Analyzing the Effect of Educational Technology on Sustainable Development & Education

Rajesh.E
Assistant Professor in Special Education, School of Behavioural Sciences
Mahatma Gandhi University, Priyadarsini Hills P.O
Kottayam, Kerala, India

Prof. (Dr.) Sagar H. Mohite
Director, Hospitality & Tourism Studies, MGM University , Institute of Hotel Management,
Aurangabad, Maharashtra, India

Dr. Kailas Aute
Vice- Principal & Associate Professor of English, Dept. of English,
Smt. CHM College, Ulhasnagar (Affiliated to University of Mumbai),
Dist. Thane, Maharashtra (India)

Ravi Kumar J S
Assistant Professor Department of Management Studies,
Ballari Institute of Technology and Management, Ballari

Dr M. Gomathi
Assistant Professor, PG and Research Department of Commerce,
Providence College for Women Coonoor, Nilgiris

Abstract

The study has been conducted to depict the influence of educational technology in maintaining the sustainable development of the educational sectors. India has been chosen to observe this impact which has been presented with evidence in this study. Moreover, the study has provided background on this digitalization of the education sector of India to analyse its scopes and opportunities. The study has found that the technological advancement of this country has grown by 15% of the CAGR within 2030. Furthermore, it can be said that the study has explored the significance of the effect of technology in the context of education. The study has chosen 20 respondents from educational backgrounds to conduct a survey in the data collection process. Therefore, SPSS has found the reliability of the study along with establishing the validity of the work. Finally, limitations of the study have been pointed out in the study to find out the gaps along with mentioning the future scope of this particular study.

Keywords: Educational technology, sustainable development, education with technology, EdTech, Digitalization, technological advancement.

Introduction

Sustainable development is considered to be an important concept in education that will be explored in this study. The study will discover the significance of having sustainable development through educational technology. The impacts of educational technology are wide, and the study will have an in-depth analysis of its influences. Moreover, different factors such as supportive structures, economic conditions, and other respective components have been identified to be discussed in this study. The study will analyse the

collected data through a primary method and establish its reliability in its respective field.

Research objectives

Research objectives are important to be formed as they help in developing a study and direct it in a specific way. Specific data and information can also be gathered by creating objectives and questions that help in fulfilling the purpose of the study.

The research questions of the study have been mentioned below.

RO1: To analyse the impact of educational technology on sustainable development in education.

RO2: To identify supportive structures in order to have sustainable development in the education system.

RO3: To evaluate the economic viability of the educational institutions for having sustainable development.

RO4: To conduct primary research for collecting data on the sustainable development in education.

The research questions of the study have been pointed out below.

RQ1: What are the impacts of educational technology on sustainable development and education?

RQ2: Which are the supportive structures for having sustainable development?

RQ3: How does economic viability help in gaining sustainable development in education?

RQ4: How has the primary research helped in collecting data in this study?

The hypotheses of the study are demonstrated below.

H0: There is no relationship between educational technology and sustainable development and education.

H1: There is a strong relationship between educational technology and sustainable development and education.

Background

Sustainable development goals can be achieved through education which plays a major role in changing the behaviour of people positively. In this case, technology comes to aid in developing the education system by implementing technological devices and other sources.
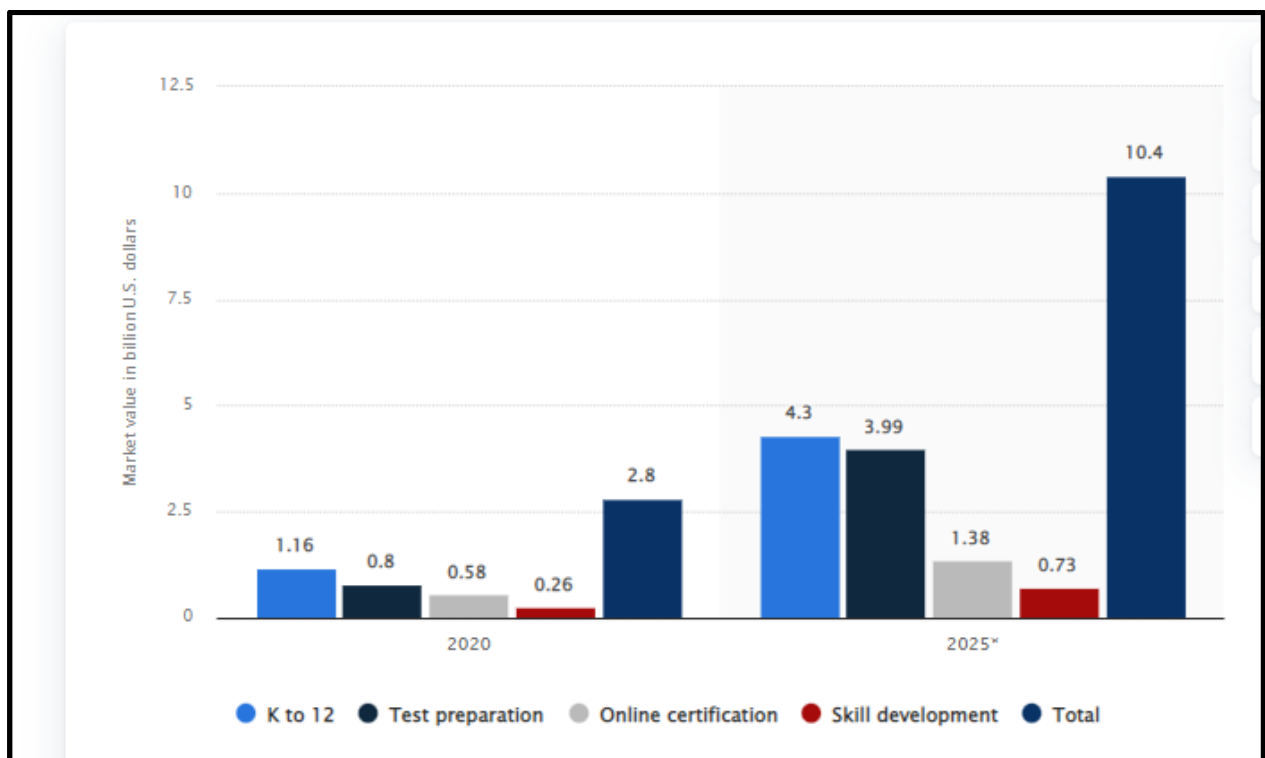

Figure 1: Market size of educational technology in India 2020
(Source: Statista, 2022)

The educational technology and market size have been mentioned in the above figure, which is regarded to be an important part of India. It has been reported that the market value of educational technology from kindergarten to the higher secondary has been estimated to be 1.16 billion U.S. dollars in 2020 (Statista, 2022). Moreover, it has been expected to increase by 10.4 billion by 2025. Hence, it can be seen that the importance of educational technology is increasing rapidly in India, which has exaggerated the significance of the study.
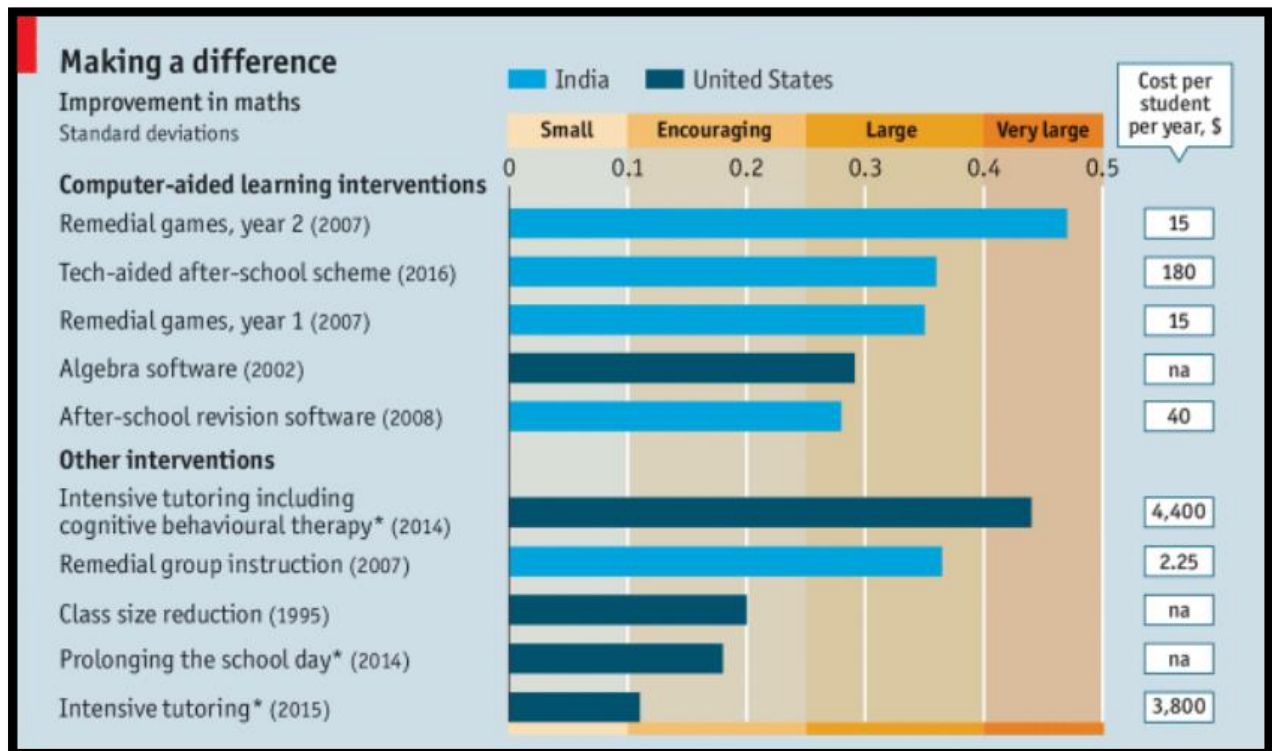

Figure 2: Comparison of US and India 2020
(Source: The economist, 2017)

Furthermore, it has also been noted that educational technology has grown to be 15% of the CAGR of India within 2030 (The Times of India, 2022). Therefore, it can be evaluated that the education system of India can achieve a sustainable development goal by implementing this EdTech in their system.

Literature review
The effect of technology on education

Technology has become an inseparable part of today's lifestyle of people all over the world, where it is seen to influence education as well. The concept of digital literacy helps in coping with the education system even during global crises. According to Malik (2018), an adaptation of technology has been seen to be easier in terms of its implication in education. People are prone to develop technological skills faster to evolve in this digital era. However, as argued by O'Flaherty &Liddy (2018), technological advancement in education can be problematic sometimes as it can create barriers for some students to access. It has been reported that there are approximately 37% of students in rural areas as of 2021 who do not attend school at all. Thus, the education system should be careful to generate education among all to emphasize the importance of education.

On the other hand, education through digital technology is an overwhelming idea as it helps the students to access higher resources in a short time. It has been depicted by a survey by AESR (rural) that the enrolment in the government schools for Indian students will be 70.3% in 2021(The Print, 2022). Hence, government schools should also come forward in advancing with technology that will

enable them to have better functional tools in education.

The role of education to gain sustainability

The role of education in achieving sustainability is regarded to be crucial as the academic skills development is related to this. The understanding of values can be gained through sustainability goals that also promote social and environmental development. As observed by Mohanty& Dash (2018), technological advancement increases academic knowledge along with professional skill improvement that can be achieved through certain changes. Hence, it can be said that technical education has turned out to be a challenging concept in terms of adaptation and utilization.

On the other hand, resources can also be managed that increase the understanding capabilities of the students. As per the view of Sinakou et al. (2019), the critical thinking of the students can also be developed by using this method that encourages communication, among others. Hence, the academic process can be changed that is predominant in achieving sustainable goals. In this context, it can also be mentioned that educational institutions can have an effective structure that becomes sustainable in the long run.

Methods
Data collection method

The study has selected *a primary data collection method* for collecting data and information that provide authentic insight. As commented by Zhang et al. (2020), the primary method of collecting data helps in making an effective process of collecting data in a study. On the other hand, a *survey* has been conducted in this study to collect data from the selected participants. The collected data have provided original information based on the experience of the chosen respondents.

Furthermore, it can be measured that the primary study has been able to focus on strengthening the foundation of the research.

Population and sampling

Population and sampling size is crucial to be selected in a study as it provides a major contribution to a study. As demonstrated by Caniglia et al. (2018), the sampling size of a study should be of a standard size that belongs to the similar industry that the study is focusing on. This particular study has selected *20 participants* from the educational background to participate in the survey process. The respondents were contacted via email, where the survey questionnaire was distributed among them, and they have answered.

Data analysis

The data analysis process is vital in a study as data accuracy is required to enhance the findings of the entire research. *SPSS* has been conducted to analyse the collected data in this study. As suggested by Fedulova et al. (2019), this analytical tool has the capability to solve complex mathematical issues in a shorter period of time. As a result, numerical values can also be presented in a study that works as evidence to prove the hypotheses and justify research questions.

Ethical consideration

All the ethical grounds have been maintained in this study as ethics should be strictly followed to make a study reliable. The ***PERSONAL DATA PROTECTION (PDP) BILL, 2018,*** has been followed in this study to maintain data privacy. As stated by Dlouhá&Pospíšilová (2018), a study should prioritize protecting the personal data of the participants to maintain anonymity. Additionally, university guidelines have also been maintained during the course of the study.

Results and analysis
Descriptive statistics analysis
 Statistics

	1. What is your gender?	2. Are you new to the educational sector?	3. For how long are you related to the education sector?	4. Does your institution follow any specific plan for sustainable development?	5. Has your institution achieved sustainable development in education?	6. Does the institution follow any particular education tech2logy for development?	7. Does the institution have supportive structures to follow in the education system?	8. Does your education system have eco2mic viability that helps educational tech2logy?	9. Do you have e2ugh skills to generate educational tech2logy in your system?	10. Did you achieve sustainable development through educational tech2logy?
Valid N	20	20	20	20	20	20	20	20	20	20
Missing	0	0	0	0	0	0	0	0	0	0
Mean	1.50	1.25	1.60	4.20	3.90	3.70	4.05	3.70	3.65	3.95
Median	1.50	1.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Mode	1[a]	1	2	5	3[a]	4	5	3	4	4
Std. Deviation	.513	.444	.598	.951	.968	1.174	1.050	.979	.933	.887

a. Multiple modes exist. The smallest value is shown

Table 1: Descriptive statistics
(Source: SPSS)

The above table has mentioned the descriptive values of this study which is reflective of the fact that the variables of the study are related to each other. As per the view of Kioupi & Voulvoulis (2019), the minimum, maximum, and median values can be gained with the help of these statistics. In this way, the research questions can be mitigated during the course of the study, which helps in reaching the ultimate goal. In this study, separate mean, median, and mode values have been presented for each question that is helping in understanding the relevance of the survey questions.

The mean value was found to be 1.50 in the first demographic question that is showing the minimum value of the study. On the other hand, the mean value for the dependent variable and the two questions are 4.20 and 3.90, respectively. As commented by Sá&Serpa (2020), the mean value represents the minimum value of the questions based on the responses and the activities of the respondents. However, the mode value has been observed as 5 and 3 for both of the questions related to the demographic part. Hence, it is suggestive of the fact that the dependent variable has a strong relationship with each other. However, the mean value has been found to be 4.05 in the context of the utilization process of specific structures to improve the sustainable development of education.
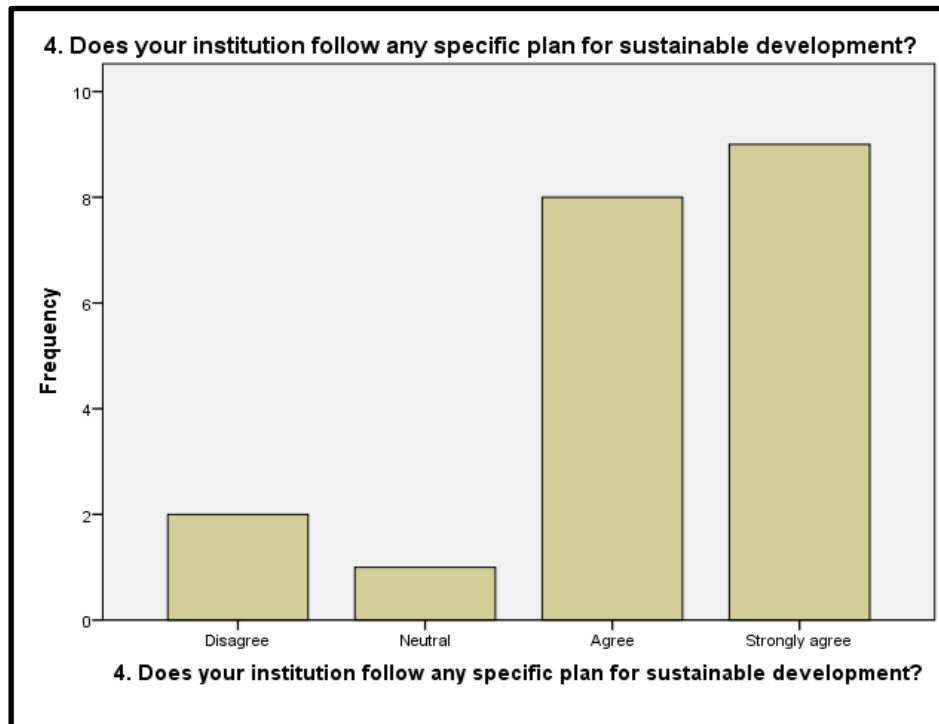
Figure 3: Responses regarding implementation of specific plan to gain sustainable development
(Source: SPSS)

The above figure has presented responses of the chosen participants that have shown that the majority of the respondents have agreed to the statement. It can be mentioned that a particular method or plan is required to be implemented in order to achieve a sustainable goal in an educational institution. However, 10% of the respondents have disagreed with this statement due to their negligence in their decisions.
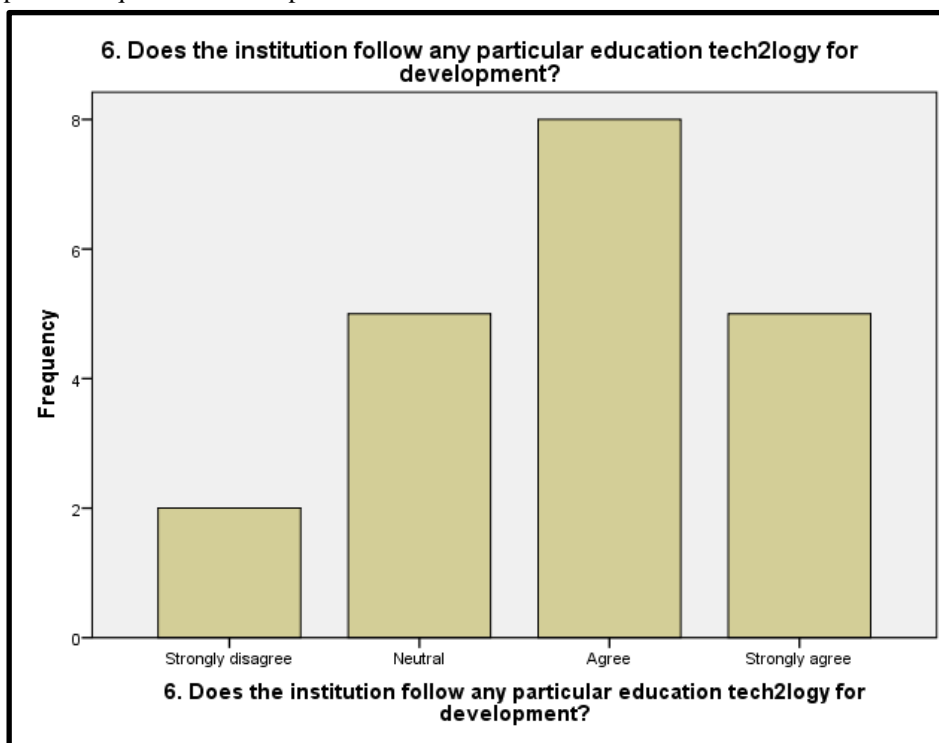

Figure 4: Responses regarding usage of educational technology

Educational technology and its impact have been responded to through this question that has mentioned that 25% of the total respondents have strongly agreed and 40% have agreed with this. On the other hand, it has been found that 10% of the respondents have strongly disagreed with the fact that educational technology does not have a strong influence on maintaining sustainable development in the education system of India.
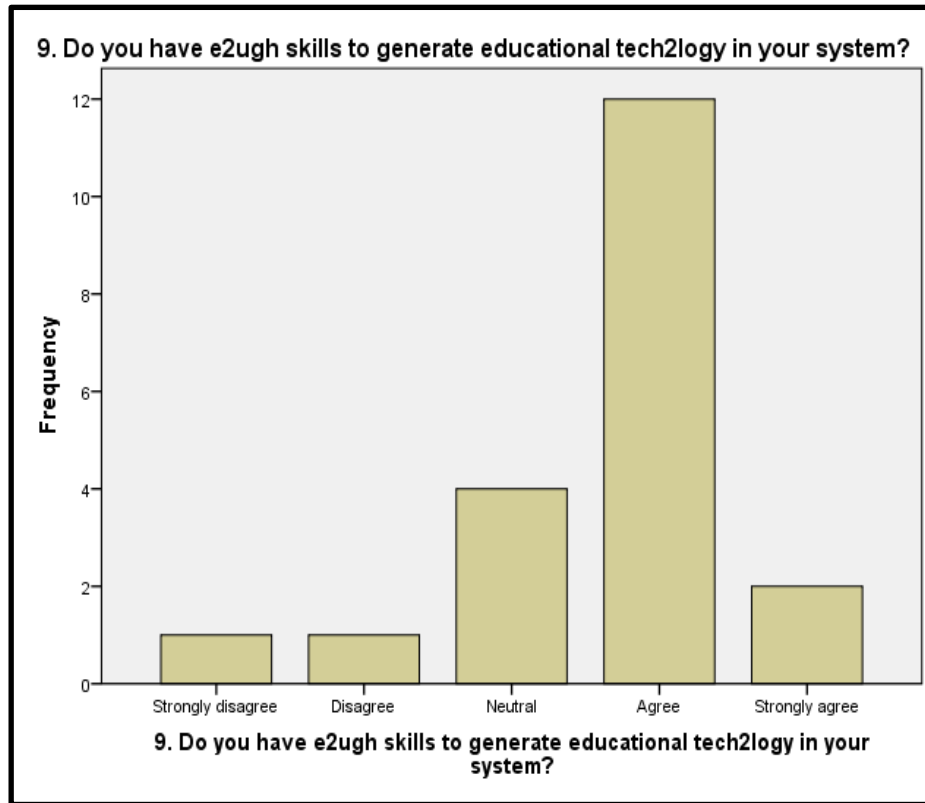

Figure 5: Importance of skills in developing technology-based education
(Source: SPSS)

Requirements of skills in the development process of sustainable education have been analysed in this graphical representation. For this particular question, a total of 70% of the respondents have agreed with the statement. The other 20% have remained neutral, and the rest of 10% have not agreed with this statement. As discussed by Nie et al. (2020), technological advancement requires skills and its constant improvement, which reflects on the education quality. Hence, it can be said that the skills of the people related to the education system are essential to be improved.

Regression
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.915ᵃ	.837	.828	.402	.837	92.242	1	18	.000

a. Predictors: (Constant), 10. Did you achieve sustainable development through educational tech2logy?

ANOVA a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.894	1	14.894	92.242	.000[b]
	Residual	2.906	18	.161		
	Total	17.800	19			

a. Dependent Variable: 5. Has your institution achieved sustainable development in education?
b. Predictors: (Constant), 10. Did you achieve sustainable development through educational tech2logy?

Coefficients a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.248	.391		.634	.534
	10. Did you achieve sustainable development through educational tech2logy?	.949	.099	.915	9.604	.000

a. Dependent Variable: 5. Has your institution achieved sustainable development in education?

Table 2: Regression test
(Source: SPSS)

The regression table has been presented in the above table, which has helped in establishing the hypothesis of the study. The R square value has been found to be 0.837 in this study that is emphasizing the fact that educational technology has a strong impact on the development process of sustainable education in India. As depicted by Hallinger&Chatpinyakoop (2019), the R squared value should be close to 1, which constructs a strong relationship between the variables. Hence, in this case, it can be mentioned that educational technology and sustainable development have a strong relationship with each other.

On the other hand, the sig value is observed to be 0.000 in this study, which proves the selected hypothesis in this study. As per the view of Vintere (2018), the sig value should be close to 0, which remarks the hypothesis and tests the purpose of the study. In this context, it can be said that the dependent variable has a strong impact on the predictors, which remains constant in a study. In this way, the hypothesis of the study has been proved from an analytical perspective.

Discussion

The study has been able to establish the relationship between the dependent and independent variables. The relationships between the variables have been found to be stronger, which helps in finding a greater impact of the independent variables on the dependent variable. As demonstrated by Fleacă et al. (2018), technological education has seen to change the purpose of the study as it involves social advancement. It can be assessed that students are becoming more confident in using advanced features that are increasing the quality of their academic skills.
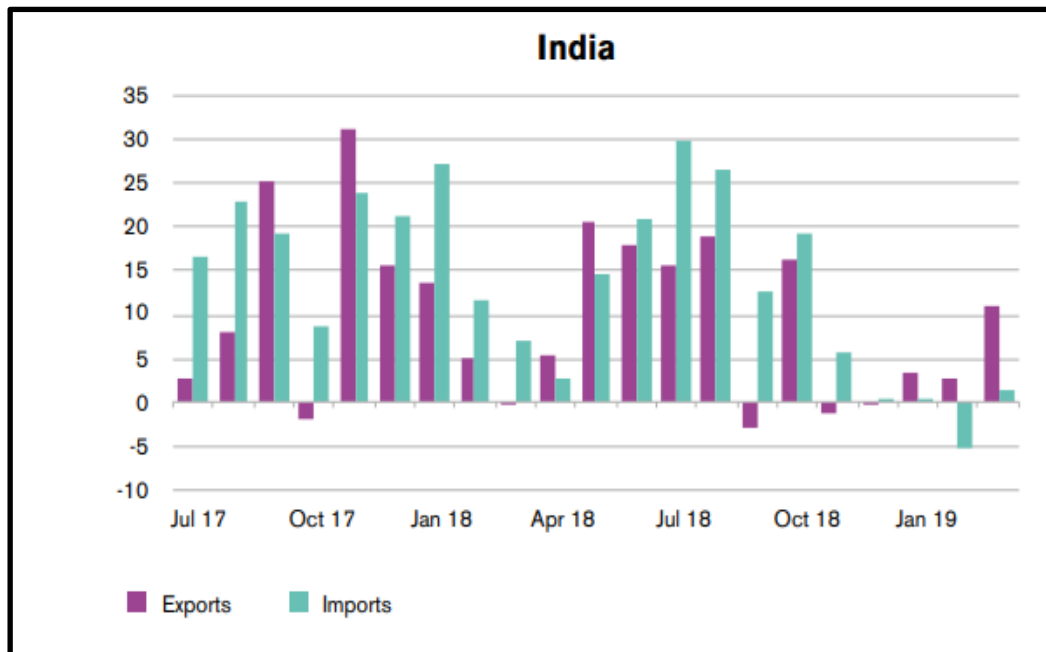
Figure 6: Economic aspects of India
(Source: World Trade Organization, 2022)

On this basis, it has been observed that the substitution of academic materials can be visible in the digital era. Resources are more accessible for the students in the digital process, which is reflected in their education system. As stated by Ichinose (2017), the engagement of students and teachers has been strengthened due to the technological processes that determine a stronger connection between the students and teachers. Moreover, economic sustainability can also be maintained, which will encourage equity promotion. According to Abidi et al. (2018), sustainability goals differ based on the requirements of the students in educational institutions. Thus, the study has provided evidence for the issues that it has found during the process of the study.

Conclusion

The study has found the impact of educational technology on sustainable development and education systems in the context of India. Several factors regarding the education system have been found that influence the educational functions. Furthermore, a primary study has been conducted for gathering valuable data and information for this study. The data analysis process has also followed the SPSS method, which has contributed to the analytical perspectives. The study has found different dimensions as it has provided reliable data with accuracy. On the other hand, the hypothesis of the study has been proved through the analytics, and

the study has been able to provide evidence for this. The regression test and the descriptive analysis in the study have helped in understanding the findings and results, along with describing the research questions of the study.

Limitation

Some limitations have been found in this study as it has followed only the primary data collection method to collect and analyse data. As discussed by Sá&Serpa (2020), the primary data analysis process can not mention and discuss previous research on the same topic, which creates barriers in the analysis process. Furthermore, it is also regarded to be a time-consuming method that can be utilized in the other section of the study. Hence, given other circumstances, the study could have been created with a stronger impact with more discussion.

Another limitation has been found within the discussion of literature as it did not mention the challenges in implementing educational technology in the Indian education system. The study has only focused on the impact of education technology to develop sustainability in education. However, it has not considered analysing the outcome of implementing this method which has been found to be another limitation.

Future scope

The study holds future scope and opportunities as it is purely based on primary research and data collection methods. According to Kioupi&Voulvoulis (2019), a study should have future implications that increase the validity of the study. Additionally, future researchers can consult this study to have several dimensions in the sustainable education development process of India. The study has justified itself by mentioning evidence for the hypotheses that have proven the fact that it has fulfilled its purpose.

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Appendix: Research questionnaire

Demographic

1. What is your gender?

Male

Female

2. Are you new to the educational sector?

Yes

No

3. For how long are you related to the education sector?

For one year

2-3 years

More than 5 years

Dependent variable

4. Does your institution follow any specific plan for sustainable development?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

5. Has your institution achieved sustainable development in education?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

Independent variable

6. Does the institution follow any particular education technology for development?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

7. Does the institution have supportive structures to follow in the education system?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

8. Does your education system have economic viability that helps educational technology?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

9. Do you have enough skills to generate educational technology in your system?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

10. Did you achieve sustainable development through educational technology?

Strongly disagree

Disagree

Neutral

Agree

Strongly agree