped classrooms, online tutorials, or adaptive learning.

- The types of edtech tools and resources being used to support Hybrid learning, such as learning management systems, digital content libraries, or adaptive technologies.
- The benefits and challenges associated with implementing Hybrid learning approaches, as well as the level of support and training provided to educators and students.
- The effectiveness of Hybrid learning approaches in terms of improving student outcomes, increasing engagement, and providing greater accessibility to education.
- The satisfaction of both educators and students with Hybrid learning approaches, as well as their willingness to continue using these approaches in the future.

The research on the effectiveness of Hybrid learning approaches adopted by edtech firms aims to explore the impact of these models on student learning outcomes. Several studies have found that Hybrid learning approaches can be effective in improving student engagement and academic achievement, particularly when supported by a range of edtech tools and resources. Overall, the research on the effectiveness of Hybrid learning approaches adopted by edtech firms highlights the potential benefits of these models, as well as the challenges that need to be addressed to ensure their success. Further research is needed to explore the long-term impact of these approaches on student learning outcomes, and to identify best practices for implementing and supporting Hybrid learning models in a range of educational settings.

The research on the effectiveness of Hybrid learning approaches adopted by edtech firms has several important implications for both edtech firms and educators. For edtech firms, the research highlights the importance of providing a range of effective and

engaging educational technologies to support Hybrid learning models. These tools should be designed with the specific needs of educators and students in mind, and should be flexible enough to support a range of teaching and learning approaches. In addition, edtech firms should focus on developing effective training and support programs for educators, to ensure that they are comfortable with the use of these technologies and can effectively integrate them into their teaching practice. This will be crucial in ensuring that Hybrid learning models are successfully implemented and can deliver positive outcomes for students. For educators, the research highlights the need for ongoing professional development to support the effective use of Hybrid learning models. This includes training on how to integrate edtech tools and resources into teaching practice, as well as ongoing support and guidance for students as they navigate these new approaches to learning.

6.0 Conclusion

Overall, the literature suggests that several key factors, including learning objectives, pedagogical design, teacher support, infrastructure resources, and models and frameworks, are important in promoting student engagement and success in education. By addressing these factors, educators can create a more engaging and effective learning model & frameworks and environment that leads to student achievement and student success. And also research suggests that hybrid learning approaches can be effective in improving student engagement, motivation, and academic performance. Furthermore, the adoption of these approaches by Edtech firms can provide personalized learning experiences that cater to individual student needs. However, challenges and limitations, such as lack of face-to-face interaction and technical issues, must be addressed to ensure the effectiveness of these approaches. Further research is needed to understand the effectiveness of these approaches in different contexts and for different types of learners.

There are several potential future research directions related to the effectiveness of Hybrid learning approaches adopted by edtech firms. Some of these directions include:

- Long-term impact: Most studies on the effectiveness of Hybrid learning approaches have focused on short-term outcomes. Future research could examine the long-term impact of these approaches on student learning outcomes, such as academic performance and retention rates.
- Teacher training: As noted earlier, effective teacher training is crucial for the successful implementation of Hybrid learning models. Future research could focus

on identifying effective approaches to training teachers to use edtech tools and resources, and exploring the impact of this training on student outcomes.

- Student motivation: While Hybrid learning approaches have the potential to increase student engagement and motivation, there may also be challenges associated with maintaining student motivation in these settings. Future research could explore strategies for addressing these challenges and ensuring that students remain engaged and motivated.
- Technology design: The design of educational technology tools and resources is crucial in supporting effective Hybrid learning. Future research could examine the impact of different design features on student outcomes and explore ways to improve the design of these tools and resources to better support student learning.

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