Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 5 Issue 2 (2025)

Evaluating the Impact of Blended Learning on Student Engagement and Performance in Management Education within the Framework of Education 4.0: An Empirical Study

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Abstract
Rapidly evolving patter and standard of education, inspired by "Fourth Industrial Revolution (Education 4.0)," has demanded the innovative approach of pedagogical to enhance learning outcomes of students. Blended learning is a combination of traditional method of face-to-face teaching and learning along with digital tools and technologies is adopted increasingly in management institutes to match with the capabilities required in digital economy. This study is conducted to evaluate the impact of blended learning on student engagement and their academic performance in management education program. Student engagement connects with the important educational outcomes that include academic achievements and satisfaction. The study has also highlighted the importance of matching the design of blended learning with principles of Education 4.0 including personalization, flexibility and integration of smart technologies. Digital and innovative technologies are used in Education 4.0; it also provides learning spaces for improving the educational quality. It imitates the transformation brought by the fourth industrial revolution with the aim to develop skills that are relevant to present and future technological scenario. A sample of 253 was collected from students and faculty of management college. The factors Evaluating the Impact of Blended Learning on Student Engagement and Performance in Management Education within the Framework of Education 4.0 are Curriculum Design and Flexibility, Student Engagement Strategies, Learning Outcomes and Academic Performance, and Technological Infrastructure & Accessibility.

Keywords: Blended learning, online learning, student performance and engagement, Education 4.0

Introduction
Enormous changes have been seen brought by how digital tools and technology and internet that are utilized in schools and colleges. With the assistance of digital tools and technologies, one of the new trends is blended learning, that is giving students access to informational material quickly and effectively. Majority of teachers in management colleges agree that the lessons need to be changed to match the latest world of technology and computers. There are three ways in which blended learning is proved to be good for students – it assists students in doing better in schools, giving them more chance to learn, and make general experience better. Majority of students are found to have better faster and consistent access to the internet. Due to this, schools, colleges as well as universities should push for the enhancement of more offline and online tools for learning and helping students. Digital devices are taking the place of face-to-face classroom system and have become the main method of communicating with students and working together. Teachers and colleges should look for new approaches which is fresh, and useful way of helping students in

making most of the new chances. Thus, the methods of teaching created for blended classroom system are good for well-being of students, their progress in learning, focus and desire to study and learn (Tabassum et al. 2024). In order to undertake innovative pedagogical approach, it is necessary to have an effective blended learning environment by using digital tools and technologies in teaching and learning system. Examining background and features of learners, design, features and learning results are essential elements for efficacy and help in designing effective environment of learning involving both face-to-face and online system. Many of the features of students and design of blended learning features mentioned in the study are essential elements for efficacy of blended learning. Blended learning is focused on increasing the level of knowledge of students to create analytical skills. Ability of students of accessing and evaluating source of knowledge critically is studied. It can go long way in the production of skills students who would be sufficiently innovative for satisfying the demand of employment by their innovativeness and creativity. Technology being less of a shoch for students give potentials for design of blended learning. Management colleges and other universities must keep emphasizing blended learning approach by installing LMS (learning management systems) along with strong internet connectivity enabling effective learning through the assistance of technology mainly in developing nations (Kintu, Zhu & Kagambe, 2017).

The dynamic nature of blended learning and different ways of blending human and digitally mediated teaching and learning system make to capability of measuring engagement under distinct conditions (Halverson & Graham, 2019). The advent of blended learning is because of the advantages it provides to facilitators and learners. Students under blended learning accessed the pedagogy to be more involving and comfortable. On an overall scale of satisfaction, blended learning system has been ranked as highly satisfying by students. Blended learning eventually results in better grades, high level of content knowledge, and enhanced understanding of the topic and other course material. The blended learning pedagogy sustains that students are the focus of teaching and learning. Tools of blended learning are flexible, that permits higher education institutes to adapt teaching activities to transforming demands of students as well as teachers (Nyathi, 2024). Student engagement can be considered as a level of attention, interest, curiosity, optimism and passion that is shown by students when they are learning or being taught. The level of student engagement determines to a large extent the motivational level and the degree of learning. Additionally, for core subjects of management, the curriculum must include courses that could manage flexibility, disruptions, and adaptability, social skills, empathy, happiness and ethics. Management education should be cross disciplinary, customized and focus on life skills and human skills. Specific skills of pedagogy must be imbibed in the instructors, as the pedagogy of instructors play a vital role in effective delivery of course in this mode than technology. Thus, instructors have to get updated constantly with the changing technology and technical knowledge as well as pedagogical approach for delivery the courses in the classroom as a lifelong learner. High use of blended teaching and learning system as the only option available has become the need for redefining the role of instructor. Social media and virtual classroom must be used to learn by students more broadly to ensure social distancing in case of pandemic situation (Gupta & Garg, 2025).

Literature Review

Industry 4.0 integrates digital technologies with industrial processes, in the same way, education 4.0 is the integration of technology, personalized trainings and learnings, and innovative methods of teaching that prepares students for the competitive future world. Education 4.0 integrates digital tools and technology into the system of education for improving the learning experiences and being out the best results. Industry 4.0 and education 4.0 are interrelated through using technology for providing communication and collaboration. Digital tools like online platform of learning, video

conferencing, and software collaboration Can be used for connecting students, teachers, and other staff members with each other along with industry partners in real time, irrespective of their location. Another method that Industry 4.0 and education 4.0 can be related us by using advanced digital tools and technologies for enhancement of learning experiences. Virtual and augmented reality, simulation of digital tools can be utilized for providing students with interact and immersive experience of learning helping them in better understanding of course material and applying concepts in real life. Digital technologies are used in Industry 4.0 for training employees and to improve their productivity. Learning is developed around them as to where, when and how to learn and track their learning performance is done through data-based personalization. Peers become highly substantial in their learning. They learn together and from each other also, while the instructors consider themselves as the facilitator (Akter, Sarker & Rion, 2024). Reactions towards collaboration is considered as an experience reflecting the nature of blended learning, where instructors should learn to experience blended learning from the point of view of students as organizing online collaboration is usually accepted as an effective method of increasing student engagement. Successful application of blended learning needs proper planning and consideration of multidimensional elements. Concentrating on evaluation and accountability for designing of "professional development initiatives (PDIs)" is the next necessary step to create efficient and effective PDIs. Blended learning has been considered as an effective approach that permits flexibility that also takes benefit of the best online tool of teaching that can be offered along with optimization of traditional physical lectures. Blended learning is a pedagogical approach that need innovation and thoughtful design of a blend of teaching and assessment (Garone et al. 2022).

In context of Education 4.0, some technologies have been mentioned more frequently and have also attracted the interest of scholars. Such technologies like artificial intelligence, augmented reality, virtual reality, virtual laboratories, blockchains, and robotics. These digital tools are utilized for teaching and learning, management tools for processes of learning, and administrative tools. Learning based on competency has been considered as a vital aspect in the development of education towards Education 4.0. It is a frequent topic, whether it is regarding understanding of competency-based learning, identification of competency for Industry 4.0 or finding out the ways, methods, or tools for development of such competencies mainly in management education. It is observed that blended learning, gamification, and e-learning are highly effective method of teaching in development of concept of education 4.0. Flexibility and autonomy are found to be crucial aspects that achieved effectively with the combination of digital learning with face-to-face teaching and learning methods. This combination is known as blended learning that has emerged as an interesting topic of research under education 4.0. Artificial Intelligence is usually mentioned as a vital player in innovation for Education 4.0. A significant impact is made by artificial intelligence on how students learn and how educational institutes manage the process of learning. Through its application, it can enhance academic results providing customized experience of learning (de Souza & Debs, 2024). Using learning environment enhanced by technology like practices of blended learning is observed to be effective in pandemic situations. Blended learning supports synchronous as well as asynchronous learning mode in online or face-to-face process of learning. Blended learning is distinct from online learning which is another type of digital teaching. Blended learning is applied in pre-planned chained or combination model. While, online learning is applied in off-campus and on-campus models. Blending of a course provides more accessibility to course content, effectiveness of pedagogical, effective course interaction and flexibility to instructors for improved student engagement. Outcome revealed that practices of blended learning enhance student performance and cognitive as well as social presence. However, study found moderate-level of student satisfaction. Moreover, it is also observed that there is a requirement to identify the elements and strategies that could enhance satisfaction level of students. In the model of digital education 4.0,

economic technology and information are observed to be essential for assistance, searching, analysing and exploring the information regarding learning. All such options of learning are accessible by using digital devices, internet and digital tools of learning and technologies. Therefore, blended learning is a feasible option with the combination of face-to-face models of learning with the model of e-learning. Traditional methods with e-learning model of learning provides opportunities of experimenting different styles of learning to enhance interest and performance of students (Kumar et al. 2021). Blended learning is found to be highly used in higher education. The commonness of blended learning program within higher education means there is very few studies are conducted with regard to use and impact of blended learning for primary as well as secondary students. Looking at the distinct expectations and motivation of adult as well as secondary students, lacking representation of young learners might mean that it is not easy to draw conclusions regarding potential influence of blended learning for students in education. The enhancement in result of course because of blended learning has been attributed partially to more strategic usage of classroom time. Rather than lecture based, problem based blended learning has made high level of student engagement. Online activities can be utilized for either reinforcing learning that is undertaken in the classroom, or they would work as a primary introduction to the topic before they are covered deeply. Under blended learning system, online communication is not restricted for peer discussion and must involve teachers. Students in higher education institutes are observed to be more self-motivated as they are able to choose their own course and can use independent learning style, while secondary learners might be less encouraged to get involved with the online factors because they are more aware with a classroom or model based on lectures. On the other hand, making online activities mandatory, or contributory towards final grades of students, might increase their engagement and submission as it offers high extrinsic motivation (Bowyer & Chamber, 2017).

The approach of blended learning is a combination of traditional classroom learning environment with digital learning system (Fahd, Miah & Ahmed, 2021). Education 4.0 and digital transformation is different from traditional system of education as they are enabled, supported and guided by digital technology that also include AI, data management, robots, ubiquitous technologies, cloud computing, and sustainable technology. Education 4.0 is dependent on digital strategies, digital security and proper infrastructure. Integration of core 4.0 elements of education with Industry 4.0 is starting of a model involving distinct stakeholders in the system of education is flexibility, and pedagogical approach. This collaboration considers the technology supporting learning, storage infrastructure, connectivity, institutional guidelines, organizational process, practice for the promotion of innovation, training of digital skills for teachers as well as students. The dynamics of Industry 4.0 in present and future shows a reality making changes imperious for Education 4.0. Models of education should include AI, data management, robots, cloud computing, and ubiquitous technologies facilitating along with many other things, reducing collateral damage post-pandemic period with complete technological transformation (Perez & Montoya, 2022). Blended learning system force to consider features of digital technology, more specifically ICT (information communication technologies). The world of education is dominated by information and economic to rest mainly on that asset. In the same way, world is also blended, it is so much blended that it is difficult to see individual factor. This blending increases and maintains access to student followers and produce better success rate for minority as well as non-minority students. Additionally, when the belief about effectiveness of learning environment is expressed by students, blended learning enjoys number one rank. However, a thorough analysis of main factors of view of students is considered as essential in learning, external and demographic elements make less impact on such decisions (Dziuban et al. 2018). A significant departure from conventional approach is marked by education 4.0 has been combined with advanced digital tools and technologies for establishment of flexible, interactivity and learner-centric environment. Educators are empowered with the

integration of artificial intelligence in this phase to customize the content and delivering education as per learning style, and preferences of an individual. Adaptive learning fueled by artificial intelligence adjust the content and activities dynamically based on the progress of students develop effective and efficient journey of teaching and learning. Influence of Education 4.0 extends beyond the classroom, pervading the whole ecosystem of education. From smart and digital classroom to online platform, the inclusion of artificial intelligence democratize access to good quality education, dismantle geographical hindrances, and cater to diversified requirement of teaching and learning (Rane, Choudhary & Rane, 2024).

Blended learning promotes improved skills of learning, active engagement in learning, and sense of self-regulated learning. The study shows that motivation of students is also enhanced by that lead to improved academic performance. Students towards blended learning. This aspect of social improvement has highlighted the positive part of collaborative strategies in learning. The easiness of engagement was also highlighted as the factor with high level of dissimilarity between two groups. In blended learning, students find it easy to get engaged to compare method with traditional method of learning. However, both of the groups deployed a sense of belongingness in their course. There are many advantages of blended learning like it provides students high level of flexibility and convenience, it also provides the benefit of face-to-face communication with teachers and peers. It also customizes the experience of learning that permit students to work independently and receive customized review. On the contrary, there are several challenges as well because blended learning can be difficult for teachers to apply that need a new skill set and approach for teaching. It might also require substantial investment in technology as well as training (Almekhlafi, Almeqdadi & Alsadi, 2025). Educational technology, when integrated effectively into the process of teaching and learning improve student engagement, enhance knowledge retention, and develop high order skills of thinking. However, the influence varies substantially that depend on technology type which is used, pedagogical approach and application context. Educational technology holds a promise to enhance learning results in higher education, but its success is dependent on thoughtful application, pedagogical alignment, and ongoing support for teachers. The mix of evidence from different studies shows that education supported by digital tools and technology making substantial contribution to high level of learning, enhance attitude towards learning, increased level of motivation and engagement, and improved performance on evaluation across educational settings that include higher education. Study further emphasizes on the influence of educational technology, students use digital tools and technologies showing high level of learning, enhanced attitude towards learning, and increased motivation and engagement. The findings shows that educational technologies improve performance across numerous settings of educations that also include higher education. The role of technology supported education in improving results of student's learning significantly, study found that students utilizing technology supported tools showing high level of learning, improved attitude towards learning, and increased motivation and engagement. These evidences highlight the potentiality of educational technology to make positive impact on learning results across various educational settings that include higher education (Akintayo et al., 2024). Two pedagogical approaches of blended learning and hybrid learning are combined very often, and sometime these are stretched with other approaches like flexible learning, flipped classroom, flipped classroom, and hyflex system of learning that are known as variant of blended learning. However, there is some confusion about blended system of teaching and learning as well as hybrid learning from the fact that these terms are used inter-changeably, talking about same practices, and referred to some distinct practices. The main dissimilarity according to some scholars, is blended system need physical appearance, and method of delivery for some topics is prescribed by the curriculum, whereas hybrid system leaves the decision to be made by the student if they want to attend the lecture physically or through online system. Transformation to blended system from traditional

system is probably unavoidable and needs to be managed properly. Educational management needs to be planned and administered efficiently to promote excellence, training to teachers must be provided to help them not just adapt to new digital tools and technologies but also to shift the system into a customized, and competency-based system to meet the diversified requirements of students (Antonic, Srok & Vretenar, 2024). E-learning or online learning was developed initially before blended learning giving response to a wide range of institutional requirements and learners that include customization of course and convenience. With the assistance of e-learning, students who live in remote areas are able to access the high quality of study material, which they are unable to access previously. Though, e-learning has made is possible for students who are busy in accessing the learning material at their own convenience, at any time or any place, it also provides increased level of accessibility that results in higher attrition rate of students. As a new way, blended learning system has emerged addressing the with the combination of benefits of independent digital learning giving the advantages of in-person teaching to keep students encouraged and involved throughout the course. The concept of blended learning is referred to the combination of two or more methods of teaching and learning (Jee & Connor, 2014).

The main element of educational and behavioral result is student engagement providing insights into motivational process of students. Integrating digital tools and technologies into the curriculum does not just provide teachers with the opportunity for amplifying the learning engagement but it also provides inquiry-based learning. As engagement of students is essential for effective learning, it is important to motivate students to involve in face-to-face as well as online system regularly for addressing the challenges associated with the effective student's engagement. It is confirmed in the study that face-to-face lectures and behavior towards blended learning makes positive influence on student engagement. Bhevaior and attitude towards blended learning works as a mediator between all the elements in blended learning (Yu et al. 2025). Understanding about the influence of blended learning system on student engagement is vital for instructors, educational institutes, as well as for policy makers. With the identification of effective strategies and practices, instructors can design and apply approaches of blended learning for enhancement of student engagement and to maximize the result of learning. Informed decisions can be made by policy makers about integration of digital tools and technologies in education system, while educational institutes can personalize their methods of teaching to adapt the transforming requirements and preferences of students. Blended learning system motivates students to participate and collaborate actively as that would create engaging and dynamic environment of learning. Flexibility and accessibility is provided by blended system of teaching and learning as it utilizes digital tools and resources that enable students to communicate with the course material at their own convenience and in their own method of learning (Joshi et al. 2023). Though student engagement is the promotion of learning results, what factor of blended learning designs make influence on effective student engagement and thus learning results, is not yet clarified. Therefore, it is not yet clear how to engage students with blended system of learning in effective way. Student engagement is the energy that are put by students in their learning. Engaged students put more energy to get engaged that results in better learning outcomes that would eventually nourish more engagement (Smolders & Prinsen, 2024). Blended learning, through out the years was given a different name like hybrid instruction, mediated learning, technology enhanced learning, web enhanced instructions, and web assisted teaching and learning. Blended learning environment are defined as a blend of face-to-face along with online system to utilize strength of both. Blended learning system is used in higher education for many years now, but there are not many studies on student engagement. Active learning is substantially higher and effective in problem-based blended learning system as compared to lecture-based learning system regardless of student individual difference (Delialioglu, 2012).

Blended system of teaching and learning is one such approach that have the goal to combine

traditional face-to-face learning with online classes supported by digital tools and technology. Significant traction is gained by the idea of blended learning over the last because because of its potential to assist students to be more involved with the procedure of education. Blended learning type is the augmented virtual model, and this type of model concentrate on online learning with less involvement of face-to-face teaching and learning. Under this system, majority of practices are carried out by virtual system, but students have to attend the lecture physically but at the selected time slot (Haque, 2024). Students engaged in online activities confirm that these activities are useful, flexible and convenient that help them in understanding, reinforcing and applying the knowledge. They also elaborated that to have a traditional and online system assisted them in understanding the content of course more effectively (Habib, 2018). Achievement in blended learning can be defined as the level of success that is attained by students when joining and completing a combination of online and tradition activities of learning. An important role is played by the methods of teaching on the academic achievement of students (Nayak, Barik & Bag, 2024).

Objective

To study the Impact of Blended Learning on Student Engagement and Performance in Management Education within the Framework of Education 4.0.

Methodology

A sample of 253 participants were collected from students and faculty of management college. The method of sampling was “Random sampling” for collection of data and examination was done by “Explanatory Factor Analysis” for results.

Findings

Table 1. demonstrates demographic details, it shows that 52.42% are Male, 48.22% are female. Looking at the age, 30.43% are between 20 to 25 years of age, 37.55% are between 25 to 30 years of age, and 32.02% are above 30 years of age. With regards to Type of colleges, 38.34% are from private colleges, 28.85% are from government colleges and 32.81% are from professional institutes.

Table 1. Respondent’s Details

Variables	Participants	Percentage
Gender		
Male	131	51.78%
Female	122	48.22%
Total	**253**	**100**
Ages in years		
20 to 25	77	30.43%
25 to 30	95	37.55%
Above 30	81	32.02%
Total	**253**	**100**
Types of colleges		
Private Colleges	97	38.34%

Government colleges	73	28.85%
Professional Institutes	83	32.81%
Total	**253**	**100**

"Factor Analysis"

"KMO and Bartlett's Test"

Table 2. "Kaiser-Meyer-Olkin Measure of Sampling Adequacy"

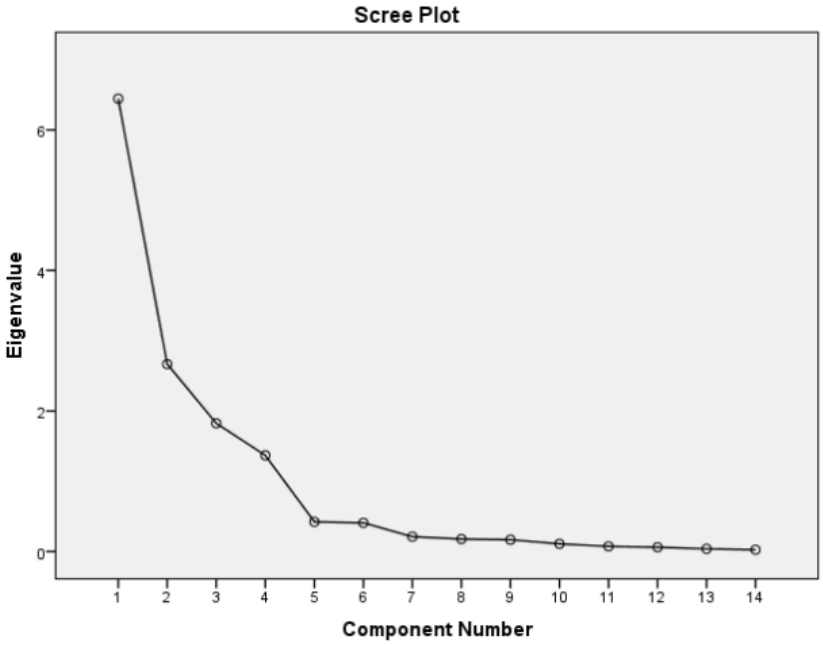
"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.764
"Bartlett's Test of Sphericity"	"Approx. Chi-Square"	4341.555
	df	91
	Significance	.000

"KMO and Bartlett's Test", value of KMO is .764 (Table 2).

Table 3. "Total Variance Explained"

"Component"	"Initial Eigenvalues"			"Rotation Sums of Squared Loadings"		
	"Total"	"% Of Variance"	"Cumulative %"	"Total"	"% Of Variance"	"Cumulative %"
1.	6.444	46.029	46.029	**3.744**	26.745	26.745
2.	2.666	19.044	65.073	**3.720**	26.572	53.317
3.	1.825	13.037	78.110	**2.549**	18.208	71.524
4.	1.369	9.775	87.885	**2.291**	16.361	**87.885**
5.	.423	3.019	90.904			
6.	.408	2.916	93.820			
7.	.211	1.508	95.328			
8.	.179	1.278	96.606			
9.	.168	1.197	97.803			
10.	.109	.780	98.583			
11.	.074	.525	99.108			
12.	.061	.435	99.543			
13.	.039	.276	99.819			
14.	.025	.181	100.000			

The four factors contribute towards explaining total 87.885% of variance. Variance explained by Curriculum Design and Flexibility is 26.745%, Curriculum Design and Flexibility is 26.572, Learning Outcomes and Academic Performance is 18.208%, and Technological Infrastructure & Accessibility is 16.361%. (Table 3).



Scree Plot

Table 4. "Rotated Component Matrix"

S. No.	Statements	Factor Loading	Factor Reliability
	Curriculum Design and Flexibility		**.955**
1.	Customization of content to suit diverse learning requirement and preferences	.942	
2.	Balance between face-to-face and online components of learning	.879	
3.	Alignment with real-world, industry relevant skills like case studies	.866	
4.	Using problem-based, experiential and collaborative learning	.852	
	Student Engagement Strategies		**.968**
1.	Interactivity of content like gamification, forums and quizzes	.961	
2.	Providing opportunities for peer collaboration and networking	.915	
3.	Motivation and self-regulating of students in managing their learning	.906	

4.	Using feedback mechanism and learning analytics	.893	
	Learning Outcomes and Academic Performance		**.890**
1.	Improving critical thinking, decision-making and problem-solving	.920	
2.	Knowledge retention and application in practical scenario	.838	
3.	Long-term employability skills	.828	
	Technological Infrastructure & Accessibility		**.823**
1.	Availability of devices and internet access	.929	
2.	Integrating AI, AR & VR and Data analytics	.920	
3.	Technical support and training for students and teachers	.638	

Factors of the study and its related variables

The first factor of the study is Curriculum Design and Flexibility, the variables it includes are Customization of content to suit diverse learning requirement and preferences, Balance between face-to-face and online components of learning, Alignment with real-world, industry relevant skills like case studies, and Using problem-based, experiential and collaborative learning. Student Engagement Strategies is the second factor, it includes variables like Interactivity of content like gamification, forums and quizzes, providing opportunities for peer collaboration and networking, Motivation and self-regulating of students in managing their learning, and Using feedback mechanism and learning analytics. Learning Outcomes and Academic Performance is the third factor, its variables are Improving critical thinking, decision-making and problem-solving, Knowledge retention and application in practical scenario, and Long-term employability skills. Last and fourth factor is Technological Infrastructure & Accessibility, it includes variables like Availability of devices and internet access, Integrating AI, AR & VR and Data analytics, and technical support and training for students and teachers.

Table 5. "Reliability Statistics"

"Cronbach's Alpha"	"Number of Items"
.898	14

Total reliability of 14 items that includes variables for Impact of Blended Learning on Student Engagement and Performance in Management Education within the Framework of Education 4.0 is 0.898 (Table 5).

"Multiple Regression"

Table 6. "Model Summary"

"Model"	"R"	"R Square"	"Adjusted R Square"	"Std. Error of the Estimate"
1	.939[a]	.881	.879	.22506
a. Predictors: (Constant), Curriculum Design and Flexibility, Student Engagement Strategies, Learning Outcomes and Academic Performance, and Technological Infrastructure & Accessibility				

Multiple regressions shows that model explained is 88% of the variance and R Square is .881. (Table 6).

Table 7. "ANOVA"

"Model"		"Sum of Squares"	"df"	"Mean Square"	"F"	"Sig."
1	Regression	93.114	4	23.278	459.565	.000[b]
	Residual	12.562	248	.051		
	Total	105.676	252			
a. Dependent Variable: Overall impact of Blended Learning on Student Engagement and Performance in Management Education						
b. Predictors: (Constant), Curriculum Design and Flexibility, Student Engagement Strategies, Learning Outcomes and Academic Performance, and Technological Infrastructure & Accessibility						

Table 8. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.158	.014		293.868	.000
Curriculum Design and Flexibility	.045	.014	.069	3.156	.002
Student Engagement Strategies	.062	.014	.096	4.405	.000
Learning Outcomes and Academic Performance	.042	.014	.064	2.946	.004
Technological Infrastructure & Accessibility	.602	.014	.929	42.429	.000
a. Dependent Variable: Overall impact of Blended Learning on Student Engagement and Performance in Management Education					

Table 8. shows that all the factors namely Curriculum Design and Flexibility, Student Engagement Strategies, Learning Outcomes and Academic Performance, and Technological Infrastructure & Accessibility are showing significant impact of Blended Learning on Student Engagement and Performance in Management Education. It is also found that highest impact is shown by Technological Infrastructure & Accessibility with beta value .929 followed by Student Engagement Strategies (.096), Curriculum Design and Flexibility (.069), and Learning Outcomes and Academic Performance (.064). (Table 8).

Conclusion

Integration of blended learning with paradigm of Education 4.0 has shown significant promise in enhancing both students' engagement and academic performance in management education. By combining the flexibility and accessibility of digital learning with interactivity and personal connection of face-to-face instructions, blended learning addresses diverse needs and preferences of students. This hybrid model motivates active participation, develops critical thinking enabling personalized learning paths. The findings bring forth some important reformations in the design of curriculum, pedagogy and evaluation system for imbibing the new age skills in the virtual teaching and learning environment of modern era. The millennial generation is usually termed as digital natives. It can also take the form of mentoring and educational counselling with the support of information and technology. Customized teaching and learning, a foundation of Education 4.0 make sure that students come across personalized experienced of education, thus improve engagement and comprehension. The study concludes that Curriculum Design and Flexibility, Student Engagement Strategies, Learning Outcomes and Academic Performance, and Technological Infrastructure & Accessibility are showing significant impact of Blended Learning on Student Engagement and Performance in Management Education.

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