

THE EFFECTIVENESS OF TECHNOLOGY IN ADVANCING DIVERSITY AND INCLUSION IN HIGHER EDUCATION

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Abstract

Introduction: A brief introduction has been added in this section which sets the scene of the research. The aim of the research and research objectives have been mentioned in this section as research questions and hypotheses have been formed according to that.

Literature Review: Relevant literature based on the study topic has been added in this section.

Methodology: Relevant research methods applied in the study have been mentioned in this section as a total of 10 survey questions have been added in this section. The data collection process has been selected as primary data collection and quantitative analysis has been conducted.

Findings and Analysis: IBM SPSS Statistics has been used for analyzing the collected information and conducting different tests.

Discussion: A detailed discussion of the findings from the previous chapter has been discussed in this section.

Conclusion: An overall conclusion to the study has been drawn in this section based on relative study findings and discussions.

Table of Contents

Introduction.....	2678
Literature Review.....	2679
Methodology	2682
Findings and Analysis.....	2683
Discussion	2689
Conclusion	2689
References.....	2689
Appendices.....	2691
Appendix 1: Survey Questions	2691

Introduction

Technology plays a crucial role in the regular life of people as it impacts positively on educational perspectives. The rise of COVID-19 has developed lockdown situations in different locations and restricted the movements of people (Ali, 2020). Therefore, technology has been implemented by major higher education sectors to enable learning for students. Similarly, technology has helped to improve diversity as well as inclusion in higher education settings in the present time. Appropriate technologies regarding learning offer a wide range of features to students especially those with disabilities (Ali, 2020). Higher education sectors are intended to deliver the educational content with different modes which are supported by several instructions depending upon individual learning styles, abilities as well and preferences.

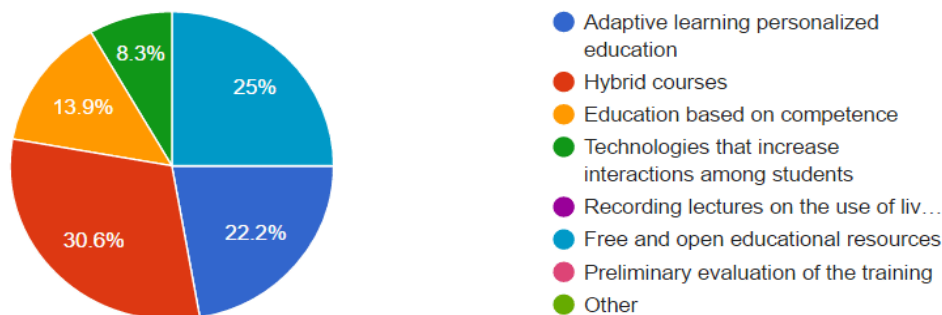


Figure 1: Role of Technology in Higher Education

(Source: Ali, 2020)

Technology increases diversity in higher education settings as it helps develop competency regarding the style of teaching by modifying behaviors and styles. The overall scientific outlook of teaching is changed by technology and as an example online classis could be mentioned (Blankenberger & Williams, 2020). Similarly, education technology is also beneficial for transferring knowledge regarding a particular study subject and helps in developing collaborative learning process development (Bond et al. 2020). Nowadays, technology is adopted in higher education to measure that educational objectives are met properly and existing gaps in the teaching processes are identified to develop an accurate solution. Teachers are more likely to use technologies to refine their teaching strategies and it helps in becoming more inclusive regarding different types of learning styles.

Therefore, a multicultural and multilingual classroom environment is developed which is beneficial for a better learning experience development. Technology helped in developing different communication platforms in education which is represented as ICT (Information and Communication Technology) (Castro, 2019). It is beneficial for implementing alternative communication methods in the classroom environment and helps in improving access to the pieces of information to the students. Different study materials are provided in a smart board system which is based on different software platforms and helps students access the information from anywhere (Dunn & Kennedy, 2019). Therefore, a multisensory experience is developed especially for students with disabilities as it improves inclusion in the classroom environment.

Research Aim

The current study aims to discuss the role of technology in advancing diversity and inclusion in higher education.

Research Objectives

- To understand how technology transformed the higher education system in the modern world
- To justify the roles of technology in developing diversity in higher education
- To define the roles of technology in inclusion in a higher educational setting
- To understand the potential difficulties associated with technology usage in higher education

Research Questions

RQ1: How has technology transformed the higher education system in the present world?

RQ2: What are some major roles of technology in developing diversity in higher education?

RQ3: How does technology help in inclusion in higher educational settings?

RQ4: What are the major issues associated with technology usage in higher education?

Research Hypotheses

H1: Technology plays a major role in developing higher educational perspectives in the modern world

H2: Technology helps in enhancing diversity and inclusion in a higher education setting

H3: There are major challenges associated with technology in the higher educational sectors.

Literature Review

Role of Technology in Transforming Higher Education System in the Present World

Technology played a significant role in transforming the education system in the present world. Teachers are now capable of developing more individualistic approaches for students which are developed to match the preferable learning styles of students. Technology implication helped in increased accessibility to different study resources. For instance, students can research related study materials from different online libraries to select their related study articles (Iglesias-Pradas et al. 2021). Moreover, it enabled the students to learn at their own pace as well as in their own time including their preferred environment. Similarly, students could access the study materials which are provided in the classroom environment. However, in a traditional classroom environment, these resources could not be accessed further; however, technology has changed this perspective forever.

Rapid implication of technology in higher education helped in increasing student engagement which is important for transforming higher education to become more interactive. Learners develop their individual lesson plans which helps students to develop unique learning styles and interests (Abad-Segura et al. 2020). Modern classroom environment is equipped with several digital devices which include different interactive whiteboards and are associated with online platforms such as Google Drive. In this situation, the information provided by the teachers is put into the cloud Google Drive platform by which students can access these pieces of information from anywhere and anytime (Radianti et al. 2020). Similarly, different virtual discussions regarding groupworks are provided by these platforms which is useful for retaining information properly and helps in increasing decision-making and problem-solving skills improvement for students.



Figure 2: Impact of Technology in Transforming Higher Education

(Source: Radianti et al. 2020)

Video conferencing processes are associated with technology implication in higher education as it improves collaboration in the classroom. Online learning processes are strengthened by this perspective and developed opportunities for students who do not have proper access to traditional resources in higher education. Similarly, students with disabilities gained major benefits from technology development as students in remote areas or underprivileged can access proper pieces of information through these technological perspectives. Along with these perspectives, there are also challenges for students regarding technology implication and usage in higher education (Chernikova et al. 2020). Moreover, technology provided wide possibilities for students and improved the current higher education system. Technology possesses the power to develop personalized learning and helps in building global connections between students by engaging them in a collaborative study platform. Students can harness these technological perspectives to improve their skills and prepare themselves for the digital-based world.

Development of Diversity in Higher Education due to Technology Development

Technology follows a specific set of activities in the classroom environment which are further tailored to the students. A diverse learner is different from normal learners as the individual could be associated with disabilities and may face differences in many levels of higher education. It can include race, gender, cultural background, language, and socio-economic background. Therefore, differences

such as dyslexia as well as ADHD could be associated with students, and not understanding the study topic may lead to developing stress among the students (Smith, 2020). Technology helps in this stage by providing different ways of teaching which is essential for self-esteem development and reduces negative attitudes towards learning in higher education settings.

A misconception was associated with the traditional classroom as lack of accessibility developed issues for students with disabilities. Whereas, technological integration in this stage helped to increase the accessibility of educational resources and materials. For instance, different no-cost solutions are developed by integrating technological perspectives such as Google Workspace and Chromebooks added to higher education systems (Serrano et al. 2019). Similarly, different assistive technologies are added in higher education which are beneficial for helping the students with ease of learning. These tools are easier to learn as not many resources are required for training and development. For instance, technology-integrated perspectives such as Text-to-Speech which is beneficial for students with visibility difficulties.



Figure 3: Different Modes of Learning Developed by Technology

(Source: Vlachopoulos & Makri, 2019)

Technology helped in improving diversity as students could access different modes such as reading mode or error detection and image-to-text converter. These perspectives are available for learners to improve their readability and legibility in higher education. Teachers can provide live classes to an entire classroom with students from different backgrounds by adding video conferencing methods (Vlachopoulos & Makri, 2019). Students often record these sessions for further reference as technology enables different digital simulations to prepare the lesson in an efficient manner and also tracks the progress of the students. Specific software platforms are implemented to give and receive assessments from the students in real time. Therefore, a diverse range of activities are associated with technology implications in higher education as it is improving the quality of education in the present world.

Impact of Technology on Inclusion Development in Higher Education Setting

Communication is a major perspective in higher education and the main intention of technology is to maintain a fair educational system. Similarly, the main focus of this perspective is that education must be available to all which is offered through several multisensory experiences, repetition as well as individual instructions (Corrêa et al. 2021). Alongside this, the overall competency of students is developed through technology which could be mentioned as a major perspective in inclusive growth in higher educational settings. The perspective of knowledge transfer is majorly associated with inclusion as it is important for the teacher to know the extent of students. Increasing recognition of inclusive education in the modern world is helping to develop more universal designs for learning strategies.

However, it is different in different countries in the world as the developing countries are still enhancing this perspective. Students with disabilities and from minority groups are mostly affected by this perspective as technology helps in presenting the study materials in favorable forms. For instance, presentations or a group curriculum for these students are provided which has intentions to enhance classroom engagement and motivation. The implication of communication technologies such as ICT helped in further innovation and inclusion in higher education. Differentiated learning processes improved the quality of education distribution in developing countries with less expenses. Previously, distance education developed accessibility issues and nowadays all the students from different backgrounds can access these educational resources.

Nowadays, inclusive education is viewed as a Human Right for people with disabilities. Moreover, technological development and implementation in higher education helped students with limited financial support and also helped in overcoming negative attitudes toward education. Countries are intended to add inclusive education as a part of legal recognition and it will be more effective to enhance the accessibility criterion properly (Bond et al. 2020). It showed that education qualification rates are increasing in the modern world and proper educational materials are acknowledged by people with disabilities. Personal development and knowledge development criteria are massively affected by inclusive education as it reduces barriers to education accessibility. Inclusive education massively influenced online learning methods which is beneficial for creating more future opportunities for students to learn.

Challenges and Difficulties Associated with Technology Usage in Higher Education

Despite developing major positive effects on higher education development, technology also has some major backlashes. Firstly, infrastructure and accessibility are necessary for integrating technological perspectives. The concept of the digital divide is disrupting education as the modern education system requires digital devices such as Macs, computers, laptops, or mobiles (Moriña, 2019). Developing countries such as India, Ghana, Nigeria, or Mauritius do not have these proper resources which could be mentioned as the major barrier to higher education (Neuwirth et al. 2021). Similarly, modern education requires an uninterrupted internet connection which may not be available in rural areas. Technical support is also not available in every location and it is developing accessibility issues for students.

Equal opportunities are not developed due to these issues and it is leading to decreasing digital literacy. Traditional classrooms are less associated with digital perspectives; however, in recent days digital literacy is a major perspective. Therefore, teachers often face difficulties using these technological perspectives and it is adequately challenging for teachers to incorporate technology-based teaching methods (Neuwirth et al. 2021). Flexibility is necessary in this stage as necessary training is required to handle these digital aspects and utilization of technological resources. Technology has affected all areas of education as it could lead to an overload of information and could develop distractions among students. For instance, social media and online gaming as well as other irrelevant websites may diversify students from their study in higher education. Teachers could guide the students to use their time properly and evaluate online sources to become more responsible technologically.

Finally, one of the major concerns regarding technology is data security and privacy. Education institutes often use end-to-end encryption methods for protecting crucial and sensitive information such as financials, passwords, and other aspects. However, a lack of proper approach in this stage may lead to major issues such as phishing or identity theft (Rapanta et al. 2021). However, not all higher education institutions use these measures which is a major vulnerability of technology. Application of adequate security measures is necessary in this stage which is useful for safeguarding important information in databases and protecting it with appropriate security measures to maintain a secure learning environment.

Methodology

Different research methods are used in this current study as the main intention of the study is to conduct a statistical analysis. A primary quantitative method is selected for the study which is based on primary pieces of data. The main intention for applying this method is to maintain accuracy

and understand the study topic clearly. Different graphs and tables are used in this research which is useful for studying the research topic numerically and helps in visually understanding the topic (Pandey & Pandey, 2021). A total of 55 participants are selected randomly as a detailed survey is conducted in the ongoing research. Furthermore, bias is completely removed from the research which is used for maintaining transparency and accuracy of the research study. A positivist research approach is selected and it helps in collecting primary information to support the quantitative data analysis process.

A total of 10 survey questions are added in this research which includes three demographic questions and the remaining seven are topic-related. A simple random sampling method is selected in this research where the survey participants are selected randomly. Moreover, the information collected for the research is based on the impacts of technology on diversity and inclusion development in higher education systems (Sileyew, 2019). Primary data collection is the focus of this study which is beneficial for maintaining the reliability, authenticity, and transparency of the study. Numerical knowledge development is associated with this research which is important to understand the current perspective of technology in higher education settings.

A statistical approach is conducted in this research as numerous tests are conducted to represent the study information numerically. IBM SPSS Statistics is used in this stage which helps in conducting tests such as 'Demographic Test' and 'Variable Test'. Furthermore, tests such as 'Regression Analysis', 'Correlation Test', and 'Descriptive Statistics' are conducted in this research. The main intention of using these tests is to understand the response rates and responses to the present study as well and these tests also define the relationships between the study variables (Al-Ababneh, 2020). Detailed testing of study hypotheses is conducted as it defines the validity of the current research by collecting and analyzing real-time information. These tests clearly defined the present scenario regarding technological impacts on higher education settings and helped to understand what issues are underlying this factor. Proper solutions could be developed after analyzing these results which could be implemented to overcome the issues.

Findings and Analysis

Demographic Analysis

Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 to 30	8	14.5	14.5	14.5
	31 to 40	30	54.5	54.5	69.1
	41 to 50	9	16.4	16.4	85.5
	Above 50	8	14.5	14.5	100.0
	Total	55	100.0	100.0	

Table 1: Age Group

(Source: SPSS)

Based on the participant's age group, Table 2 was created. Eight responders fall into the 20–30 age range, meaning that thirty participants fall into the 31–40 age range. Following that, participants in the age group of 41 to 50 completed nine frequencies of responses. Furthermore, eight contestants are older than 50.

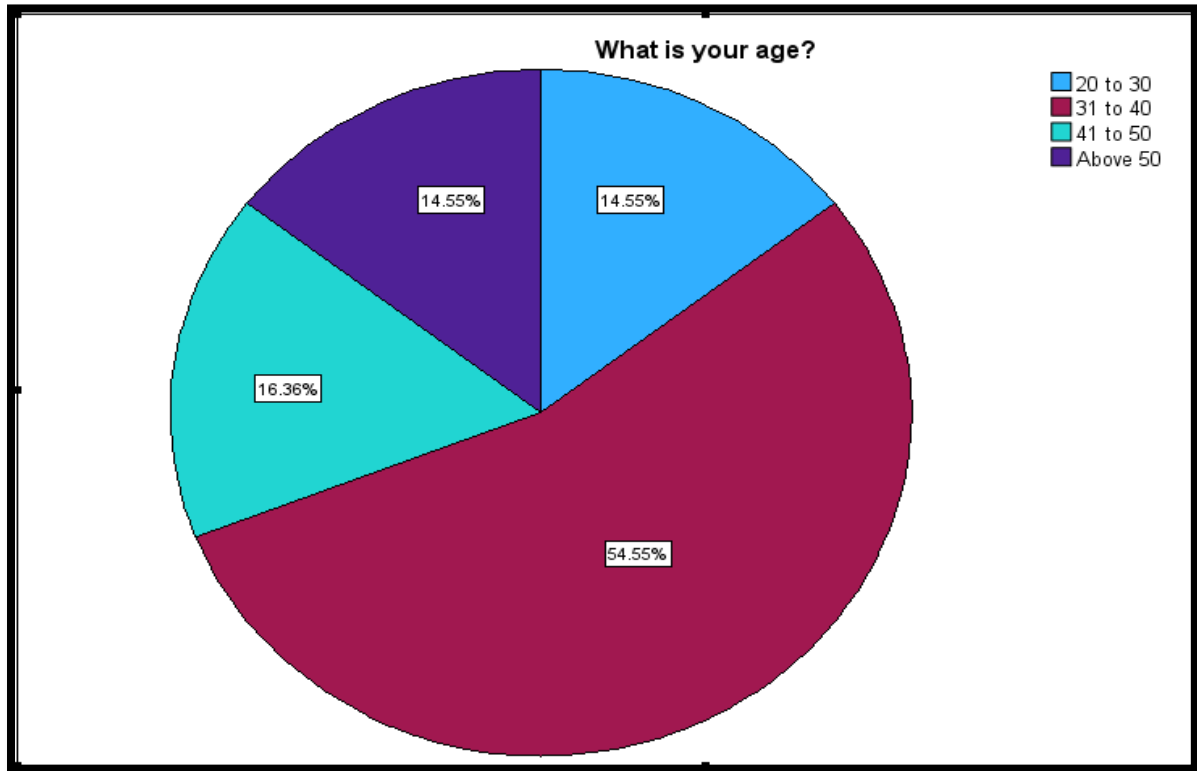


Figure 4: Age Group

(Source: SPSS)

As per this figure, the highest response rate is 54.5%, and this value is carried out by 31 to 40 age group of participants. Therefore, lowest response rate is 14.5%, and it is carried out by above 50 age group of respondents.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	27	49.1	49.1	49.1
	Male	19	34.5	34.5	83.6
	Prefer not to say	9	16.4	16.4	100.0
	Total	55	100.0	100.0	

Table 2: Gender

(Source: SPSS)

In this analysis, 27 female respondents are taken part. Therefore, 19 male participants are allowed to take part in this data collection process.

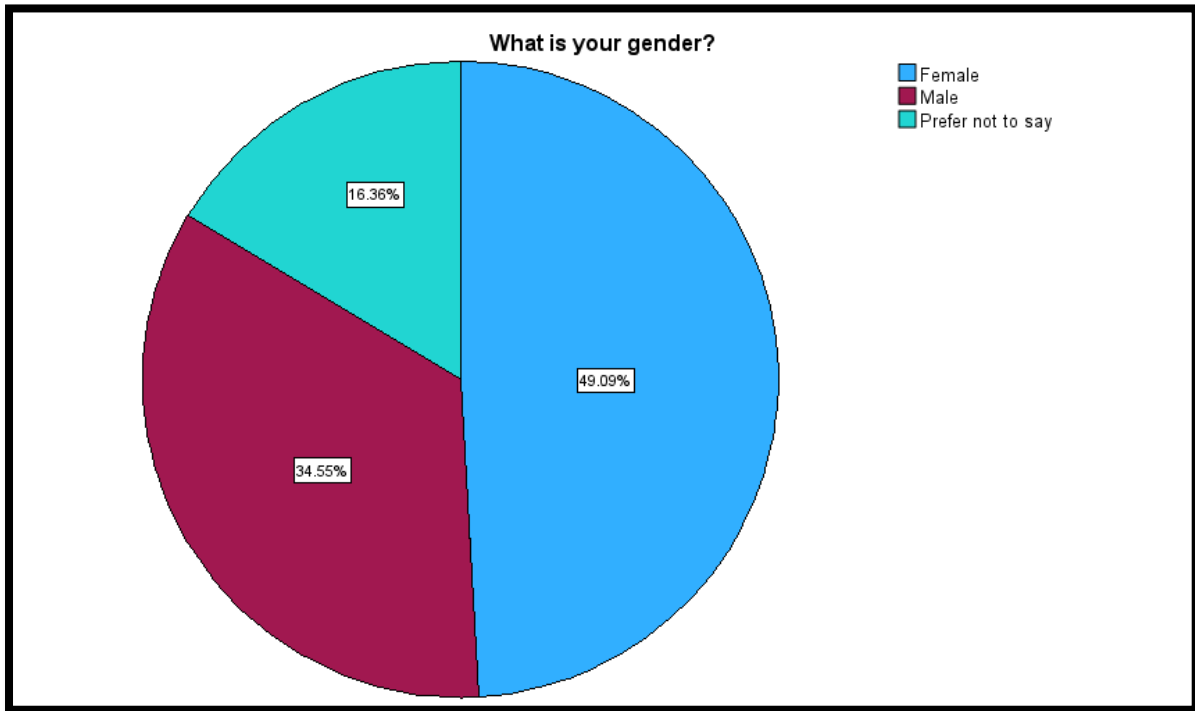


Figure 5: Gender

(Source: SPSS)

Figure 5 is based on the response rate of the respondents. Therefore, in this figure, the maximum response rate participants are belonging in female category. Therefore, their response rate is 49.1%.

Income

What is your income?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Above 60,000	8	14.5	14.5	14.5
	From 20,000 to 30,000	8	14.5	14.5	29.1
	From 31,000 to 45,000	8	14.5	14.5	43.6
	From 46,000 to 60,000	31	56.4	56.4	100.0
	Total	55	100.0	100.0	

Table 3: Income

(Source: SPSS)

The response rate of the people according to their income range is shown in Table 3. Eight participants fall into the income bracket of more than \$60,000. Subsequently, the frequency of response rate stands at 31, and the respondents fall within the income range of \$46,000 to \$60,000.

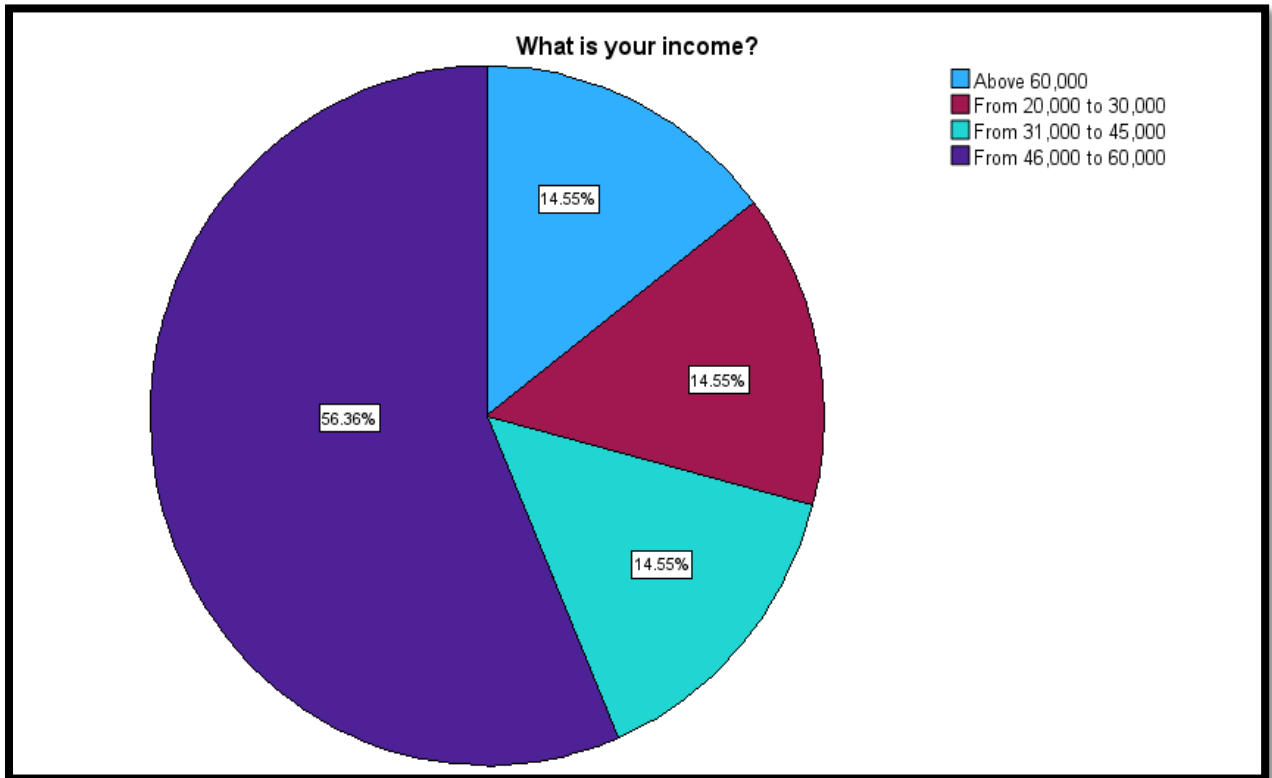


Figure 6: Income

(Source: SPSS)

According to this figure, the response rate of the respondents is collected. As per this table, the highest response rate of participants is belonged from 46,000 to 60,000 income rage.

Statistical Analysis
Descriptive Analysis

Descriptive Statistics								
	N	Minimum	Maximum	Mean		Std. Deviation	Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error
DV	55	3	5	4.38	.102	.757	-.814	.634
IV 1	55	3	5	4.38	.102	.757	-.814	.634
IV 2	55	3	5	4.38	.102	.757	-.814	.634
IV 3	55	3	5	4.38	.102	.757	-.814	.634
Valid N (listwise)	55							

Table 4: Descriptive analysis of different variables

(Source: IBM SPSS)

According to this descriptive statistics table, the “Mean value” of the variables is 4.38 respectively. Therefore, these variables also have .757 “standard deviation” values.

Hypothesis 1

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Durbin-Watson	
						F Change	df1	df2		Sig. F Change
1	.341 ^a	.117	.100	.417	.117	6.995	1	53	.011	3.270
a. Predictors: (Constant), DV										
b. Dependent Variable: IV 1										

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.217	1	1.217	6.995	.011 ^b
	Residual	9.220	53	.174		
	Total	10.436	54			

a. Dependent Variable: IV 1
 b. Predictors: (Constant), DV

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.293	.552		4.152	<.001
	DV	.341	.129	.341	2.645	.011

Table 5: Linear regression analysis

(Source: SPSS)

The initial hypothesis's regression analysis is presented in full in Table 5. The first variable's significance value is 0.011, according to the "model summary" table. Thus, the significant value of this variable is likewise 0.011 based on "The ANOVA" table. Consequently, 2.645 is this variable's "t value." Furthermore, it can be shown from this table that there is no correlation at all between these two factors.

Hypothesis 2

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Durbin-Watson	
						F Change	df1	df2		Sig. F Change
1	.819 ^a	.671	.665	.417	.671	107.963	1	53	<.001	3.270
a. Predictors: (Constant), DV										
b. Dependent Variable: IV 2										

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.780	1	18.780	107.963	<.001 ^b
	Residual	9.220	53	.174		
	Total	28.000	54			

a. Dependent Variable: IV 2
 b. Predictors: (Constant), DV

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.707	.552		-3.092	.003
	DV	1.341	.129	.819	10.391	<.001

Table 6: Linear regression analysis for Hypothesis 2

(Source: IBM SPSS)

As per table 6, the “R value” of the second component is .819. Therefore, “R square value” is .671. On the other hand, this hypothesis has 10.391 “t value”.

Hypothesis 3

Model Summary ^c										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change	Durbin-Watson
						F Change	df1	df2		
1	1.000 ^a	1.000	1.000	.000	1.000		1	53		. ^b

a. Predictors: (Constant), DV
 b. Not computed because there is no residual variance.
 c. Dependent Variable: IV 3

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.436	1	10.436	106.900	<0.001 ^b
	Residual	.000	53	.000		
	Total	10.436	54			

a. Dependent Variable: IV 3
 b. Predictors: (Constant), DV

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.000	.000		3.023	.004
	DV	1.000	.000	1.000	9.974	<0.001

Table 7: Linear regression analysis for Hypothesis 3

(Source: SPSS)

In this table, the “R value” is 1.00; therefore, this variable has 9.974 “t value”. With the aid of ANOVA table, the significance value of the variables is collected.

Correlation Test

		DV	IV 1	IV 2	IV 3
DV	Pearson Correlation	1	1.000**	1.000**	1.000**
	Sig. (2-tailed)		<.001	<.001	<.001
	N	55	55	55	55
IV 1	Pearson Correlation	1.000**	1	1.000**	1.000**
	Sig. (2-tailed)	<.001		<.001	<.001
	N	55	55	55	55
IV 2	Pearson Correlation	1.000**	1.000**	1	1.000**
	Sig. (2-tailed)	<.001	<.001		<.001
	N	55	55	55	55
IV 3	Pearson Correlation	1.000**	1.000**	1.000**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	55	55	55	55

Table 8: Correlation test between a dependent variable and independent variables

(Source: SPSS)

These two variables are co-related because, according to Table 8, the first variable's significance value is .001. Both the second and third variables have significance values of .001. Consequently, there is a positive correlation between these variables as well.

Discussion

From the data analysis, it can be said that technology plays a crucial role in the modern world's higher education system by enhancing diversity and inclusion. It can be said that technological implementation is beneficial for enhancing interactivity among students with different backgrounds. At the same time, increased accessibility to education helped to maintain a fair environment in higher education settings. The use of rapid learning technologies helped in capturing the interests of students and enhanced their learning processes (Rashid & Yadav, 2020). The instructors are able to find new ways of teaching as the traditional methods of teaching are not preferable for all students. Similarly, students can gain access to major educational tools that are suitable for their specific learning styles such as presentations or audiobooks. Technology is enhancing collaboration which is necessary for students to actively participate in several virtual simulations to engage with others in an online classroom.

A higher level of interaction between the students helps in grasp the study materials properly and keeps them interested in learning. Technological perspectives helped in diversity improvement by providing wide access to information to the students as students could dive into a web search instead of book knowledge. Adaptive learning platforms are mostly selected by teachers which are associated with video conferencing processes to distribute knowledge among students. It is also improving the knowledge development and knowledge-sharing perspectives among the students as the internet has become the main source of learning nowadays (Fidalgo et al. 2020). However, despite having major benefits to higher education, technology also has some major backlashes in education development. Many students, especially in developing countries, do not have proper access to digital devices and do not have any stable internet connection to cope with the latest changes. Similarly, educational institutes might face major financial burdens due to updating to the latest technologies as it requires additional costs.

Conclusion

From the above discussions, it can be concluded that technology is crucial in education development and improves diversity and inclusiveness. Technological implications helped students to leverage aspects such as the internet and changed the way of teaching and learning. Personalized learning experiences are developed through technological integration which are useful for bolstering their learning outcomes as well as self-confidence. It was not easy previously for students with learning difficulties to understand relevant study topics. However, thanks to technology, students can select their favorable learning process to gain knowledge regarding their study subject. It helped in growing their critical thinking abilities which are necessary to tackle real-world challenges and helps them to develop their professional skills. However, it is also noticed that technology has major backlashes such as accessibility options are not available in rural areas. Therefore, these perspectives are still required to be developed properly to engage with proper learning methods. Teachers use these technological perspectives to understand the strengths and weaknesses of students and further develop individualistic approaches to suit their learning styles. More personalized approaches help students to study at their own method and pace which helps them to understand their related education properly.

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Appendices

Appendix 1: Survey Questions

1. What is your age group?
 - 20 to 30
 - 31 to 40
 - 41 to 50
 - Above 50
2. What is your gender?
 - Male
 - Female
 - Prefer not to say
3. What is your income range?
 - Above 60,000
 - From 20,000 to 30,000
 - From 31,000-45,000
 - From 46,000 to 60,000
4. Technology helped in communication development and collaboration in higher educational setting
5. Different types of teaching styles are associated with new technological implication in higher education
6. The existing gaps in teaching process are identified through technological implication
7. Technology improved classroom diversity by adding new learning styles
8. Nowadays technology plays a crucial role in delivering study materials to disabled students
9. Classroom behaviours and styles are changed due to rapid implication of technology in higher education
10. Technology has impacted on accessibility by ensuring students get the study materials faster and from anywhere