

Impact of EdTech on College Students

Sanjoni Jain, Netaji Subhas University of Technology (2026)

Sanjana Dewan, RCC Institute of Information Technology (2027)

Project Guide: Agnimitra Biswas

Report submitted to: IDEAS - Institute of Data Engineering, Analytics and Science Foundation, ISI Kolkata

1. Abstract

This project analyzes the impact of EdTech on college students, focusing on their preferences, challenges, and effectiveness in enhancing learning and career readiness. We collected data from various college students living in Delhi and Kolkata, asking questions designed to gauge their attitude towards various factors regarding Educational Technology that may have a possible impact on college students. For this project, those factors were: students' general attitude regarding their preferences for modern learning tools vs. traditional learning tools, the effect of the pandemic regarding their preferences for modern learning, and their inclination to use modern learning tools regarding job preparation. The results aim to provide actionable insights into how students perceive EdTech and what improvements can better support them in education and career preparation.

2. Introduction

With the exponential increase in the use of technology over the past few years, it is no surprise that the use of it has expanded to the field of education. Education technology refers to the usage of digital tools, platforms, and technologies to enhance teaching, learning, and educational management. “The global education technology market size was estimated at USD 142.37 billion in 2023 and is expected to grow at a CAGR of 13.4% from 2024 to 2030. EdTech includes hardware and software technology used to educate students on a virtual level to improve learning in classrooms and enhance students’ education outcomes.” (c. In appendix)

Starting with the survey, we collected data from various college students living in Delhi and Kolkata, asking questions designed to gauge their attitude towards various aspects of Educational Technology that may have a possible impact on college students. For this project, those factors were: students' general attitude regarding their preferences for modern learning tools vs. traditional learning tools, the effect of the pandemic regarding their preferences for modern learning, and their inclination to use modern learning tools regarding job preparation.

The data collection was done through a survey via Google Forms. The descriptive analysis was done through Power BI and the inferential analysis through Excel.

The purpose of this project is to offer valuable insights to educational institutions, policymakers, and EdTech providers, helping them enhance learning experiences and address the specific needs of students in these cities.

3. Project Objective

- To study the impact of EdTech on college students through survey and analysis.
- The survey was conducted in the cities of Delhi and Kolkata, with the target audience being college students residing in those cities. To test the hypothesis: “Is there a relationship between students' city (Delhi vs. Kolkata) and their preference for EdTech tools?” and “Is there a relationship between students' field of study (Engineering vs. Non-Engineering) and their preference for EdTech tools?”
- Analyze college students' attitudes towards traditional vs. modern learning methods in Delhi and Kolkata.
- Identify the challenges faced by students when using EdTech, such as financial or technical barriers.
- Assess the impact of the COVID-19 pandemic on students' adoption of EdTech tools.
- Gauge the role of EdTech in developing job skills and preparing students for the job market.
- Provide insights for institutions and policymakers to improve the effectiveness of EdTech in higher education.

4. Methodology

- Define the target population: College students residing in Delhi or Kolkata.
- Identify possible factors that impact the students and can be gauged via the survey: Traditional vs. Modern Learning, Impact of COVID-19 pandemic, and Using EdTech to develop job skills.
- Create the survey: 3 definitive questions and 6 questions per factor to be studied. (b. In appendix)
- The survey was then circulated through both cities from 8th October to 22nd October, garnering a total of 92 responses. 54 from Delhi, 34 from Kolkata, and 4 from other cities.
- The data collected was then analyzed via general sentiment as well as city-wise.
- **Descriptive Analysis (General Sentiment):**
 - Using Power BI, the data was cleaned and preprocessed using queries in the transform data section. (Transform>Trim and Transform>lowercase.)
 - The 4 multiple choice questions responses were separated and were counted as one response for each option. (E.g. If someone stated that they learned technical

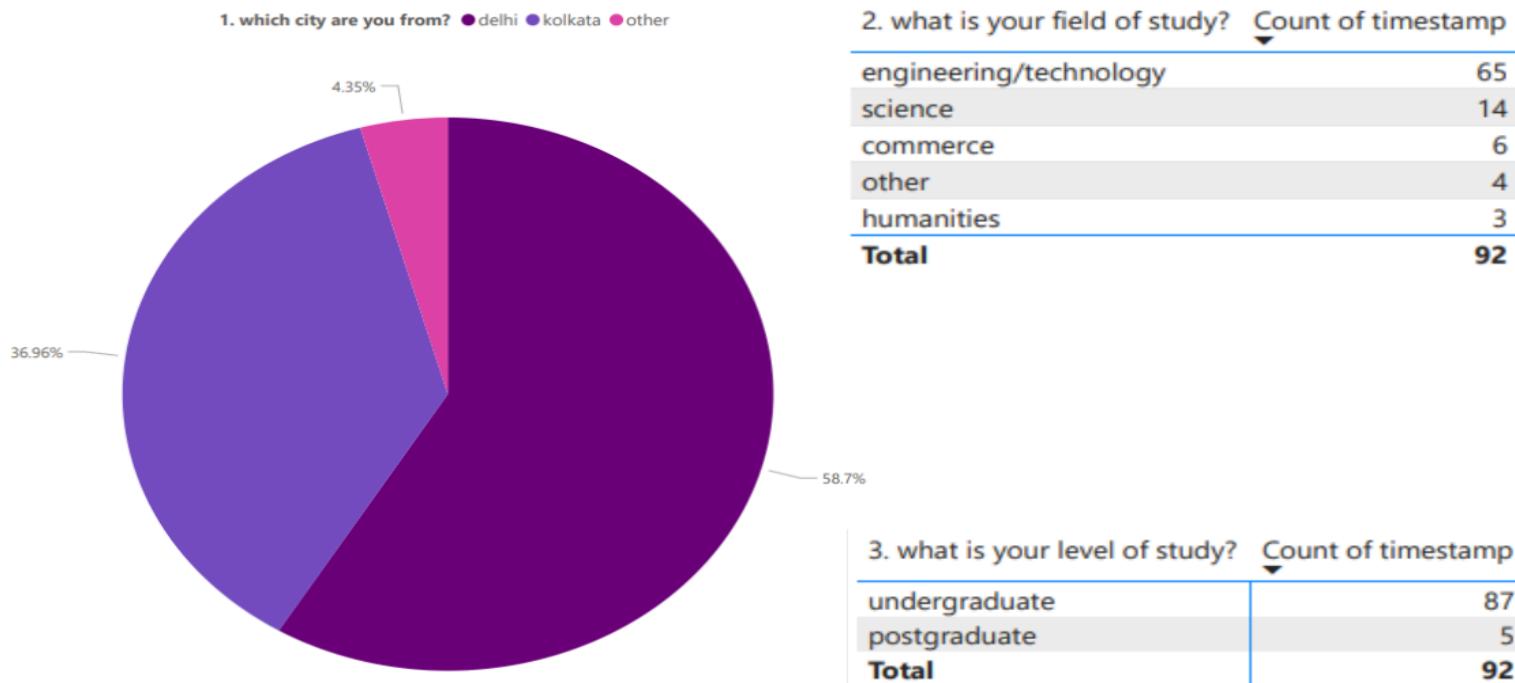
skills and problem-solving skills, their response was added to both counts.) (Split column> By delimiter ‘comma’>different rows.)

- The cleaned data was then made into a data visual for each question.
- **Inferential Analysis (Delhi vs. Kolkata):**
 - Hypothesis testing: “City and preference are independent variables.” Using Excel.
 - Created pivot table of city and preference.
 - Calculated expected value using Excel
 - Calculated chi-square value using Excel
 - Found p-value to test the fit of the hypothesis
 - Hypothesis testing: “Field of study and preference are independent variables.” Using Excel.
 - Created pivot table of city and preference.
 - Calculated expected value using Excel
 - Calculated chi-square value using Excel
 - Found p-value to test the fit of the hypothesis

5. Data Analysis and Results

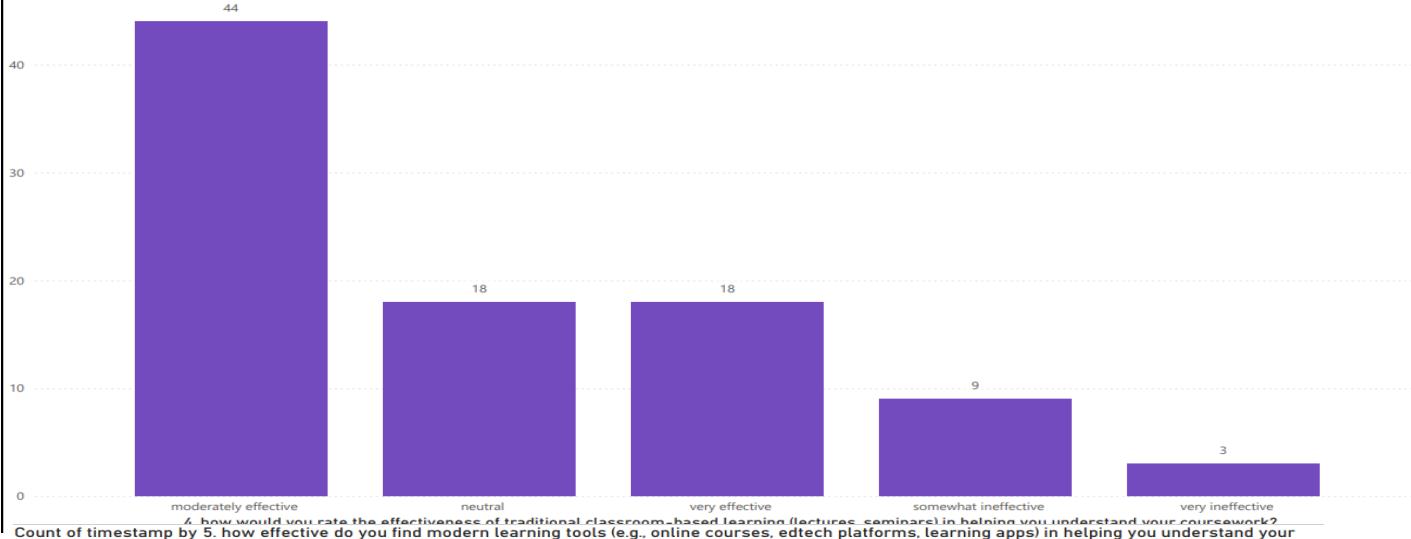
a. Descriptive Analysis: An analysis of all responses as one large data pool.

Q. 1-3: General demographic questions

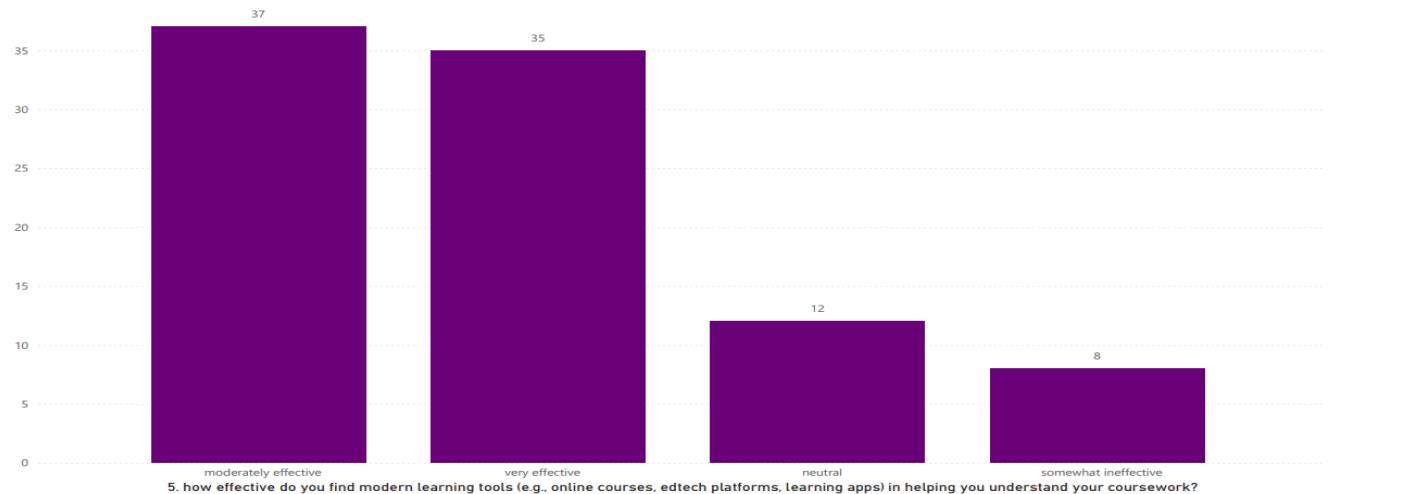


Q. 4-9: Traditional vs. modern learning:

Count of timestamp by 4. how would you rate the effectiveness of traditional classroom-based learning (lectures, seminars) in helping you understand your coursework?

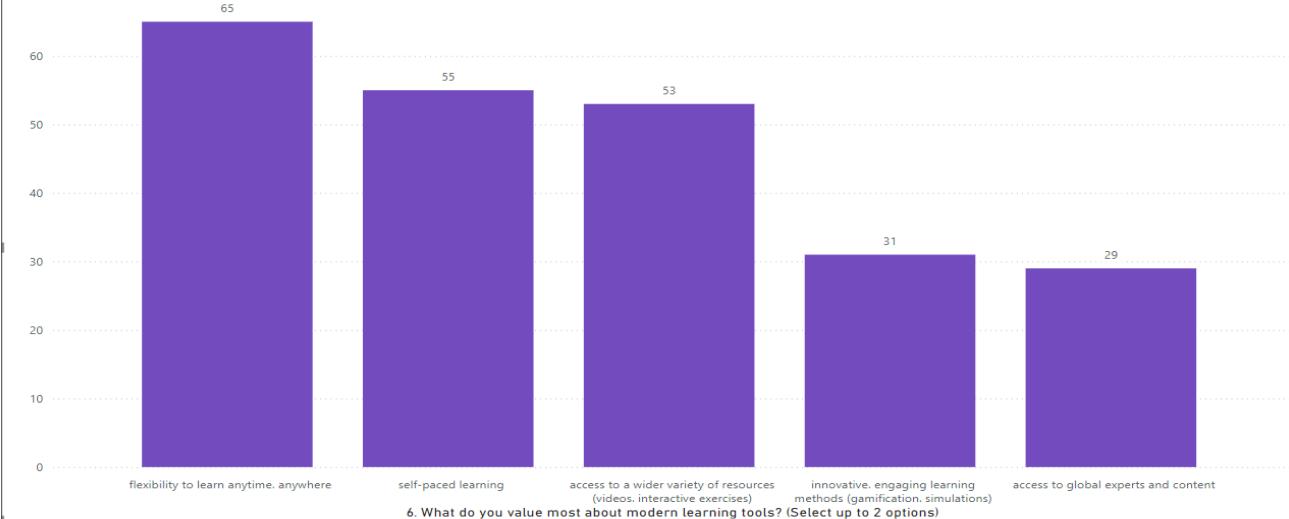


Count of timestamp by 5. how effective do you find modern learning tools (e.g., online courses, edtech platforms, learning apps) in helping you understand your coursework?

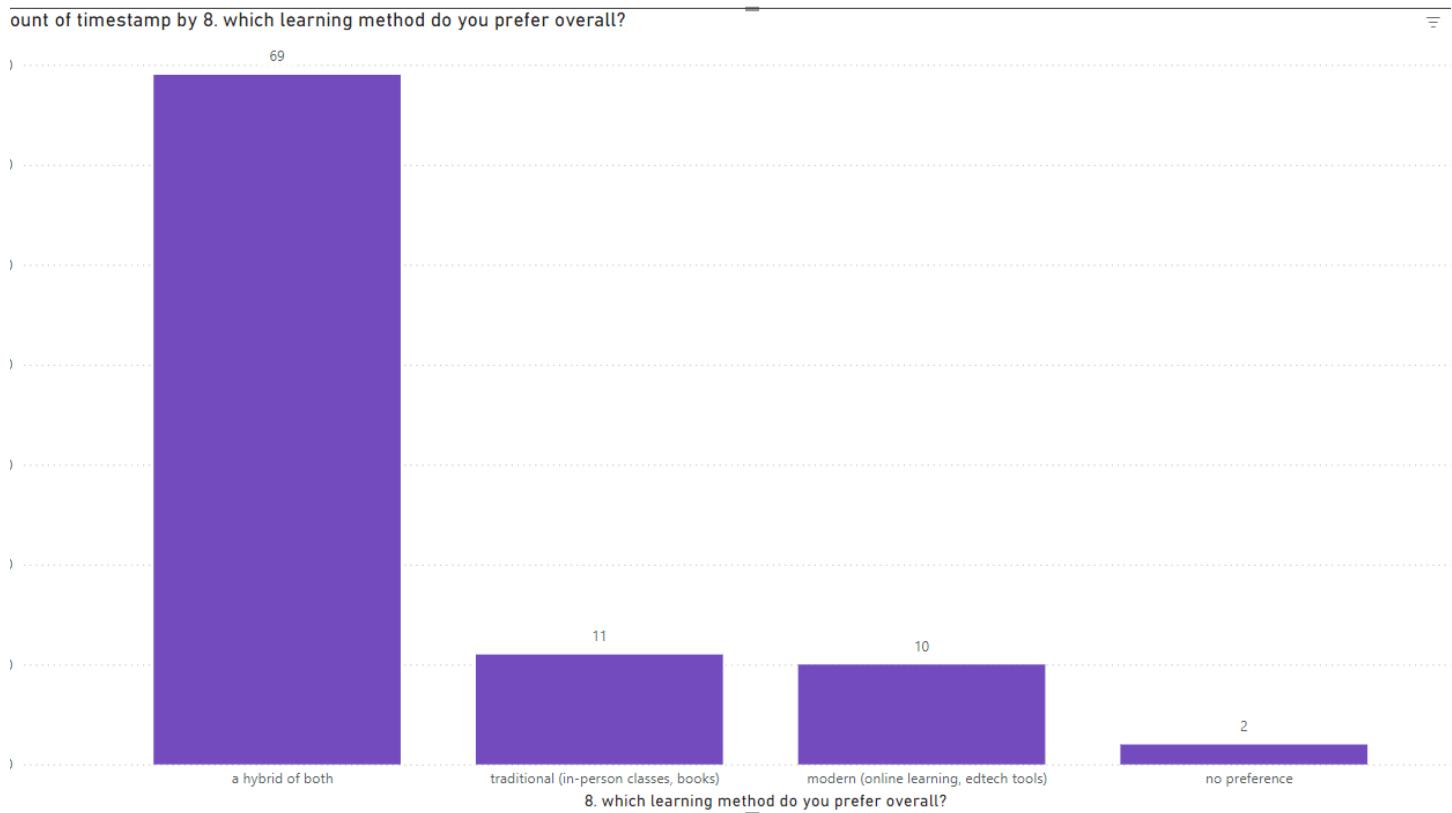
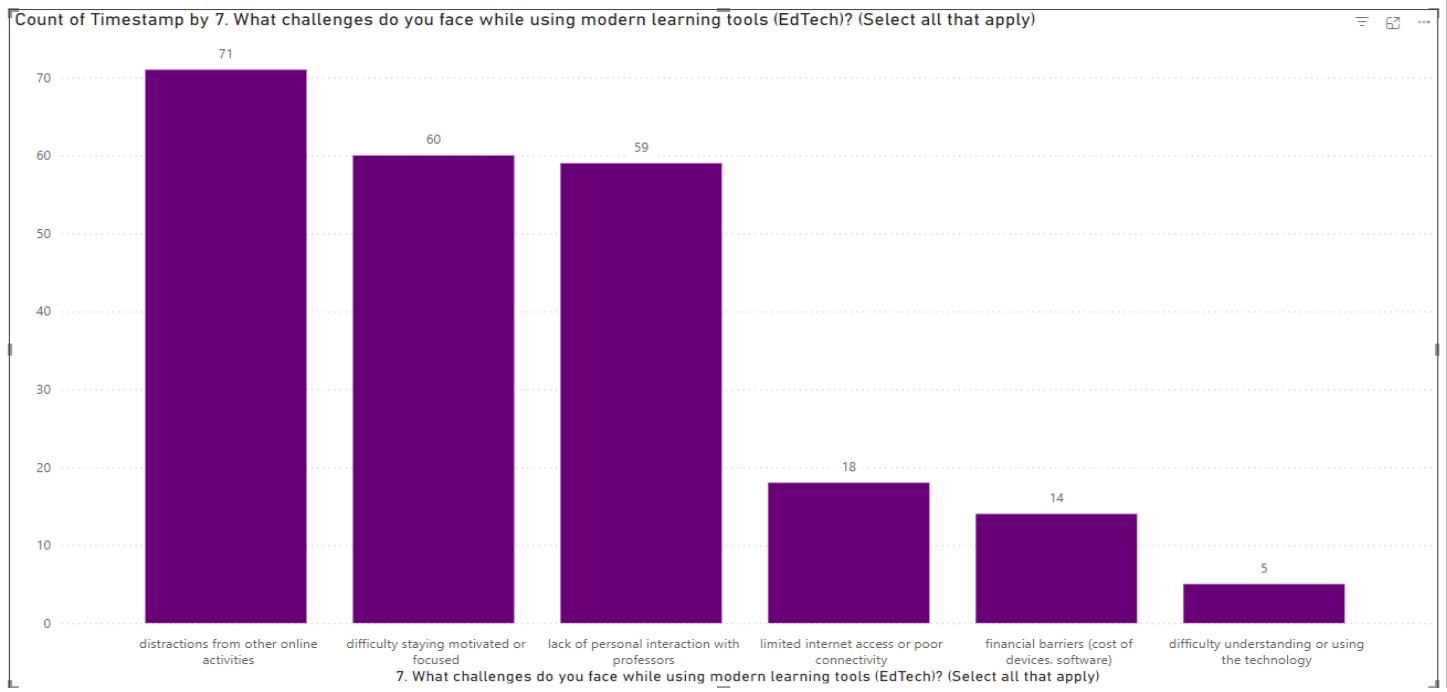


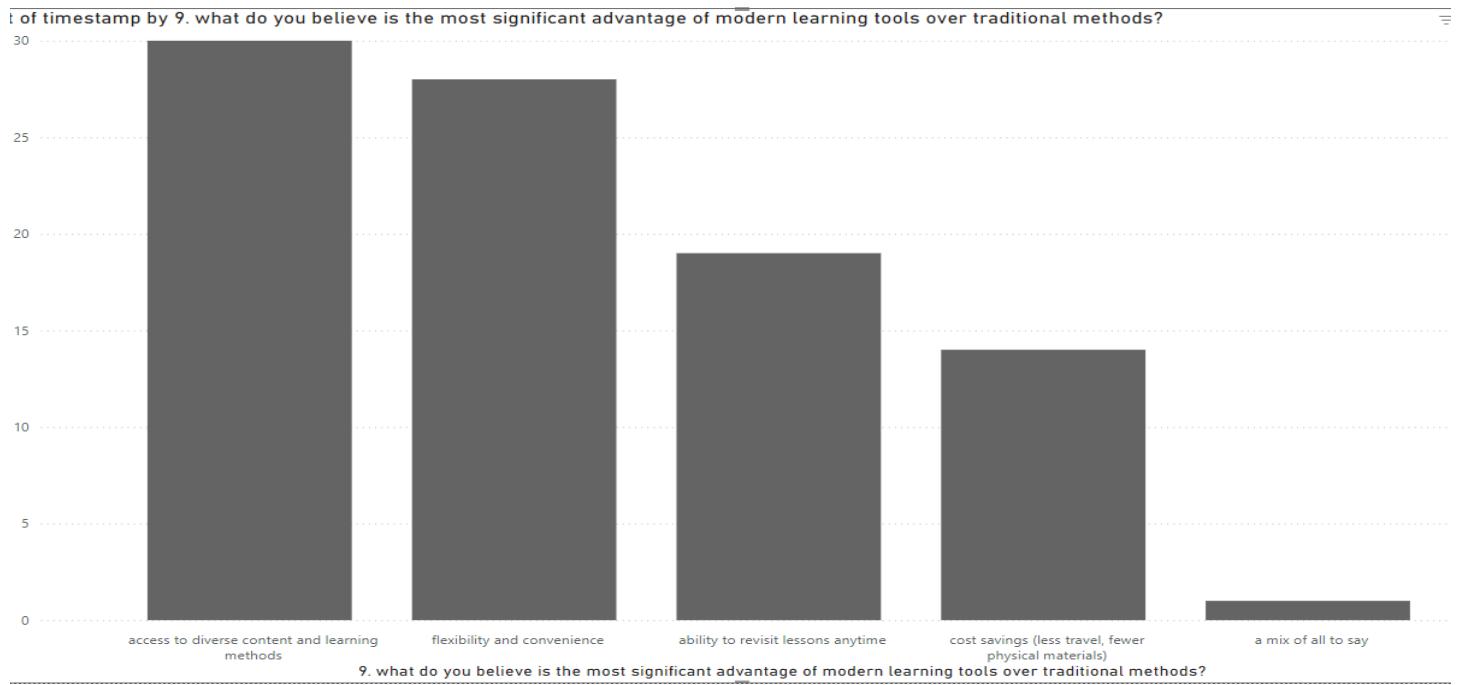
5. how effective do you find modern learning tools (e.g., online courses, edtech platforms, learning apps) in helping you understand your coursework?

Count of Timestamp by 6. What do you value most about modern learning tools? (Select up to 2 options)



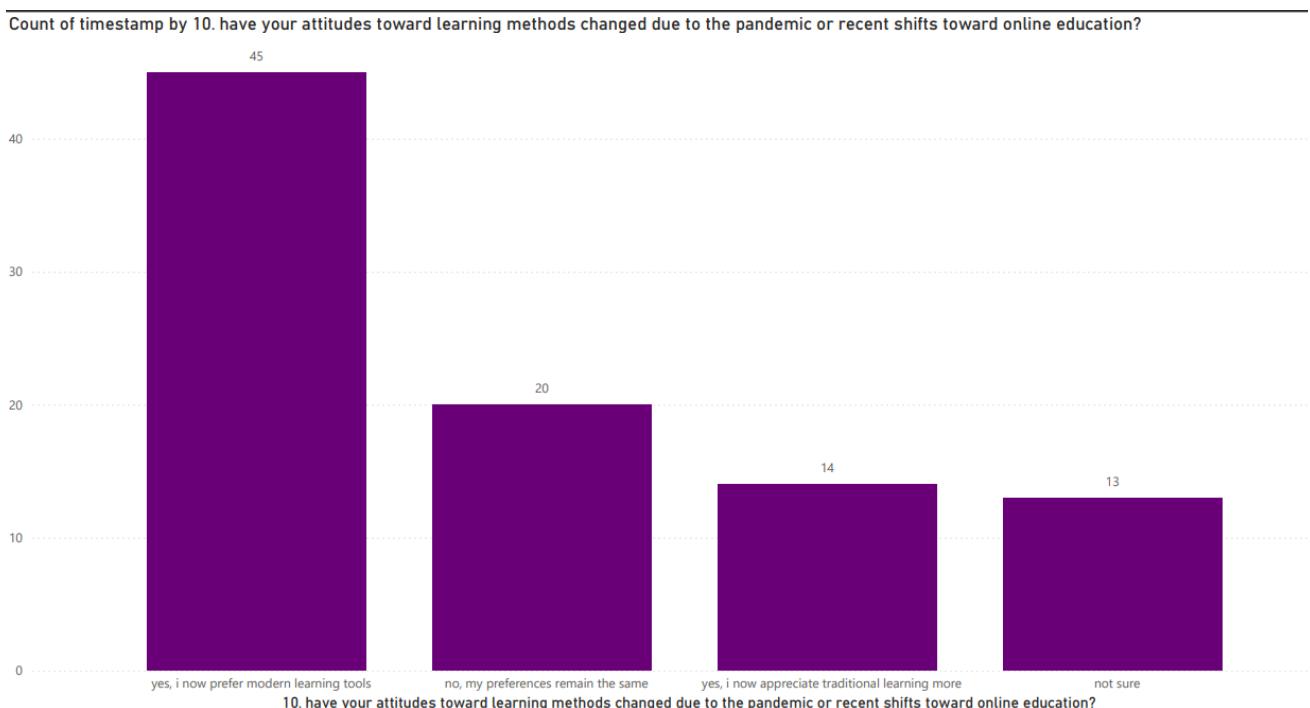
6. What do you value most about modern learning tools? (Select up to 2 options)

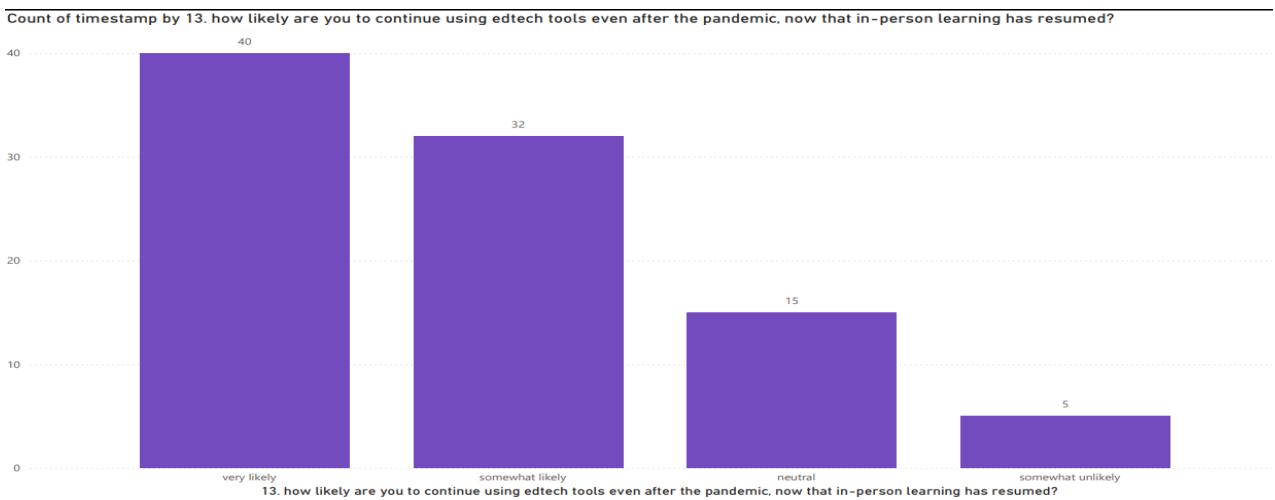
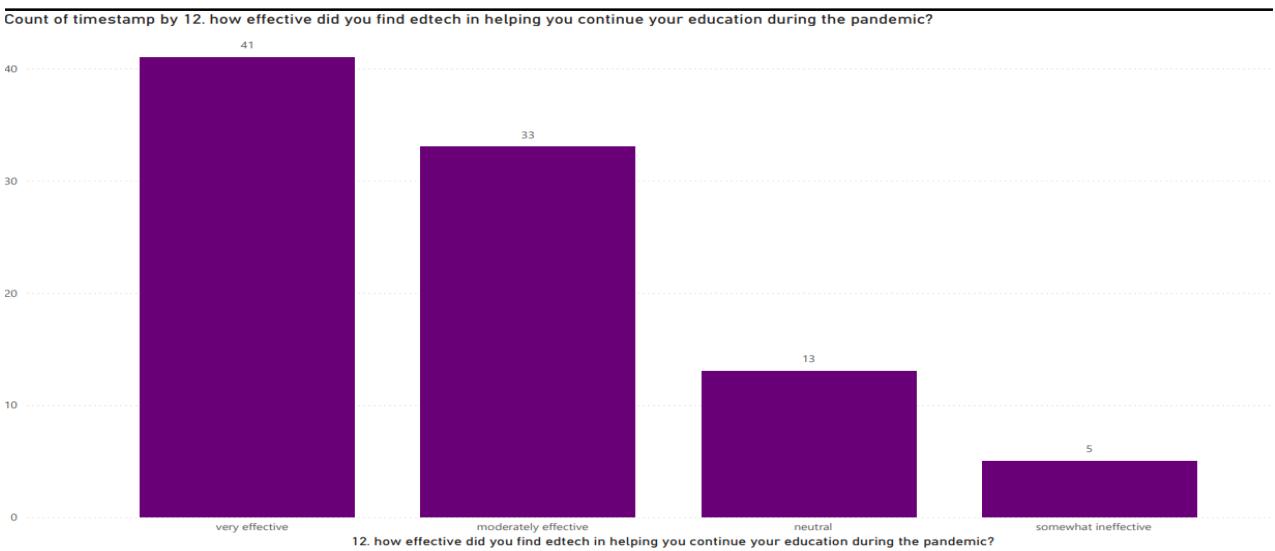
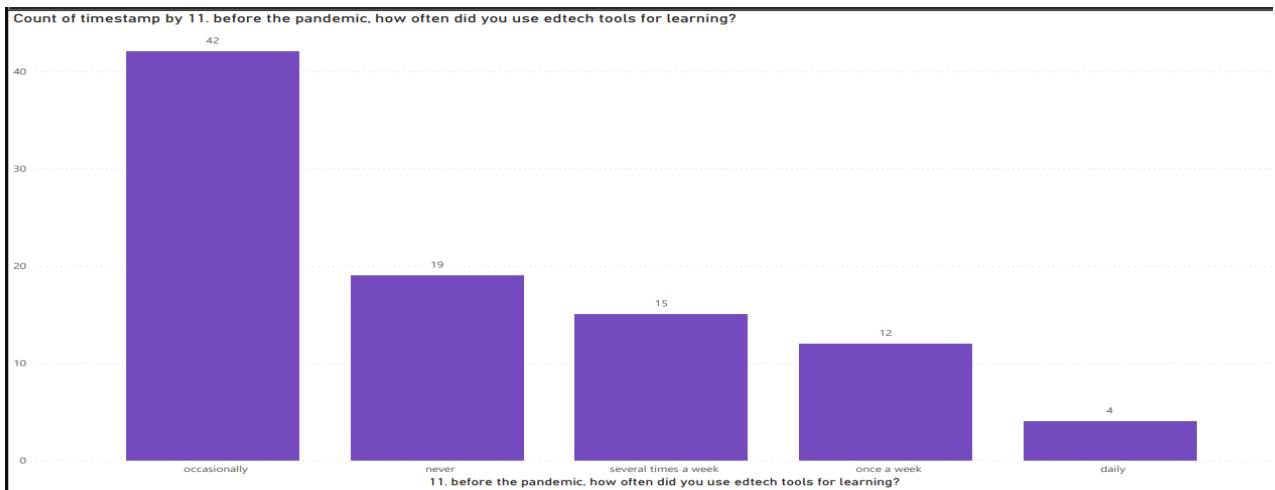




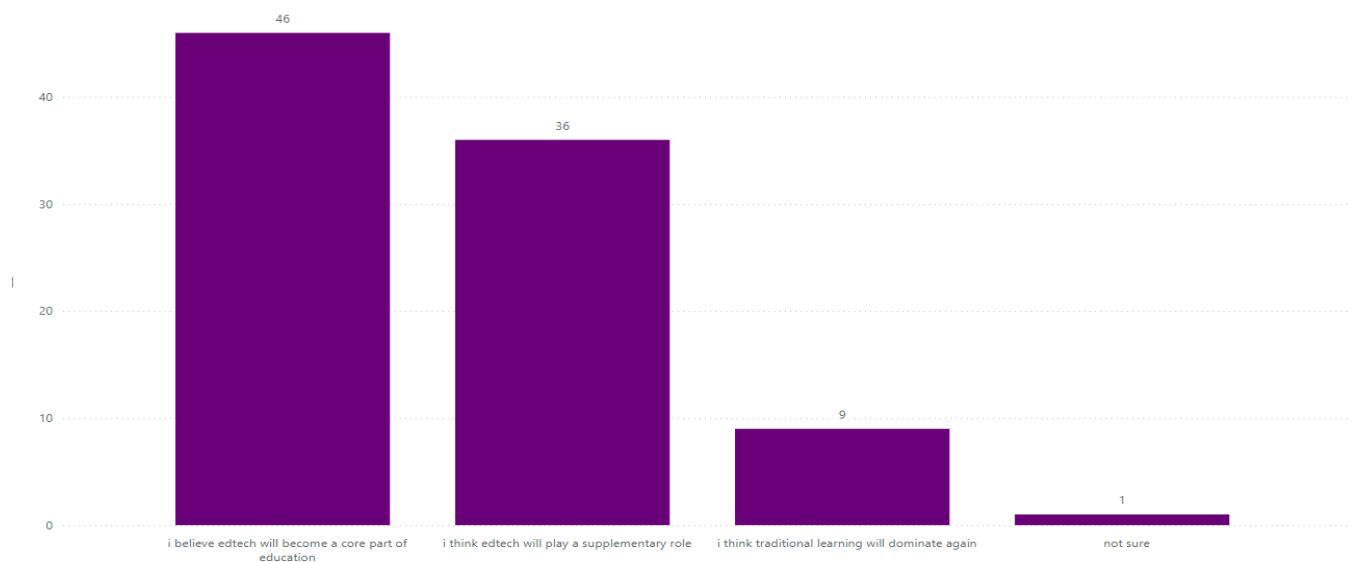
General Result: In the debate of traditional vs. modern learning, 47.82% of students generally found traditional learning to be moderately effective, and 75% preferred a hybrid mode of education. Major factors for not using modern technology are being distracted easily, difficulty staying motivated, and lack of personal interaction with professors. The major advantages of EdTech are a large variety of source materials, self-paced learning, and flexibility.

Q. 10-15: Effect of the pandemic on college students' learning preference.



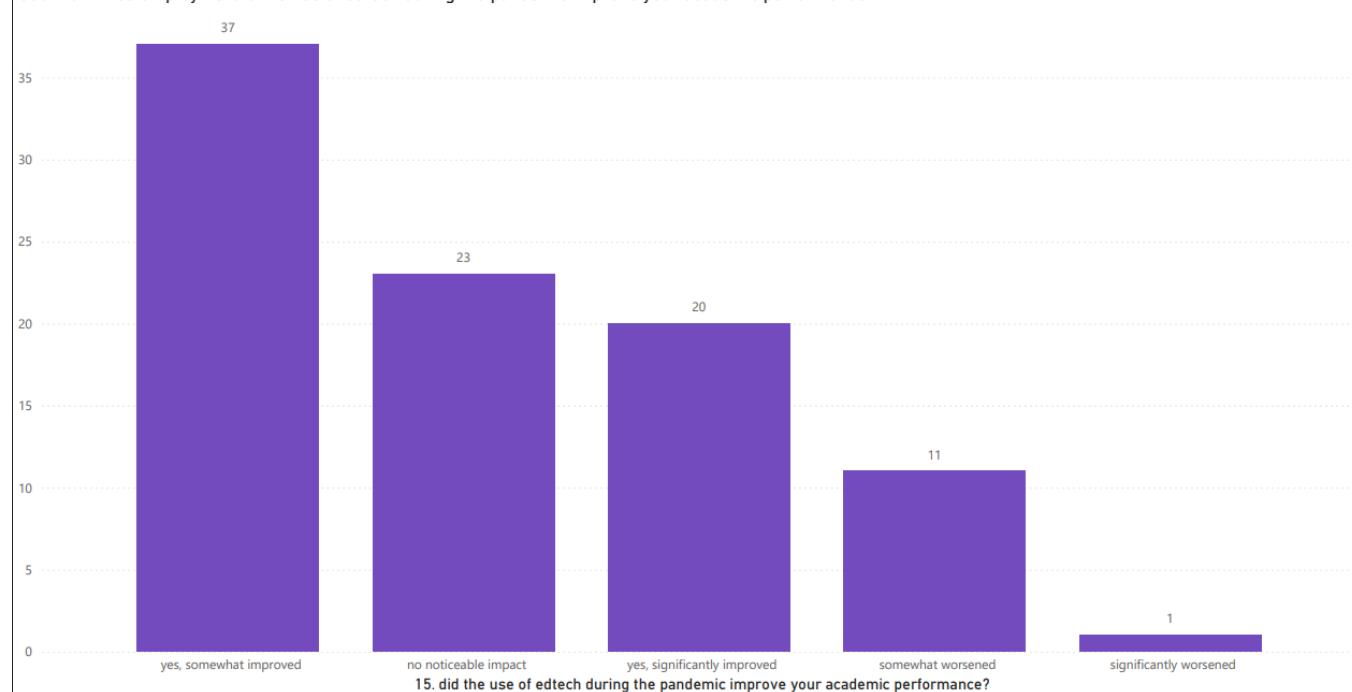


Count of timestamp by 14. how do you think the pandemic has influenced the future of education in terms of edtech adoption?



14. how do you think the pandemic has influenced the future of education in terms of edtech adoption?

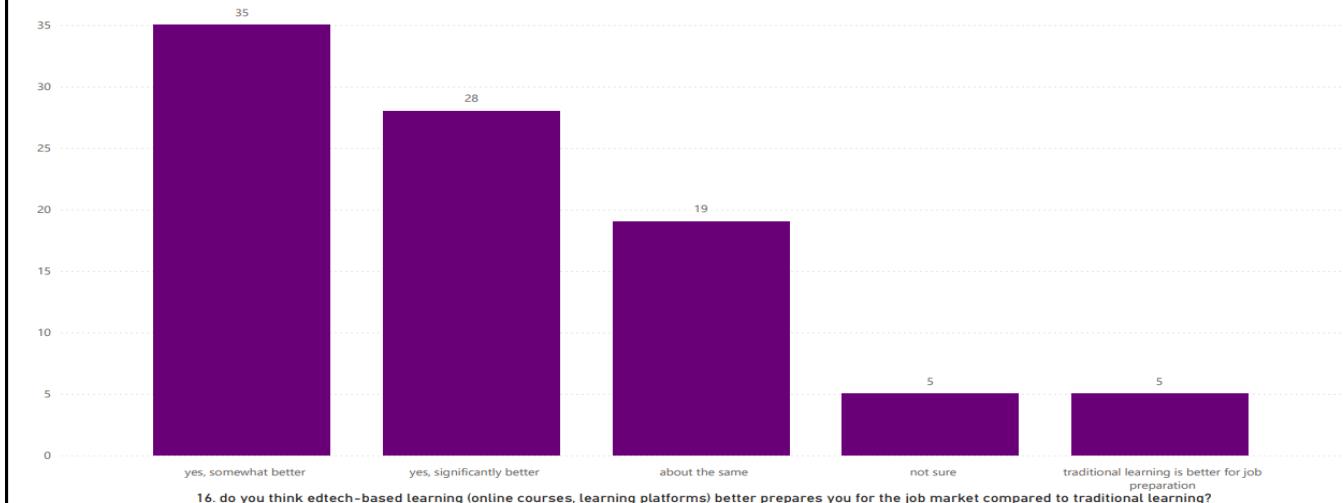
Count of timestamp by 15. did the use of edtech during the pandemic improve your academic performance?



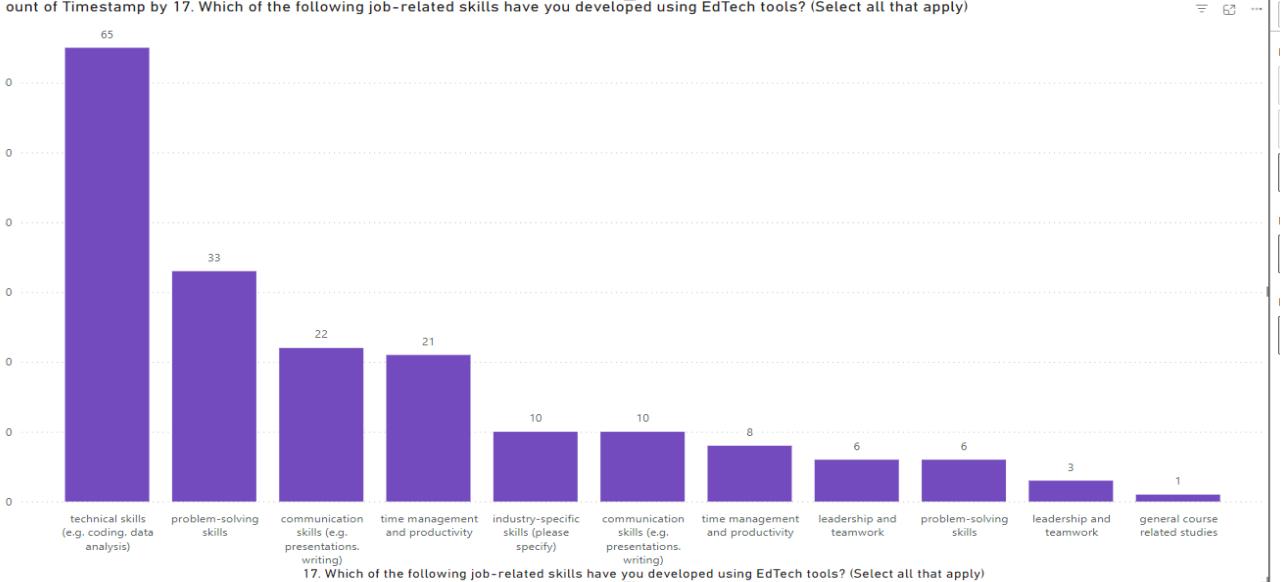
General Results: The COVID-19 pandemic vastly impacted students, 48.91% now preferring modern learning tools. 44.57% found it very effective in continuing their education during the pandemic. 43.48% say they are very likely to continue using EdTech after the pandemic. 50% it will become a core part of our education. 40.2% say their performance somewhat improved during the pandemic.

Q. 16-21: Use of EdTech for job preparation.

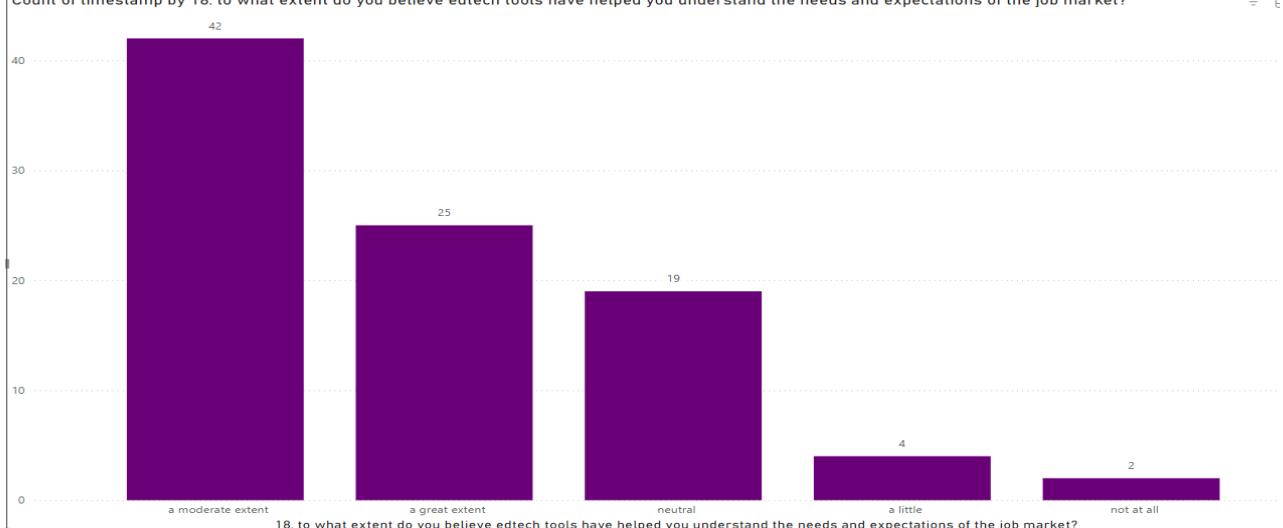
Count of timestamp by 16. do you think edtech-based learning (online courses, learning platforms) better prepares you for the job market compared to traditional learning?

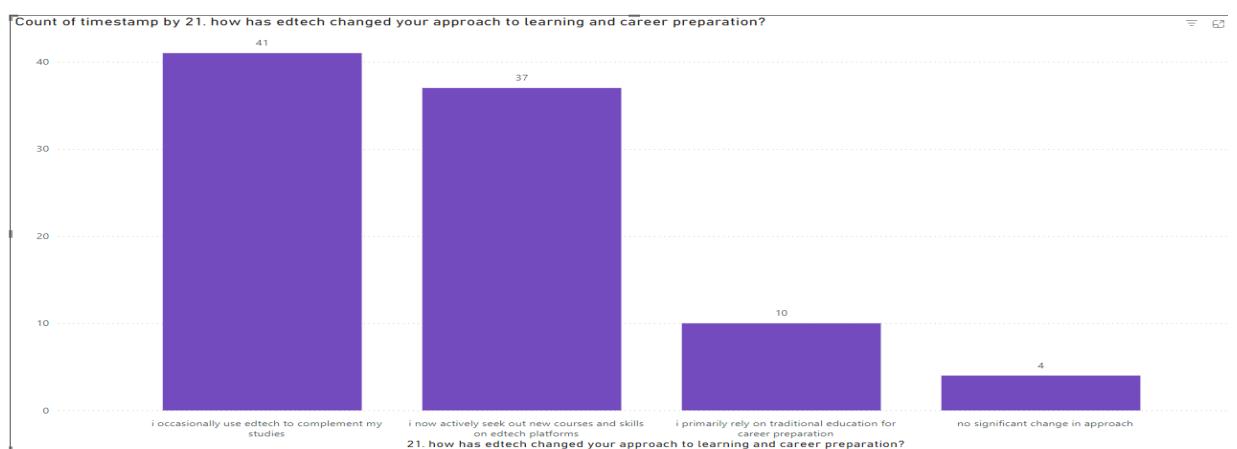
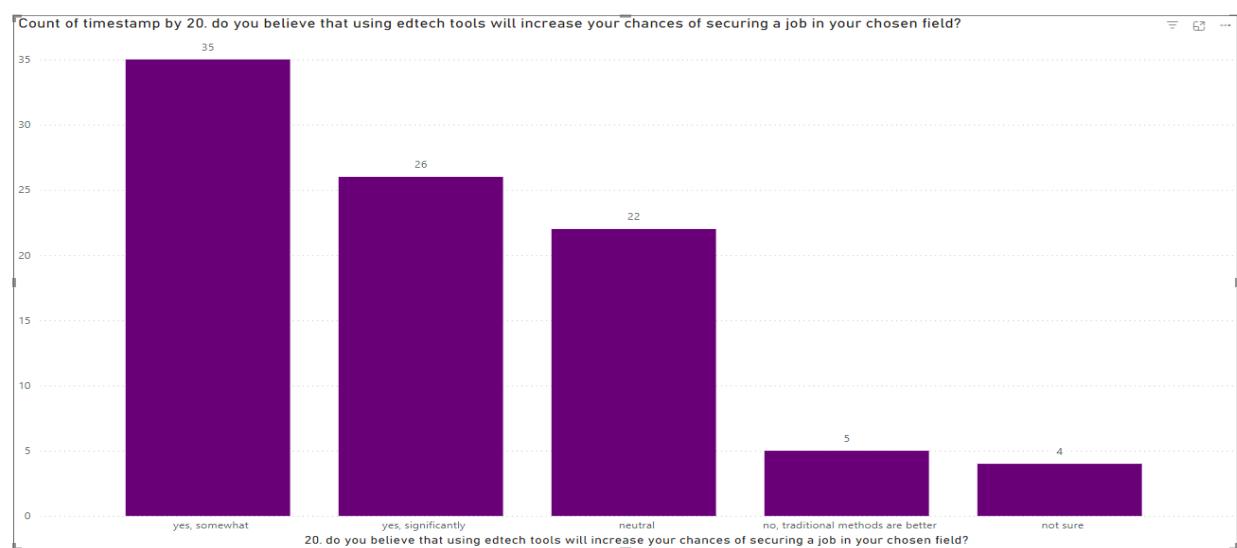
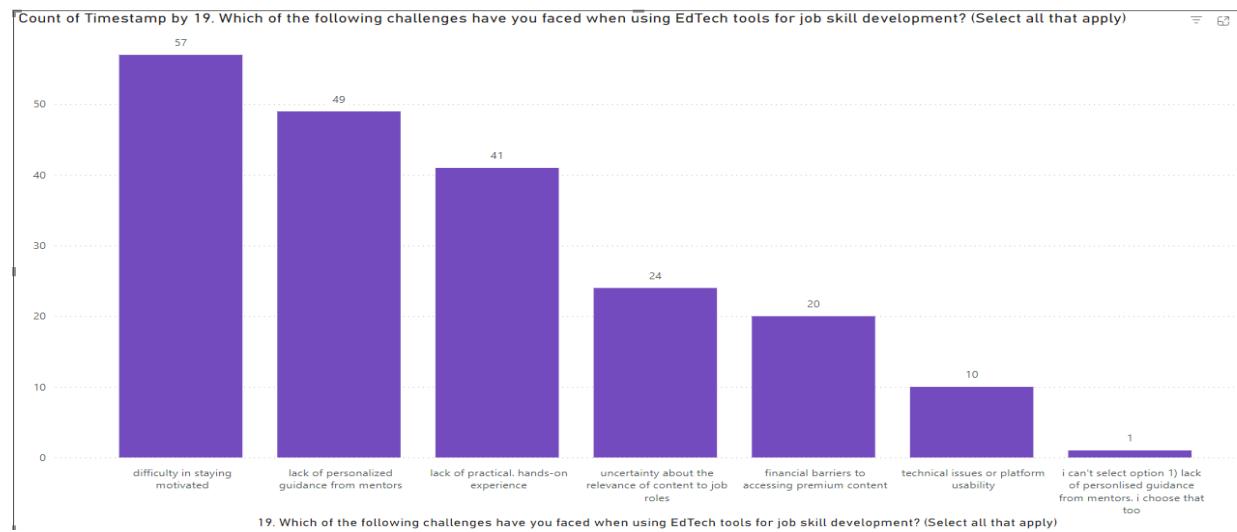


Count of timestamp by 17. Which of the following job-related skills have you developed using EdTech tools? (Select all that apply)



Count of timestamp by 18. to what extent do you believe edtech tools have helped you understand the needs and expectations of the job market?





General Results: 68.48% of respondents believe EdTech prepares them for the job market somewhat or significantly better. 35.14% use EdTech to learn technical skills, though it should be noted that 70.65% of respondents were from an engineering/technology background. 66.3% believe EdTech will help them find a job somewhat or significantly better. Major challenges faced were a lack of hands-on experience, a lack of personalized guidance from mentors, and difficulty in staying motivated.

b. Inferential Analysis:

Hypothesis Testing: Null hypothesis (H0)- City and preference are independent.

- Step 1: Create a Pivot table of values.

Count of 8. Which learning method do you prefer overall? Column Labels						
Row Labels		A hybrid of both	Modern (online learning, EdTech tools)	No preference	Traditional (in-person classes, books)	Grand Total
Delhi		42		5	1	6
Kolkata		24		5	1	4
Other		3				1
Grand Total		69		10	2	92

- Step 2: Calculate Expected Values (Neglecting Other section to avoid zero division error caused by null values, as well as to avoid ambiguity)

The formula for expected value is:

$$E_{ij} = \frac{(\text{Row Total}) \times (\text{Column Total})}{\text{Grand Total}}$$

17	Expected Values	Hybrid of both	Modern	No Preference	Traditional
18	Delhi	40.5	5.869565217	1.173913043	6.456521739
19	Kolkata	25.5	3.695652174	0.739130435	4.065217391

- Step 3: Calculate Chi-Square value and p-value

The Chi-Square formula is:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

- For each cell, calculate:

$$\frac{(O - E)^2}{E}$$

	Chi Square Formula per Cell	Hybrid	Modern	No Preference	Traditional	Total
23	Delhi	0.055555556		0.128824477	0.025764895	0.032279315 0.24242424
24	Kolkata	0.088235294		0.460358056	0.092071611	0.001046268 0.64171123
25	Grand Total					0.88413547
26	p-value					0.8292545
27						

Degree of freedom: 3

Using formula: =CHISQ.DIST.RT(ChiSquare_Value, Degrees_of_Freedom), in Excel, we get:

p-value=0.829545

Here, p-value > 0.05, therefore, null hypothesis fits and **no significant association of city and preference is found.**

Hypothesis Testing: Null hypothesis (H_0)- Field of study and preference are independent

i. Step 1: Create a pivot table

16	Count of 8. Which learning method do you prefer overall?	Column Labels				
17	Row Labels	A hybrid of both	Modern (online learning, EdTech tools)	No preference	Traditional (in-person classes, books)	Grand Total
18	Engineering/Technology	48		9	2	6 65
19	Non-Engineering	21		1	0	5 27
20	Grand Total	69		10	2	11 92
21						

ii. Step 2: Calculate Expected Values

23	Count of 8. Which learning method do you prefer overall?	Column Labels				
24	Row Labels	A hybrid of both	Modern (online learning, EdTech tools)	No preference	Traditional (in-person classes, books)	
25	Engineering/Technology	48.75		7.065217391	1.413043478	7.77173913
26	Non-Engineering	20.25		2.934782609	0.586956522	3.22826087
27						

iii. Step 3: Calculate Chi-Square value and p-value

29	Count of 8. Which learning method do you prefer overall?	Column Labels				
30	Row Labels	A hybrid of both	Modern (online learning, EdTech tools)	No preference	Traditional (in-person classes, books)	Grand Total
31	Engineering/Technology	0.011538462		7.065217391	0.243812709	0.403906963 7.724475524
32	Non-Engineering	0.027777778		1.275523349	0.586956522	0.972368614 2.862626263
33	Grand Total					10.58710179
34	p-value					0.014181528
35						

Degree of freedom: 3

p-value: 0.014181528

Here p-value < 0.05, therefore **there is a relation between field of study and preference for EdTech.**

6. Conclusion

From this report, we have concluded that college students from both Delhi and Kolkata have a preference for a hybrid mode of education, and there is no significant relation between the cities and the responses. However, while both have a preference for hybrid mode, there is a relationship between the field of study and preference. We also conclude that the pandemic made students prefer EdTech and that modern technology greatly helped them continue their education during the pandemic. We also concluded that students rely on EdTech for job preparation and skill enhancement.

It is also important to keep in mind the limitations of this survey, starting with the fact that a majority of the responses are from an engineering background and that we have already proven that the field of study affects their preferences. It should also be noted that the survey pool was not truly random. Finally, it should be noted that financial background and other relevant factors were not taken into account while conducting the survey. This survey will be beneficial for various companies who work on Edtech like Coursera Inc., BYJU'S, and various other educational platforms in understanding the mindset of students regarding Edtech and making a better version of it, keeping the various disadvantages identified in the survey. It could also help education policymakers take into account what students feel is most helpful in their education, and attempt to make the consequent changes. As per the survey, the next step is to take measures to have college education taken into a hybrid mode of modern and traditional classes.

7. Appendix

- a. Survey:
 - Which city are you from?
 - Delhi
 - Kolkata
 - Other
 - What is your field of study?
 - Humanities
 - Science
 - Commerce
 - Engineering/Technology
 - Other
 - What is your level of study?
 - Undergraduate
 - Postgraduate
 - Doctoral

- Other
- HYBRID MODE
 - How would you rate the effectiveness of traditional classroom-based learning (lectures, seminars) in helping you understand your coursework?
 - Very effective
 - Moderately effective
 - Neutral
 - Somewhat ineffective
 - Very ineffective
 - How effective do you find modern learning tools (e.g., online courses, EdTech platforms, learning apps) in helping you understand your coursework?
 - Very effective
 - Moderately effective
 - Neutral
 - Somewhat ineffective
 - Very ineffective
 - What do you value most about modern learning tools? (Select up to 2 options)
 - Flexibility to learn anytime, anywhere
 - Access to a wider variety of resources (videos, interactive exercises)
 - Self-paced learning
 - Innovative, engaging learning methods (gamification, simulations)
 - Access to global experts and content
 - Other (please specify)
 - What challenges do you face while using modern learning tools (EdTech)? (Select all that apply)
 - Lack of personal interaction with professors
 - Distractions from other online activities
 - Limited internet access or poor connectivity
 - Difficulty staying motivated or focused
 - Financial barriers (cost of devices, software)
 - Difficulty understanding or using the technology
 - Other (please specify)
 - Which learning method do you prefer overall?
 - Traditional (in-person classes, books)
 - Modern (online learning, EdTech tools)
 - A hybrid of both
 - No preference
 - What do you believe is the most significant advantage of modern learning tools over traditional methods?
 - Flexibility and convenience

- Access to diverse content and learning methods
 - Cost savings (less travel, fewer physical materials)
 - Ability to revisit lessons anytime
 - Other (please specify)
- PANDEMIC EFFECT
 - Have your attitudes toward learning methods changed due to the pandemic or recent shifts toward online education?
 - Yes, I now prefer modern learning tools
 - Yes, I now appreciate traditional learning more
 - No, my preferences remain the same
 - Not sure
 - Before the pandemic, how often did you use EdTech tools for learning?
 - Daily
 - Several times a week
 - Once a week
 - Occasionally
 - Never
 - How effective did you find EdTech in helping you continue your education during the pandemic?
 - Very effective
 - Moderately effective
 - Neutral
 - Somewhat ineffective
 - Very ineffective
 - How likely are you to continue using EdTech tools even after the pandemic, now that in-person learning has resumed?
 - Very likely
 - Somewhat likely
 - Neutral
 - Somewhat unlikely
 - Very unlikely
 - How do you think the pandemic has influenced the future of education in terms of EdTech adoption?
 - I believe EdTech will become a core part of education
 - I think EdTech will play a supplementary role
 - I think traditional learning will dominate again
 - Not sure
 - Did the use of EdTech during the pandemic improve your academic performance?
 - Yes, significantly improved
 - Yes, somewhat improved

- No noticeable impact
 - Somewhat worsened
 - Significantly worsened
- SKILLS
 - Do you think EdTech-based learning (online courses, learning platforms) better prepares you for the job market compared to traditional learning?
 - Yes, significantly better
 - Yes, somewhat better
 - About the same
 - Traditional learning is better for job preparation
 - Not sure
 - Which of the following job-related skills have you developed using EdTech tools? (Select all that apply)
 - Technical skills (e.g., coding, data analysis)
 - Communication skills (e.g., presentations, writing)
 - Problem-solving skills
 - Time management and productivity
 - Leadership and teamwork
 - Industry-specific skills (please specify)
 - Other (please specify)
 - To what extent do you believe EdTech tools have helped you understand the needs and expectations of the job market?
 - A great extent
 - A moderate extent
 - Neutral
 - A little
 - Not at all
 - Which of the following challenges have you faced when using EdTech tools for job skill development? (Select all that apply)
 - Lack of personalized guidance from mentors
 - Difficulty in staying motivated
 - Technical issues or platform usability
 - Lack of practical, hands-on experience
 - Financial barriers to accessing premium content
 - Uncertainty about the relevance of content to job roles
 - Other (please specify)
 - Do you believe that using EdTech tools will increase your chances of securing a job in your chosen field?
 - Yes, significantly
 - Yes, somewhat

- Neutral
 - No, traditional methods are better
 - Not sure
- How has EdTech changed your approach to learning and career preparation?
 - I now actively seek out new courses and skills on EdTech platforms
 - I occasionally use EdTech to complement my studies
 - I primarily rely on traditional education for career preparation
 - No significant change in approach

b. Data Collected:

<https://drive.google.com/drive/folders/1YJ1O83d8fN5TrxPDm1qnlfOHTXCMHmhk?usp=sharing>

c. Significance of EdTech:

<https://www.grandviewresearch.com/industry-analysis/education-technology-market>