

# A STUDY IN EVALUATING THE IMPACT OF DIGITAL CRM PRACTICES ON STUDENT ENGAGEMENT IN PRIMARY AND SECONDARY SCHOOLS FROM THE NAGPUR REGION

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## ABSTRACT

*In the current scenario, it is noted that both the student involvement and the technological interface are important components that have the potential to increase the overall satisfaction of students. Technology is currently the primary component of the contemporary educational system, which may also have a big impact on the level of happiness experienced by students. In addition, the engagement of students is essential to the continued satisfaction of students. Students that are engaged in their education are more likely to participate actively in their education, participate in conversations, and ask questions at the appropriate times. As a result of feeling more accountable for their education, students who are engaged in their studies report higher levels of satisfaction. As a result, educational institutions have to make technology accessible to their students and cultivate an atmosphere that encourages involvement and collaboration among students. Colleges may be able to enhance their overall academic performance and see an increase in student happiness by using this technique.*

**Keywords:** Digital CRM, Student Engagement, Regression Analysis.

## INTRODUCTION

In the early 1990s when the concept of customer relationship management (CRM) was first introduced in the fields of business and economics. Customer relationship management (CRM) is a system that maintains and evaluates customer data and interactions by using a variety of business processes, strategies, and technologies. Increasing the quality of interactions with customers can serve to promote the retention of customers and the development of money, both of which are tools that enable the retention of customers. The information about customers is compiled by CRM systems. There is a possibility that the solutions may provide staff members who interact directly with customers with exact information on the personal data, activity history, and preferences of customers. In order to define the requirements for the creation of commercial and research settings, academics and business organisations have been urged to apply this paradigm by the term customer relationship management (CRM). For the majority of people, customer relationship management (CRM) is now intimately connected with the presence and expansion of the Internet, which enables access to the internet all over the globe. The Internet, which has changed significantly in recent years, has a significant impact on individuals. Through the use of the Internet, businesses, particularly those in the field of higher education, may be able to monitor performance and undertake online operations. In addition to this, it may be able to personalise pricing, engage with clients, enhance services, and attract new customers (Libai, 2020).

The potential for new technology to improve the learning process has been emphasised throughout the course of this discussion. Scholars from all around the world have compiled a significant amount of information about the expanding use of technology in a variety of sectors, including academic administration, online course registration and attendance, and learning management systems. Among the advantages of current technology are the reduction of paperwork, the reduction of challenges linked to distance, and the improvement of instructional techniques. Because of this, educational institutions of higher learning are quickly adopting and integrating new technology. 2018 will see a significant rise in student participation and support for academic achievement thanks to technology. It is possible to improve both academic achievement and student participation (SE) by incorporating technology into the physical classroom setting. Students will engage in direct interaction with their classmates via various digital channels, and they will enhance their creative abilities by making use of various creative tools and technology. Through the use of several resources, active inquiry-based learning encourages more student participation (Hair, 2019). Through the use of technology into the curriculum, the classroom is transformed into a more student-centered environment, with instructors taking on the role of guides to assist students in achieving their instructional objectives. Both educators and students are of the opinion that the use of technology may contribute to an improvement in student satisfaction (Al-Azawei, 2020).

Students are better able to display interest in their classes and connect with them when they have access to modern technology and friendly interfaces. Students are able to better their educational process and allow them to comprehend difficult subjects by taking advantage of the many interactive and multimedia learning opportunities that are made available by this technology. Today's education is mostly based on technology, which has a significant impact on the level of happiness experienced by students (Ringle, 2020). The purpose of this article is to evaluate whether or not the use of technology in conjunction with SE leads to an increase in student satisfaction (SS). Researchers highlighted the positive relationship between SE and emotional well-being that is connected with it. It has been claimed that the use of instructional technology might be beneficial to SE in a number of different ways. In particular, new technologies such as the learning management system (LMS) have had a significant impact on social enterprise (SE) and have supplanted social networking systems (SNS). A rapid platform is provided by the LMS for both the instructors and the students. It is possible for professors to offer the Learning Management System (LMS) with lectures, assignments, videos, and other instructional materials in addition to supporting discussion activities. For the purpose of group projects and the uploading of videos of their assignments, students have access to an interactive forum (Migdadi, 2021).

## LITERATURE REVIEW

The design, functionality, and usability of software, hardware, and other digital instruments are all components that make up the technology interface. This interface demonstrate how consumers engage with various technologies. When it comes to education, the technology interface refers to the process of designing online course management systems, learning management systems, and other tools that are associated with educational technology. The level of participation, curiosity, and motivation that students exhibit in their educational pursuits is referred to as student engagement. Students who are engaged in their course of study are more likely to retain material, achieve academic success, and have a sense of contentment with their educational journey. Students who participate in class discussions, ask questions, and look for chances to learn are considered to be engaged learners (Kabirlyants, 2021).

An interface for technology, sometimes known as a TI, is the point of engagement between users and the technological systems or applications they consume. Furthermore, it

serves as the route through which clients are able to engage with technology in an efficient and successful manner. There are several components that make up TI, and they all have an impact on the availability of information technology. These components include cyber infrastructure, digital content, and facilities that have been upgraded by technology. It is difficult for contemporary educational institutions of higher learning to sustain enrolment numbers for new students in a variety of different ways. It is expected that the implementation of technological assistance would assist enrolment activities (Guerola-Navarro, 2021).

Maintaining order among students is a unique issue for educational institutions, despite the fact that a course is an effective way to recruit students. In order to be successful, retention efforts need to prioritise providing students with good student advising and outdoor activities, as well as orientation programmes that are both flexible and thorough. There is widespread consensus among educational institutions of higher learning that a comprehensive information system that is centred on students as educational consumers has the potential to boost enrolment and retention rates (Dibb, 2020). When it comes to information systems, the majority of students who attend higher education institutions have favourable perceptions. The encounters give rise to expectations about the ease with which technological tools may be accessed. One possibility is that students would want technology to be an integral part of the educational process, which would make it easier for them to acquire knowledge efficiently (Galaige, 2018). When seen from this perspective, EdCRM would be perceived by students, who are the customers of higher education institutions, as a tool for interactions that range from the admissions and registration process to the administration of final examinations. With a single customer relationship management system, it is anticipated that students would get services that are both efficient and effective, which will in turn assist programmes aimed at enrolment and retention. There are many different stakeholders involved in higher education institutions (HEIs), and they need to work together in order to serve their primary client, which is the students. In addition to their classroom instruction, university students are responsible for a variety of complicated administrative tasks, such as selecting departments, completing registration procedures, and purchasing textbooks (Dubey, 2019). It is possible that the efficiency of the EdCRM system will assist students in carrying out administrative activities such as online registration and payment, attendance confirmation, and score reporting (Khashab, 2022).

The infrastructure that exists in cyberspace is what makes it feasible for technological systems to work properly. The hardware, software, networks, and other technological components that contribute to the transmission and analysis of data and knowledge are all included in this statement. The dependability and accessibility of cyberspace are essential to the success of any technical endeavour on the internet. The term "cyber infrastructure" refers to the virtual and physical resources that are essential for the proper functioning of information technology systems. There is a direct correlation between a robust cyber infrastructure and the smooth functioning of information technology systems (Habibi, 2020).

## METHODOLOGY

In order to gather information on the ways in which digital learning media effect student academic attainment in Nagpur's primary and secondary schools, this study makes use of quantitative methodologies that are based on a survey. The capacity of quantitative approaches to offer a mechanism of validating research findings that is both objective and consistent contributes to its selection as the method of choice. Through the use of a survey methodology, data were collected from a bigger demographic in order to get a better understanding of the utilisation of digital media in primary and secondary school settings. The method of sample selection that was used was known as random sampling, and its purpose was to guarantee that

each and every pupil had an equal chance of getting chosen as a responsive individual. A questionnaire has been devised that includes questions on the frequency of the use of digital media in educational settings, the types of media that are utilised, and the views of students regarding the efficacy of media Tables 1-7.

### Analysis

Gender	Frequency	Percent
Male	88	61.10
Female	56	38.90
Age groups	Frequency	Percent
Less than 10 years	39	27.10
10 - 12 years	56	38.90
13 - 14 years	18	12.50
15 - 16 years	31	21.50
School	Frequency	Percent
Primary schools	94	65.30
Secondary schools	50	34.70
Type of School	Frequency	Percent
Private	86	59.70
Government	58	40.30
How long have you been using digital communication platforms provided by your school	Frequency	Percent
Less than 6 months	67	46.50
6 months - 1 year	35	24.30
1 - 2 years	23	16.00
More than 2 years	19	13.20
How often do you access the school CRM platform	Frequency	Percent
Daily	35	24.30
2 - 3 times per week	42	29.20
Weekly	29	20.10
Once a month	27	18.80
Rarely	11	7.60
Total	144	100.00

The demographic assessment of the data offers a comprehensive picture of the respondents who participated in the research project that evaluated the influence of digital CRM practices on student engagement in primary and secondary schools located in the Nagpur area. According to the gender breakdown of the individuals who participated in the survey, female students accounted for 38.90% (56 out of 144) of the total, while male students accounted for 61.10% (88 out of 144). This indicates that there is a certain degree of favouritism towards male involvement in the population under consideration. The age range of 10–12 years is the most often occurring segment, according to the analysis of the age groups of the respondents, which reveals that this age range accounts for 38.90% of the total respondents. Young children under the age of ten earned 27.10 percent, while those between the ages of 13

and 14 made 12.50 percent. There were 21.50 percent of the participants who were between the ages of 15 and 16 years old. This distribution reveals that the majority of participants had educational levels that lie somewhere between that of a middle-primary and early-secondary level. In terms of the respondents' educational backgrounds, 34.70 percent of them had attended secondary schools, while 65.30 percent had spent their time in elementary schools. This demonstrates that younger students had a more significant presence in the research. In terms of the kind of education received, students attending public schools made up 40.30 percent of the sample population, while students attending private schools made up 59.70 percent. Consequently, the survey reveals a greater number of students attending private institutions, which may indicate a higher level of acceptance or frequency of the use of digital customer relationship management systems inside private educational settings.

When looking at the length of time that students have used the digital communication tools that their schools have made available to them, it is found that around 46.50 percent of the respondents have used these tools for a period of time that is less than six months. Approximately 24.30% of them have used them for six months to one year, while 16.00% have used them for one to two years. Only 13.20% of them have experience that is more than two years. According to a significant number of the students who were questioned, this indicates that digital CRM practices are a relatively recent development that reflects the increasing utilisation of digital communication technology, which was most likely driven by the COVID-19 outbreak. Twenty-four point three percent of students reported using their customer relationship management (CRM) platform on a daily basis, while the highest amount, 29.20 percent, claimed to utilise it two to three times each week. Twenty-one percent of those who participated in the survey said that they used it on a weekly basis, while eighteen percent indicated that they used it on a regular basis. 7.60% of respondents, a minority, said that they use the CRM system only seldom. Despite the fact that a large number of students interact with the digital CRM system on a daily basis, this use trend reveals that a sizeable proportion of them only use it on an infrequent basis. This has the potential to impact the efficiency of the CRM strategies that are now in place as well as their degree of engagement.

<b>Correlations</b>	<b>Better Understanding of Concepts</b>	<b>Effective Student Orientation</b>	<b>Personalised Communication</b>	<b>Student Satisfaction</b>	<b>Student Engagement</b>
Better Understanding of Concepts	1	.846**	.928**	.830**	.823**
Effective Student Orientation	.846**	1	.890**	.830**	.865**
Personalised Communication	.928**	.890**	1	.853**	.867**
Student Satisfaction	.830**	.830**	.853**	1	.838**
Student Engagement	.823**	.865**	.867**	.838**	1

The study on correlations between the factors that were researched reveals that there are strong and substantial positive connections among all of the variables that were investigated. These variables include improved comprehension of ideas, successful student orientation, personalised communication, student satisfaction, and student involvement. There is a moderately high positive link between the measure "Better Understanding of Concepts" and the variables "Effective Student Orientation" ( $r = 0.846$ ), "Personalised Communication" ( $r = 0.9928$ ), "Student Satisfaction" ( $r = 0.830$ ), and "Student Engagement" ( $r = 0.823$ ). These

results indicate that successful orienting processes, increased levels of individualised communication, increased levels of happiness with their educational experiences, and increased levels of engagement are significantly associated with students' perceptions of having a better understanding of the topics that are being taught inside the classroom.

There is a significant amount of association between "Effective Student Orientation" ( $r = 0.890$ ), "Personalised Communication" ( $r = 0.890$ ), and "Student Satisfaction" ( $r = 0.865$ ). Consequently, this suggests that orientation activities that are well-managed and successful have a favourable impact on the perceptions that students have of personalised communication, overall satisfaction, and their readiness to interact more intimately with their learning environment. "Personalised Communication" has a link with other factors that is rather strong, as seen by correlations of 0.853 for Student Satisfaction and 0.867 for Student Engagement. The purpose of this research is to highlight how individualised communication that is suited to the specific requirements and preferences of students not only increases the level of pleasure that they experience but also significantly increases the amount of involvement that they have.

In addition, "Student Satisfaction" exhibits a strong positive correlation with "Student Engagement" ( $r = 0.838$ ), which highlights the concept that a higher level of satisfaction with the academic experience, which is driven by improved communication, comprehension, and orientation, is correlated with an increase in the amount of time spent participating in school activities. It is possible that developments in any one of these areas—such as improving conceptual clarity, orienting oneself, personalising communication, or raising satisfaction—are likely to concurrently increase student engagement. This is because all of the variables show strong positive correlations with one another, and all of these correlations are significant at the 0.01 level (shown by \*\*). Taking into account the fact that academic assistance, communication strategies, and student-centered methods all work together to provide a supportive environment that enhances active student engagement and involvement in the learning process, the strong linkages highlight the full scope of student involvement.

<b>ANOVAa</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>p value</b>
Regression	148.773	4	37.193	149.712	.000b
Residual	34.532	139	0.248		R sqd
Total	183.306	143			0.812
Coefficientsa	B	Std. Error	Beta	t	p value
(Constant)	0.249	0.168		1.485	0.14
Better Understanding of Concepts	0.001	0.088	0.001	0.011	0.99
Effective Student Orientation	0.358	0.085	0.357	4.225	0.00
Personalised Communication	0.302	0.112	0.322	2.693	0.01
Student Satisfaction	0.26	0.073	0.266	3.543	0.00
a Dependent Variable: Student Engagement					

As a result of the analysis of the ANOVA and regression data, a significant new understanding of the relationship between the dependent variable, Student Engagement, and the independent variables, which are Better Understanding of Concepts, Effective Student Orientation, Personalised Communication, and Student Satisfaction, has been gained. Because the regression model has a p-value of 0.000 and an F-value of 149.72, the analysis of variance table demonstrates that the model is statistically significant. When the p-value is less than 0.05,

the model is considered to be statistically significant, and when the independent variables are considered as a whole, they account for a significant fraction of the variation in student involvement. This is corroborated by the R-squared value of 0.812, which indicates that the combined influence of the four independent components evaluated in the research helps to explain about 81.2% of the variability in student engagement. This is a significant finding when considering the findings of the study. This shows that the chosen variables are significantly more important to understanding student involvement in this context, as seen by the high R-squared value, which indicates that the model fits the data very well at all. According to the coefficients table, the value of the constant, also known as the intercept, is 0.249. Additionally, the p-value of 0.14 is greater than 0.05, which indicates that the constant does not possess statistical significance on its own. Better Understanding of Concepts has a standardised coefficient that is insignificant (Beta = 0.001) and a p-value that is exceptionally high (0.99). This indicates that, when paired with the other variables, it does not have a statistically significant influence on student participation among the independent components. On the other hand, Effective Student Orientation demonstrates a p-value of 0.00, which is very significant, a high t-value of 4.225, and a standardised Beta of 0.357, which indicates that it has a significantly positive affect. The level of student participation is significantly increased by better orientation programmes.

The results of the study indicate that Personalised Communication has a positive and statistically significant affect, as shown by the Beta value of 0.322, the t-value of 2.699, and the p-value of 0.01. In light of this, it can be deduced that enhancing the customisation of communication significantly boosts the levels of student participation. In the same vein, the statistical analysis of student satisfaction reveals that a Beta value of 0.266, a t-value of 3.543, and a p-value of 0.00 all point to a greater level of participation. All of the other independent factors, including Effective Student Orientation, Personalised Communication, and Student Satisfaction, have a substantial and positive influence on student engagement. This is the case other than the fact that students have a better understanding of the concepts being taught. The findings indicate that digital customer relationship management (CRM) techniques that increase the efficiency of orientation, personalise communication, and encourage satisfaction are among the most important ways for enhancing student participation in primary and secondary schools located in the metropolitan area of Nagpur.

## Test of Hypothesis

Better Understanding of Concepts	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Strongly Disagree	5	1.00	0.000	0.000	1.00	1.00
Disagree	13	1.46	0.519	0.144	1.15	1.78
Neutral	18	2.50	0.786	0.185	2.11	2.89
Agree	39	4.67	0.478	0.076	4.51	4.82
Strongly Agree	69	4.49	0.504	0.061	4.37	4.61
Total	144	3.90	1.299	0.108	3.68	4.11
ANOVA	Sum of Squares	df	Mean Square	F	p value	
Between Groups	201.794	4	50.448	176.883	0.00	
Within Groups	39.644	139	0.285			
Total	241.438	143				

Through the examination of the data, crucial new views are provided about the ways in which students' perceptions of improved conceptual understanding impact the degree to which they are involved. According to the descriptive statistics, there is a discernible pattern that is connected to the level of agreement among the pupils. Students who "Strongly Disagree" with the assertion that they have a greater knowledge of ideas have a mean engagement score of 1.00, combined with a standard deviation of zero, which indicates that they are completely consistent in their responses and that they have a very low level of engagement. The students who "Disagree" have a much higher mean engagement score of 1.46 and a standard deviation of 0.519, indicating that there is limited diversity among these students. This is despite the fact that they have a low degree of involvement. The students who are classified as "Neutral" have a mean engagement score of 2.50 and a standard deviation of 0.786. This indicates that the students' levels of engagement are moderate, and there is a significant amount of variety in their perceptions within this group. Students who "Agree" that they have a better comprehension of themes demonstrate a notable increase; their average engagement level climbs to 4.67, coupled with a tiny standard deviation of 0.478, which indicates both high engagement and a strong agreement among the students. In addition, the students' standard deviation is minimal, which indicates that they are in consensus. Students who "Strongly Agree" have high levels of interest with low variance, as seen by their mean engagement score of 4.49 and their standard deviation of 0.504. Although there is a significant amount of individual variation among the students, the overall mean engagement score for the group is 3.90, with a standard deviation of 1.299. This indicates that students, on average, demonstrate a greater level of interest. The findings of the ANOVA provide further evidence that there are statistically significant changes in the level of student involvement based on the students' level of conceptual knowledge. Although the total number of squares inside groups is 39.644, the total number of squares between groups is 201.794. Along with a p-value of 0.00, the F-value is 176.883, which is much lower than the limit of 0.05 that is suggested. This provides a clear illustration of the major disparities in student participation that are based on the various degrees of conceptual understanding agreement. There is a significant correlation between the pupils' degree of engagement in their education and the manner in which they comprehend certain topics. When compared to individuals who lack confidence or clarity in their comprehension of the concepts, those who have great conceptual knowledge are often more active in the process. This result highlights the critical need for conceptual clarity in enhancing student engagement and demonstrates the necessity of primary and secondary schools giving top priority to ensuring that students have a strong grasp of the academic content they are studying in order to support more and more active participation in their learning.

Effective Student Orientation	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Strongly Disagree	5	2.00	0.000	0.000	2.00	2.00
Disagree	13	1.77	0.439	0.122	1.50	2.03
Neutral	18	3.00	0.000	0.000	3.00	3.00
Agree	39	4.72	0.456	0.073	4.57	4.87
Strongly Agree	69	4.78	0.415	0.050	4.68	4.88
Total	144	4.17	1.130	0.094	3.99	4.36
ANOVA	Sum of Squares	df	Mean Square	F	p value	
Between Groups	160.715	4	40.179	254.502	0.00	
Within Groups	21.944	139	0.158			
Total	182.66	143				

The examination of the findings highlights the extent to which successful student orientation influences an individual's level of involvement. According to the descriptive statistics, there is a clear and highly significant positive connection between the students' perceptions of the effectiveness of orientation and the degree to which they are engaged. Students who "Strongly Disagree" with the assertion that the student orientation was successful had a mean engagement score of 2.00, which was accompanied by a standard deviation of zero. This indicates that there was total consistency within this small cohort, as well as a relatively low degree of involvement. With a mean score of 1.77 and a standard deviation of 0.439, those who "Disagree" to the statement demonstrate a low degree of engagement but exhibit considerably larger variability than the other respondents. Students that received a score of "Neutral" on the efficacy of orientation had a mean engagement score of precisely 3.00, and there was no variance in their replies. This indicates that there is a consistent and moderate level of involvement among this group of students.

There has been a discernible rise in the number of students who "Agree" or "Strongly Agree" with the statement that the orientation is effective. With a minimal standard deviation of 0.456 and a high mean engagement score of 4.72, those students who marked themselves as "Agree" demonstrate that the majority of the students in this cohort demonstrate consistent high involvement overall. Students who "Strongly Agree" demonstrate a clearly high degree of involvement and solid consensus, as seen by their mean engagement score of 4.78 and their standard deviation score of 0.415. According to the standard deviation of 1.130, the average score for engagement among all students is 4.17; the majority of students demonstrate a high level of interest, but there is a significant amount of variation throughout the whole sample.

The findings of the analysis of variance (ANOVA) provide support for these conclusions by demonstrating that there are statistically significant variations in the levels of student participation across the various degrees of perceived orientation effectiveness. In spite of the fact that the sum of squares inside groups is much lower at 21.944, the sum of squares between groups is 160.715. In light of the fact that the observed variances have a p-value of 0.00 and an F-value of 254.502, it is evident that they are highly statistically significant. The degree to which students are able to accurately judge the efficacy of orientation sessions has a significant impact on the degree to which they participate in school activities. Those who believe the orientation to be beneficial and helpful exhibit much greater levels of involvement, while those who do not believe it to be effective exhibit significantly lower levels of interest. As a result of the fact that these programmes significantly enhance student engagement, participation, and overall educational experience, it is imperative that elementary and secondary schools make investments in orientation programmes that are well-organized, accessible to the public, and beneficial to their students.

Personalised Communication	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Strongly Disagree	5	2.00	0.000	0.000	2.00	2.00
Disagree	13	1.46	0.519	0.144	1.15	1.78
Neutral	18	3.17	0.383	0.090	2.98	3.36
Agree	39	4.90	0.307	0.049	4.80	5.00
Strongly Agree	69	4.88	0.323	0.039	4.81	4.96
Total	144	4.26	1.206	0.100	4.07	4.46
ANOVA	Sum of Squares	df	Mean Square	F	p value	
Between Groups	191.579	4	47.895	406.112	0.00	
Within Groups	16.393	139	0.118			

Total	207.972	143			
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When one looks at the facts about tailored communication and student engagement, one discovers a link that is both obvious and noteworthy. According to the descriptive data, the degree of personalised contact that students have with their teachers has a substantial impact on the amount of involvement they have. Students who "Strongly Disagree" on the presence of personalised communication had a mean engagement score of 2.00, with no variability (standard deviation of 0.000), suggesting absolute homogeneity within this tiny group at a very low level of involvement. This was the case because there was no variability in the engagement score. In a similar vein, persons who "Disagree" have an even lower mean engagement score of 1.46, followed by a tiny standard deviation of 0.519. This indicates a little increase in variability, but it still reflects a rather low level of involvement. There was a low degree of involvement among the students who were classed as "Neutral" regarding personalised communication, as shown by their mean engagement score of 3.17. Additionally, there was minimal diversity among the students, with a standard deviation. Students whose responses indicate that they "Agree" or "Strongly Agree" that targeted communication is provided in an effective manner demonstrate a greater level of involvement. Those who "Agree" have a mean engagement score of 4.90, while those who "Strongly Agree" have a mean score of 4.88. Both groups have minimal standard deviations (0.307 and 0.323, respectively), which demonstrates that both groups have a high level of consistency and a decent level of participation. A standard deviation of 1.206 indicates that the average involvement among all respondents is 4.26. This indicates that while the majority of students demonstrate a significant amount of interest, there is a significant amount of variance in the larger sample.

These findings are supported by the results of the analysis of variance (ANOVA), which show that the total of squares across groups was 191.579, which is significantly higher than the sum of squares within groups, which was 16.393. It may be concluded that the differences between the groups are statistically significant, as shown by the F-value of 406.112 and the p-value of 0.00. Students' levels of engagement are significantly and statistically impacted by the degree to which they are able to communicate in a personalised manner. In comparison to students who do not accept the possibility of customisation, those who see communication as being personalised to their own needs, interests, and concerns exhibit much higher levels of involvement in school activities. This result highlights the critical role that tailored communication plays in educational settings and suggests that primary and secondary schools should give the development of communication strategies that are more student-centered and responsive a top priority in order to improve overall learning outcomes and higher levels of engagement.

Student Satisfaction	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Strongly Disagree	5	1.00	0.000	0.000	1.00	1.00
Disagree	13	1.77	0.439	0.122	1.50	2.03
Neutral	18	3.17	0.383	0.090	2.98	3.36
Agree	39	4.46	0.682	0.109	4.24	4.68
Strongly Agree	69	4.57	0.499	0.060	4.45	4.69
Total	144	3.99	1.159	0.097	3.80	4.18
ANOVA	Sum of Squares	df	Mean Square	F	p value	
Between Groups	152.516	4	38.129	134.323	0.00	

Within Groups	39.457	139	0.284			
Total	191.972	143				

When it comes to student involvement, the findings indicate a significant and robust link between student satisfaction and student engagement. The descriptive data unequivocally demonstrate a pattern: the level of involvement among students increases in tandem with their level of happiness. Students who "Strongly Disagree" with their delight with digital CRM interactions had the lowest mean engagement score of 1.00, with no variability (standard deviation of 0.000), suggesting that discontent leads to persistently poor engagement. This was the case since there was no fluctuation in the scores. The "Disagree" responses suggest a low level of involvement, which is mirrored by a mean of 1.77 and a modest standard deviation of 0.439. This indicates that there is minimal volatility occurring despite the overall low levels of engagement.

Students who are classified as "Neutral" in terms of their level of satisfaction have a significant increase in the mean engagement score, which has reached 3.17. Additionally, the standard deviation is quite low, coming in at 0.383, which indicates that this cohort has a moderate level of involvement with a limited amount of fluctuation. A mean engagement value of 4.46 is shown by students who "Agree" with their level of satisfaction, while a mean score of 4.57 is displayed by students who "Strongly Agree" with the statement. With low standard deviations (0.682 for "Agree" and 0.499 for "Strongly Agree"), both groups demonstrate a high degree of consistency in their replies. This demonstrates that increased and consistent levels of participation obviously correspond with greater degrees of enjoyment. The total mean for all participants is 3.99, with a standard deviation of 1.159. This indicates that there is a general tendency towards increasing pleasure and involvement, but there is a considerable deal of diversity across individual encounters.

The ANOVA research provides evidence that these findings are accurate. While the F-value that was obtained was 134.323 and the p-value was 0.00, the sum of squares that was calculated between the groups was 152.516, which was significantly higher than the sum of squares that was computed within the groups, which was 39.457. These findings unequivocally demonstrate that there is statistical significance in the variations in student participation that exist across the various degrees of enjoyment. Satisfaction among students is a significant factor that plays a role in determining engagement levels. In educational institutions that place a high priority on enhancing student satisfaction through the implementation of digital customer relationship management (CRM) strategies—through enhanced support, responsiveness, personalised communication, and user-friendly interfaces—it is likely that there will be a discernible increase in the amount of interaction that students have with their academic environment. The relevance of routinely monitoring and improving the happiness of students as a strategic tool to achieve greater levels of student participation and performance is brought to light by these results.

## Discussion

In the context of the use of educational technology, this study highlights the importance of local perspectives, which is a factor that is sometimes neglected in research conducted on a worldwide scale. The usefulness of digital learning media may vary substantially depending on local factors such as educational culture, technical infrastructure, and instructors' skill in integrating technology into the classroom and learning process. This is despite the fact that digital learning media is extensively utilised in many countries. The use of technology to encourage participation may manifest itself in the form of online discussion forums, virtual simulations, interactive multimedia tools, and individualised learning environments. These

technological advancements contribute to the creation of a classroom environment that is more engaging and dynamic, which in turn motivates students to take an active role in their own education. A higher likelihood of learners feeling inspired and interested with the content of the course may lead to an increase in the level of satisfaction experienced by students (Habibi, 2022).

Additionally, technology has the potential to enhance cooperation and communication between teachers and students, which would ultimately lead to increased student satisfaction. Through the use of online discussion boards, students have the opportunity to pose questions, exchange ideas, and get feedback from both their instructors and their peers. Students are able to collaborate on projects and activities regardless of where they are physically located thanks to platforms that facilitate virtual communication. The actual implementation of the Education 4.0 idea is contingent upon the development and implementation of intelligent educational infrastructure (Peñarroja, 2019). The use of technology in educational settings has the potential to significantly boost student engagement and contentment via the use of methodologies such as active learning, group projects, and individualised teaching. In spite of this, it is essential to have a clear understanding that the success of technology-mediated interaction is contingent on how well it fits into the larger process of education and instruction.

## CONCLUSION

A reevaluation of the functions that technology serves is required in light of the findings of this research. It is necessary to establish a connection between technological innovation and social engagement in order to boost academic achievement, improve skill development, and encourage active participation. The mixed multifactorial scale for educational engagement has shown to have a high degree of dependability in terms of its qualities that are associated with academic engagement, reasons, values, learning contexts, emotional states, and management tactics. The incorporation of technology into learning that is both interactive and immersive is much required. Students are able to put their newly acquired abilities to work in practical scenarios because to the availability of real-time simulations and virtual experiences made possible by technology. This is especially important in industries such as business, engineering, and medicine, among others. This result is consistent with the findings of recent research, which indicate that the most significant challenge for decision-makers is their capacity to make use of technology, to assimilate the significance of the lessons learned from the COVID-19 pandemic, and to guarantee that the planet is adequately prepared for future viral outbreaks or other catastrophes. Technology ensures that students have persistent access to learning resources, makes it easier for students and teachers to communicate with one another, and assists students in developing a feeling of community and belonging, which ultimately results in an increase in their level of continuous enjoyment. As a whole, technology is a potent instrument that may significantly improve both the enjoyment and performance of students. Technology should not be utilised to replace effective education and human connection; rather, it should be used to promote student learning and participation.

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