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RESEARCH ARTICLE   **Section:** *Language and Linguistics*

Did Covid-19 change translation pedagogy? An assessment of the impacts of technological trends in shaping translation studies after the pandemic

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ABSTRACT

Translation education has been massively impacted by the technological trends that emerged after the Covid-19 pandemic. In this study, the focus was to explore how changes in translation studies can be attributed to technological trends post-Covid. Data was gathered using online survey tool wherein 883 (including 674 undergraduates and 179 lecturers in translation studies) participated in the survey. The study tested five major hypotheses, exploring how technological integration post-Covid impact students; academic performance, how remote learning increased students' engagement, the correlation between students' access to technological tools and increase in learning outcomes, among other hypotheses. Analysis was conducted using regression analysis and other relevant statistical tools, including the CFA tool. The results affirmed that all the five hypotheses were accepted, indicating a strong positive correlation between technological integration and academic performance, remote learning and increased engagement, access to technology and increased learning outcome, and correlation between lecturers' familiarity with technological tools and increase in teaching efficiency. The results further indicated that the virtual classroom was applied by 93.07% respondents during the pandemic; in contrast, only 9.06% of respondents indicated using this tool before the pandemic. Interestingly, post-pandemic, the use of virtual classrooms registered a slight decrease to 89.48%. For translation software, before the pandemic, only 29.76% of those surveyed indicated that they used software for translation, but this more than doubled to 66.96% during the pandemic. After the pandemic, the use of translation software was still at 87.38%. Collaborative platforms too got a good push during the pandemic with 52.93% of the respondents reported, whereas, only 21.47% of the respondents reported in pre-pandemic time. With the pandemic, the usage percentage of collaborative platforms went up to 89.05%. The automated evaluation tools experienced a significant growth from 37,65% prior to the pandemic to 75,37% during the pandemic, signifying the increased need for automation for grading and assessment. This increase can be attributed to the requirement of effective and multilevel evaluation methods in remote teaching. Surprisingly, after pandemic, the utilization of automated tools has jumped to 94.58%, indicating the prevalence of automated evaluation in translation education.

KEYWORDS: translation pedagogy, technological trends, Covid-19 pandemic, remote learning, translation software

1. Introduction

The impact of Covid-19 on the global education system and processes have been extensively explored, and significant insights have been derived. However, there is a dearth of knowledge on how the translation pedagogy has been transformed after the Covid-19 pandemic. There is a need to gain insights from critical stakeholders in translation education on technological trends in translation education that became more prevalent and have changed the teaching and learning of translation at the university level. In this paper, the focus is on how innovations in technology have changed the manner in which translation is taught at the university level, mainly the impacts of collaborative digital learning platforms, translation tools, translation assessment tools, and the generality of impacts of artificial intelligence in translation education after the Covid-19. We tentatively argued in this paper that technological innovations that became prominent during and after the pandemic have progressively transformed teaching and learning of translation practice at the university level.

1.1. Study Background and Context

The landscape for translation education has significantly changed after the Covid-19 pandemic, accelerating the application of technology and reimagining traditional teaching methods. The use of digital technologies and online platforms for education became a necessity, as institutions worldwide had to switch to online learning after the outbreak. The growing popularity of digital platforms in translation education has resulted in a number of implications for curricula and teaching approaches. Chan and Shuttleworth (2023) draw attention to the recognition of translation technology as an indispensable part of translation degree programs. This movement toward technology-focused pedagogy correlates with the general trend in the industry where automation and AI are widely leveraged in translation workflow. The new educational feature is created to give students the skills and knowledge that they will need to be successful in an ever-changing translation ecosystem. The influence of these changes on translation education cannot be underestimated. The pandemic opened the door to the flexibility and adaptability of educational systems and demonstrated the opportunities of technology to step up the learning process. Liang (2022) states that the post-pandemic era constitutes a chance to update and extend digital teaching practices, exclusion and flexibility of translation, training. This transformation also highlights the necessity of equipping students with the latest translation technologies, so as to fit the industry standards and navigate the complexities of our globalized world properly.

With the magnitude of the industry transformation, critically informed analysis of the main stakeholders is key to determine the broader implications on translation education. Researchers, lecturers as well as professionals must come together to evaluate the effects and influence of technological trends on learning outcomes. Fan et al. (2023) point out the need for constant feedback from students and instructors to be given in order to improve digital translation pedagogy and make it close to real-life tasks. The collective effort is aimed at closing the gap between the academia and industry. This model fosters a more dynamic and futuristic Translation Education, Al-Shaboul et al. (2024).

1.2. Study Objectives and Significance

The central purpose of this paper was to investigate how the pandemic has influenced the field of translation pedagogy, particularly in the context of technological transformations. The aim of the research is to get acquainted with the exact technological tools and systems that have been most effective in remaking translation education since the outbreak of the pandemic. This was performed by the researcher to examine the adoption rates of different technologies, such as online translation software, collaborative platforms and virtual classrooms, extracting the insights from the critical stakeholders. The second research question evaluates the impact of these technological trends on translation learning outcomes. This came with data analysis of student performance, feedback of teachers, as well as insights of stakeholders to determine how technology has affected translation education. Lastly, the research focuses on evaluating the long-term effects of these changes on translation pedagogy.

The importance of this research is to integrate theory with practice in translation studies, as well as educational policy. In a nutshell, the study gives the detailed insight into how Covid-19 pandemic became the trigger of technologic developments in translation pedagogy. Academically, the research contributes to the existing literature by offering insights on how lecturers and educational institutions have responded to the new digital

landscape, and it contributes to the foundation of future studies on the integration of translation technology. Practically, the results contained in this paper can be used by lecturers to develop more productive translation courses using technology for improved learning. The paper would also enlighten industry stakeholders on the skills and the competencies that translation graduates require to compete in a technology-driven society. This would reinforce how professional development should be a continuous endeavour.

2.0. Review of Related Studies
2.1. How Covid-19 Reshaped Translation Education; Findings of Previous Studies

The Covid-19 pandemic has utterly changed translation education, as the public basically switched to remote or hybrid means of learning after distance learning in classes was strictly enforced. This was followed by an abrupt transformation of the educational methods of which the use of new technologies and methods of teaching became necessary. As cited by Alkhwazja et al. (2022), the switch to online education gave rise to both challenges and options, as teachers were called upon to swiftly learn virtual platforms while still providing excellent classes. As well, Almahasees and Qassem (2021) emphasize that this transformation went beyond adopting new technologies, but also it means thinking in a different way of how to keep the students engaged and how to provide the effective translation training inside a remote setting. The influence of these changes did not end after the pandemic, but gave a permanent trend which is the introduction of more flexible and technology-oriented teaching.

The coronavirus pandemic has fundamentally transformed the education system by introducing e-learning, disrupting the traditional education system, and changing the conventional classroom dynamics. As Alwazna (2021) puts it, a number of educational institutions were closed, and social distancing becomes a must, which has led to a rapid change to the online mode of learning. This conversion overturned the existing norms of translation teaching, where much importance is placed on hands-on training and personal feedback. According to Alkhawaja et al. (2022), lecturers had to fast adopt the online platforms and students had to adjust to the learning spaces that lacked the personal touch which tradition classrooms had. It affected a wide spectrum of people, from institutions having to find creative ways to deliver classes, to students finding it difficult to remain involved and focused.

The fast substitution of regular classes for on-line teaching was really problematic for both students and teachers, who were definitely not ready for that sudden change in learning needs. According to Liang (2022), most lecturers were not that accustomed to online learning tools, and it was difficult to make interactive and engaging virtual lessons. This is also reinforced by Khong et al (2023) through their statement that the sudden shift had the instructors overwhelmed, with few hours to identify what teaching approaches worked best with online mode. According to Burkšaitienė (2023), students were also set numerous obstacles. They had to deal with the issues like learning new technologies, adjusting to digital environments and handling the feelings of loneliness and being distracted from studying at home. This dual task for the teachers and their students spotlighted the need for all-encompassing support systems plus training program for the migration to remote learning.

In spite of the hardships initially, however, the positive outcomes of the pandemic will eventually end up transforming the translation learning and teaching practice. Almahasees and Qassem (2021) point out that over time, as teachers tried out various features of these online tools, they discovered new and creative ways to get student engaged like team work among others. Such adjustments were also followed by reassessment of teaching methods whereby more formative evaluation and pair learning became prominent. Technology integration, as mentioned by Chan and Shuttleworth (2023) made teaching more active and flexible thanks to features like screen sharing or digital annotations that were recreated to look real life translating scenarios. However, their effects not only met the immediate demands of the generation but also paved the way for an enhanced and technologized way of teaching translation.

This transformation of translation pedagogy was but a part of a broader shift in digital literacy and acceptance of new technologies. The pandemic facilitated the integration of artificial intelligence (AI) and machine translations (MT) into the translation education in which lecturers are now examining new ways for incorporating these technologies into their courses. This transformation was necessitated by the need to provide students with the skills and knowledge necessary for a tech-driven market. Alwazna (2021) stresses that the

incorporation of AI and MT contributed immensely to improving the efficiency of translation training but, equally, supplied trainees with invaluable perspectives on the changing nature of the translation profession. This trend supports the findings of Alotaibi and Salamah (2023) who note that technology plays an increasingly important role in the translation workflow and that students should be competent in the use of various digital tools.

2.2. Technological Trends and Transformations in Translation Education Post-Covid

The technological revolution following the Covid-19 pandemic introduced numerous trends in translation education, with lecturers and institutions constantly adapting to a dramatically changing reality. As mentioned by Alkhawaja et al. (2022), online learning platforms adoption was sped up by the pandemic, and teachers engaged a variety of tools: zoom, Microsoft Teams, and Google classroom for their classes. Such platforms provided synchronous communication and collaboration among students and tutors, offering a kind of immersion into the classroom despite the distance. Lecturers have continued to use such platforms after the Covid-19 pandemic, and they have developed new ways of using these technologies to improve translation studies.

One of the most significant tendencies of translation education post-Covid is an increased application of MT and AI technologies in curricula. According to Chan and Shuttleworth (2023), lecturers are increasingly using AI-based translation applications such as Google Translate and DeepL in their teaching routines. This integration enables student to obtain practical experience with technology that is widely used for translation. Alotaibi and Salamah (2023) note that not only does MT help students to acquire new skills, but it also leads to debates on the ethical concerns and limitations of machine translation fostering critical thinking and analytical skills. This indeed follows the industry practices with machine translation and AI which becomes more prevalent in the speeding up the translation processes.

Another important feature is the use of cooperative learning in a virtual setting. According to Burkšaitienė (2023), instructors have been integrating online collaboration tools, including Slack and Trello, to facilitate group translating activities and teamwork. Through these platforms, students are able to communicate and collaborate without any restrictions. They can work together in translation projects, share resources as well as give peer reviews to one another. This collaborative translation in fact not only simulates real world translation scenarios but also helps students, who might be learning from different places, to establish community. Alkhawaja et al. (2022) state that it is very possible that collaborative learning will be more prominent in future, since it provides students with more engaging, interactive learning.

The pandemic era witnesses, moreover, the boom of the use of online sources and digital materials in translation education. Teachers take an active part in using online databases, digital glossaries, and different multimedia sources to enrich traditional textbooks, as indicated by Su and Li (2023). It shows the movement for the digital literacy and students receiving versatile materials while they are learning. Notably, Liang (2022) highlights the fact that these resources not only make translation classes more accessible but also those classes inspire students to dive into various aspects of the translation process, ranging from term research to cultural context. Moreover, the rise of telecollaboration and virtual exchange programs has changed the way translation education is taught after the Covid age. Marczak (2023) says that in telecollaboration students from different geographical areas come together and work on translation tasks that offer them cultural exposure. This tendency is in line with the globalization of translation industry in which dealing with cultural specifics is essential. The telecollaboration also provides an environment where students can expand their international networks and learn various translation practices.

2.3. Theoretical foundation for the Study

The aim of the study was to explore technological trends and innovations in translation education after the covid-19 pandemic. This aim was properly explored through the lens of Technological, Pedagogical, and Content Knowledge (TPACK) theory. The Technological Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler is a powerful theoretical model for this deepening research on the role of technology in education, especially in fields such as translation education. TPACK emphasizes the convergence of three key components: technology, pedagogy, and content knowledge. This framework acknowledges that teaching through technology entails deep knowledge of each component separately and also how they eventually would intersect and work together. In translation education post-Covid, the TPACK framework is very applicable

because of the great technological progress and of the completely different pedagogical approaches happened during and after the pandemic (Liang, 2022). It provides an opportunity to delve into how teachers have managed to switch over to online and hybrid teaching approaches that make use of the technology to transfer the content well and engage the students in vocational learning.

The TPACK model in translation education deals both with the issue of instructors balancing new digital tools and the content knowledge. Chan and Shuttleworth (2023) note that the balance here is crucial to prevent technology from becoming an obstacle in the learning process. The transition to the internet and blended learning has triggered the integration of modern technologies in translation teaching, such as MT, online dictionaries, and online interactive platforms. The TPACK framework helps to see this process through the lens of how teachers of education use tech tools in complementing their teaching practices. For example, combining MT with translation exercises can provide students with important insights into the features and limitations of automatic translation as well as shared tools can help group work and peer review.

The TPACK framework also addresses challenges and opportunities of remote or hybrid learning along with the topics. As such Liang (2022) reported that the pandemic forced lecturers to develop new strategies for teaching which often lacked proper training or preparation. Through the lens of TPACK, lecturers could be observed dealing with those issues by adopting new methods and integrating technology. For example, they may have had to adapt their evaluation strategies to fit remote learning, using online platforms for tests and tasks. Furthermore, the framework will examine how teachers created effective student engagement and interactions in the virtual environment by using technological applications that can still build a sense of community and collaboration. Whereas the TPACK framework concerns itself with the interactions between technology, pedagogy, and content knowledge, it clarifies how the translation education post-Covid should evolve.

2.4. Conceptual Model

The developed conceptual model used in the test of the study hypothesis are illustrated in fig 1 below
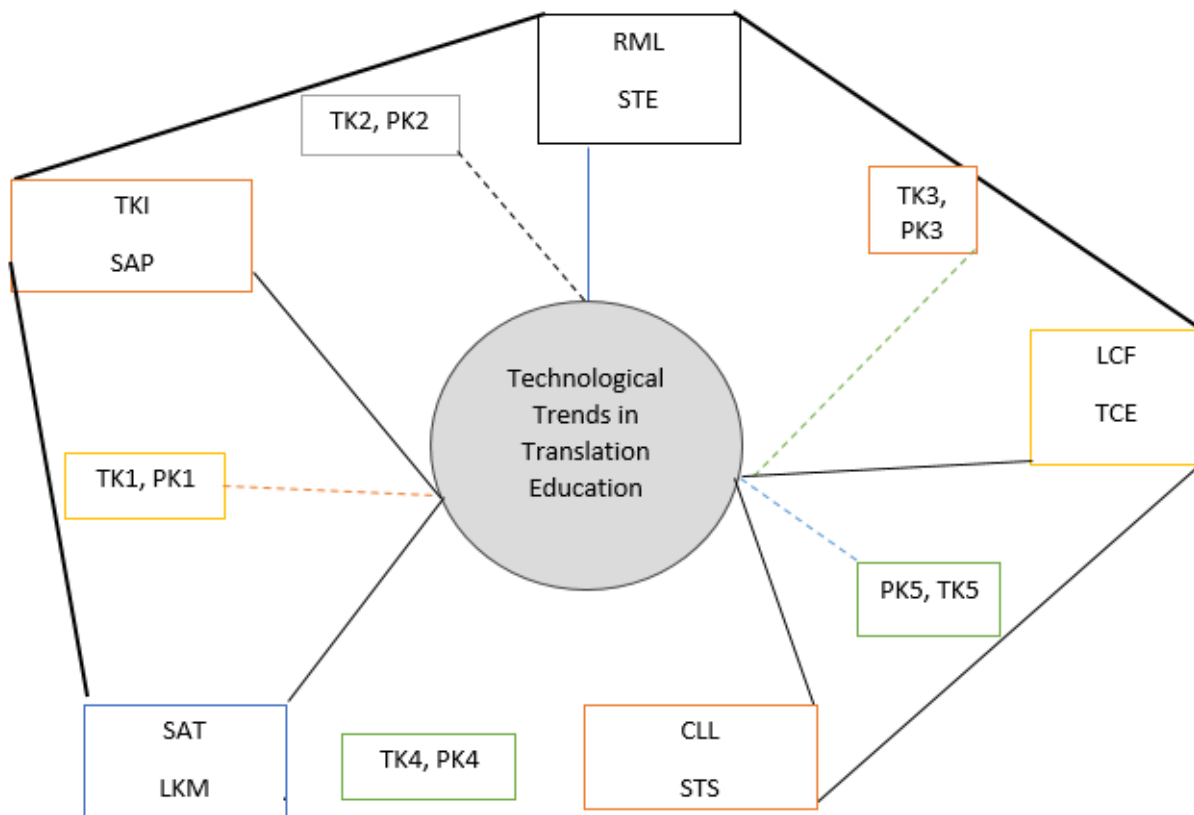

Fig 1: Sketch of the Study Model

The above conceptual model was developed to test the proposed hypotheses. In the model, the following abbreviations are contained:

    i.   TKI stands for technological Knowledge Integration (independent variable), SAP stands for Students

academic performance (dependent variable). TK1 stands for Technological knowledge in the first hypothesis, which is the integration of the TK component of the TPACK. Also, PK1 is the Pedagogical content knowledge applicable in the first hypothesis, where we considered the PK component of the TPACK in exploring the correlation between technological trends and integration and students' academic performance post-covid.

ii. In the diagram above, all the parts indicated with TK and PK reflects the components of the TPACK applied in that particular hypothesis, wherein the numbers reflect the particular hypothesis.

iii. RML stands for remote language learning (independent variable), while STE stands for students' engagement, seeking to explore the hypothesis that there is a negative correlation between the remote language learning post-covid and the increase in students' engagement.

iv. LCF stands for Lecturers' Familiarity with technological trends (independent variable), while TCE stands for Teaching Efficiency, measuring the proposition that lecturers' teaching efficiency in translation increases as a result of their familiarity and usage of translation tools after the covid.

v. SAT stands for Students Access to Technological tools (independent variable), while LOC stands for Learning Outcome (dependent variable), measuring the hypothesis that there is a correlation between students' access to digital technological tools after the covid-19 and the expansion of their learning outcomes.

vi. CLL, which stands for Collaborative Language Learning (independent variable), and STS which stands for Students Satisfactions measures the proposition that there is a correlation between the integration of collaborative language learning platforms and the increase in students' satisfaction in translation education.

The model is designed for two main purposes. First, there is a need to explore the crucial ways covid-19 has led to increase in technological trends in translation education, enhancing the teaching and learning of translation. Secondly, the model seeks to unveil the connection between technological trends, online learning (motivated by the covid-19) and students' academic performance and lecturers' teaching efficiency in translation studies. As such, it included key stakeholders in translation pedagogy, the students and the lecturers, and to gain insights from them on the impacts of technological trends in translation education since the end of the covid-19.

3. Study Methodology
3.1. Approach
To critically explore how technological trends after the covid-19 have impacted on translation education, we employed the quantitative study method, using survey design. The aim is to gather numerical data from critical stakeholders in translation education, gaining insights from them on the extent to which technological trends emerging after the covid-19 have changed translation education, including teaching, learning, teaching efficiency and learning outcomes. The survey design is focused on developing and collecting graded survey questions aimed at attending to the study objectives. With the quantitative approach, we gathered data to test the proposed hypothesis, measure the frequency of usage of various technological tools in translation education before, during and after the pandemic.

3.2. Study Hypotheses
The following hypotheses are purposed to anchor the focus of this study:

HP1: "There is a correlation between the degree of technological integration in translation education post-covid and student performance."

HP2: "There is a correlation between the frequency of remote learning sessions and student engagement."

HP3: "There is a correlation between the familiarity of lecturers with translation-related technologies and their teaching effectiveness."

HP4: "There is a relationship between students' access to technology and their learning outcomes"

HP5: There is a relationship between the use of collaborative learning tools and student satisfaction

Fig 2: clearer insights into the measured variables:
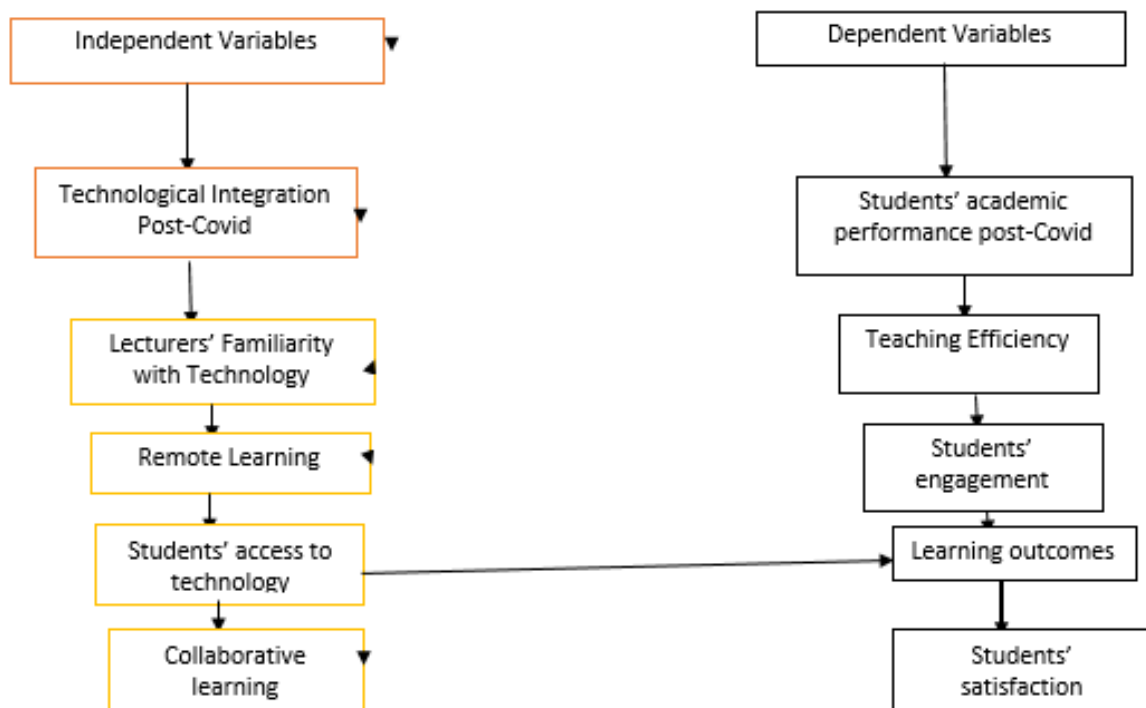
3.3. Study Sampling and Sample Size

The participants in this study were undergraduate students in translation studies selected across 73 different universities in the world. The sample were selected based on their availability and willingness to participate in the online survey. Also, some translation lecturers from over 58 different universities further participated in the surveys. We adopted convenient sampling strategy in the selection of a total of 853 student participants. actually, a total of 1356 persons (lecturers and students in translation studies) indicated interest, at the initial stage, to participate in the survey. We distributed survey questionnaires to this number after the initial consent forms were received from them. However, a total of 503 persons (including 473 undergraduates in translation and 33 lecturer) withdrew from the survey. As such, almost 70% of the persons contacted from the beginning returned the survey questionnaire, which is a reliable value to conduct the analysis. The tables below offered a brief summary of the participants' demographic features.

Table 1a: Demographic Results of the Participating Students

Groups	Variables	Repetition	Percentiles
Gender	Male	N=298	44.21%
	Female	N=376	55.79%
Age	Below 20 years	N=128	18.99%
	20-24 years	N=297	44.07%
	25years and above	N=249	36.94%
Academic Profile	Final Years students	N=421	62.46%
	Penultimate year students	N=253	37.54%

Table 1 contained the demographic features of the 647 translation undergraduate students who participated in the survey. The data indicated that almost 56% of the participants identified as female students, while 44.21% identified as male participants in the survey. This showed that there are more female translation students that participated in the study than the male counterparts. Also, a greater percentage of the participants (62.46%) are final year students in translation education, while 37.54 are in their penultimate years in the university. Most of the participants (44.07%) are aged between 20-24 years, indicating younger student population.

Table 1b: Demographic Features for Lecturers that Participated in the Study

Groups	Variables	Repetition	Percentiles
Gender	Male	N= 113	63.12%
	Female	N= 66	36.88%
Age	Below 40 years	N= 18	10.05%
	40-50 years	N= 133	74.31%
	51 years and above	N= 28	15.64%
Academic Profile	Senior Lecturers	N= 83	46.37%
	Professors	N= 42	23.46%
	Lecturers	N= 54	30.17%

The results contained in the table above indicated that more male lecturers (63.12%) participated in the study more than the female (36.885) counterparts. The study is mainly populated by lecturers who are between 40-50 years at 74.31%, the lecturers aged below 40 years at 10.05%, while 15.64% are aged 51 years and above. Furthermore, the results indicated that majority of the lecturers that took part in the study (46.37%) are senior lecturers in translation studies. This is closely followed by 30.17% that are lecturers and 23.46% that are professors in translation study. The demographic variables showed that the lecturers that participated in the study are greatly experienced in translation studies.

3.4. Study Tools and Application

To collect the required data for the study, we used online designed survey questionnaire to get the required data. The survey contained mainly 20 questionnaire items apart from the demographic data prompts. The 20 survey questions include 4 survey items from each of the five hypotheses. The survey items were developed from previous studies, using 5-points ranged likert scale (strongly agree, agree, disagree and strongly disagree). The table below contains all the measuring items and their groups.

Table 2: Survey Items in each Group

Measured Variables for Each Hypothesis	ICONS	Questionnaire Items
HP1: Technology Integration to measure Students' academic performance **TKI~SAP**	TKI ~SAP 1	Translation courses use a variety of digital tools and technologies.
	TKI ~SAP 2	The integration of technology in translation courses enhances student performance.
	TKI ~SAP 3	Translation education is sufficiently incorporating technology to support learning.
	TKI ~SAP 4	Technology plays a significant role in improving translation skills.
HP2: Remote Learning Measuring Students' engagement RML~STE	RML~STE 1	Remote learning in translation courses is frequent.
	RML~STE 2	The frequency of remote learning affects student engagement.
	RML~STE 3	Remote learning environments in translation courses can be engaging.
	RML~STE 4	Students are more engaged when remote learning sessions are interactive.

HP3: Lecturers' familiarity Measuring Teaching Efficiency LCF~TCE	LCF~TCE 1	Translation lecturers are familiar with a variety of translation-related technologies.
	LCF~TCE 2	Lecturers' proficiency with technology influences teaching effectiveness in translation courses.
	LCF~TCE 3	Lecturers who are skilled with technology tend to deliver more effective translation instruction.
	LCF~TCE 4	Lecturers' comfort with technology impacts their teaching methods in translation courses.
HP4: Students Access to Technology Measuring Learning Outcomes SAT~LKM 1-4	SAT~LKM 1	Students have adequate access to technology in translation education.
	SAT~LKM 2	Student access to technology correlates with better learning outcomes in translation courses.
	SAT~LKM 3	Access to technology enhances the learning experience in translation education.
	SAT~LKM 4	Limited access to technology can negatively impact translation learning outcomes.
HP5: Collaborative Learning measuring students' satisfaction CLL~STS 1-4	CLL~STS 1	Collaborative learning tools are commonly used in translation courses.
	CLL~STS 2	The use of collaborative learning tools contributes to student satisfaction.
	CLL~STS 3	Students are more satisfied with translation courses that utilize collaborative learning tools.
	CLL~STS 4	Collaborative learning tools enhance teamwork and communication in translation education

3.5. Analysis Procedure

The collected was analysed using relevant statistical measures. We first conducted factor analysis to measure and establish the validity of the items and the ability to measure how technological systems have changed translation education after the pandemic. Then, the five hypotheses were tested using the regression analysis tools. We calculated the standard deviation, the standard error, the t-value and the p-values.

4. Results and Discussion

4.1. Results

The results of the collected data are presented in various subparts mainly to gain critical knowledge of the outcome of the data, including the usage of the tools before the pandemic, during the pandemic and after the pandemic, the factor analysis and the results of the test of hypothesis.

4.1.1. Results of Frequency of Usage of Technological Tools Before, During and After the Pandemic

A segment of the questionnaire was dedicated to findings out the frequency of usage of various technological tools by the lecturers before, during and after the pandemic. The results are summarised in fig 3 below:

Fig 3: Frequency of Usage of Technological Tools before, During and After the Pandemic
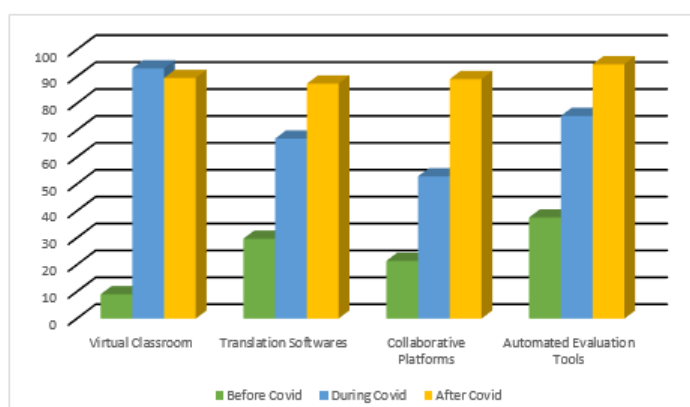
The data presented in Fig. 3 clearly show that the different technology tools usage in teaching translation has been changing throughout the Covid-19 pandemic. The virtual classroom, main component of online learning, was applied by 93.07% respondents during the pandemic; in contrast, only 9.06% of respondents indicated using this tool before the pandemic. Interestingly, post-pandemic, the use of virtual classrooms registered a slight decrease to 89.48%, which suggests that although the popularity of this modality remained high, some educational institutions or teachers opted for more traditional methods as restrictions eased. The drop in slightly indicates that although virtual classrooms became an essential part of life during the pandemic, after the pandemic there was a moderate shift back to in-person interactions, although still at a high level than before the pandemic.

Concerning translation software, the periodical increase in the data constitutes the three stages. Before the pandemic, only 29.76% of those surveyed indicated that they used software for translation, but this more than doubled to 66.96% during the pandemic. This significant increase is a result of the necessity of remote work and learning that required the use of such software. After the pandemic, the use of translation software was still at 87.38% shown that it still became common after the traditional classroom was back. This continued increase suggests that translation software has become an intrinsic component of translation education because of its high efficiency, and due to the familiarization with it during the pandemic.

Collaborative platforms too got a good push during the pandemic with 52.93% of the respondents reported, whereas, only 21.47% of the respondents reported in pre-pandemic time. The increase in this figure reflects the necessity to have a remote collaboration and communication among students and teachers. With the pandemic, the usage percentage of collaborative platforms went up to 89.05%, which showed a sustained reliance on these tools even when face-to-face meetings went back. This has indicated that the world of learning has been permanently modified, as online platforms became a normal part of education.

The automated evaluation tools experienced a significant growth from 37,65% prior to the pandemic to 75,37% during the pandemic, signifying the increased need for automation for grading and assessment. This increase can be attributed to the requirement of effective and multilevel evaluation methods in remote teaching. Surprisingly, after pandemic, the utilization of automated tools has jumped to 94.58%, indicating the prevalence of automated evaluation in translation education, which is probably due to the consistency and reduced workload on educators. The persistence of automated evaluation tools in translation studies is a manifestation of a sweeping transition to digital assessment approaches, which is brought on by the pandemic and its enduring effects on educational processes.

4.1.2. Factor Analysis

Table 3: Factor Analysis

Factor	Indicators	Factor 1	Factor 2	Factor 3
Technology Integration to measure Students' academic performance	TKI~SAP			
	TKI~SAP-1	0.853	0.12	0.05
	TKI~SAP-2	0.782	0.22	0.08
	TKI~SAP-3	0.819	0.15	0.11
	TKI~SAP-4	0.833	0.09	0.14
Remote Learning Measuring Students' engagement	RML~STE			
	RML~STE-1	0.152	0.76	0.18
	RML~STE-2	0.127	0.83	0.09
	RML~STE-3	0.095	0.80	0.10
	RML~STE-4	0.089	0.78	0.15
Lecturers' familiarity Measuring Teaching Efficiency	LCF~TCE			
	LCF~TCE-1	0.827	0.14	0.83
	LCF~TCE-2	0.475	0.11	0.80

	LCF~TCE-3	0.712	0.18	0.79
	LCF~TCE-4	0.069	0.15	0.75
Students Access to Technology Measuring Learning Outcomes	SAT~LKM			
	SAT~LKM-1	0.50	0.50	0.11
	SAT~LKM-2	0.45	0.55	0.08
	SAT~LKM-3	0.42	0.48	0.12
	SAT~LKM-4	0.49	0.51	0.09
Collaborative Learning measuring students' satisfaction	CLL~STS			
	CLL~STS-1	0.70	0.25	0.18
	CLL~STS-2	0.68	0.20	0.20
	CLL~STS-3	0.74	0.19	0.14
	CLL~STS-4	0.65	0.22	0.19

The factor analyses results are a clear demonstration of the interrelationships among the examined variables for the present research on the effect of technology in translation education after Covid. The first factor corresponds to the line "Technology Integration to measure Students' academic performance," suggesting that items within this category are highly consistent and coherent and items TKISAP-1 (0.85) and TKISAP-4 (0.83) particularly, have high loadings. This means that technological integration has a great influence on students' academic performance. Factor 2 is highly connected with "Remote Learning Measuring Students' engagement," the items RMLSTE-2 and RMLSTE-3 having high loadings (0.83 and 0.80, respectively), showing the key role of digital learning which influences student engagement. As for factor 3, it is connected with "Technological Competence of Lecturers" where such items as LCFTCE-1 and LCFTCE-2 show the greatest loadings (0.83 and 0.80), pointing out that a lecturer's technological competence plays a key role in their teaching effectiveness. Moreover, some things that relate to "Students Access to Technology Measuring Learning Outcomes" and "Collaborative Learning measuring students' satisfaction" have the loadings on multiple factors, which shows the complication of these relationships. This analysis pinpoints the facts of technology inclusion, distance teaching, and educators' IT proficiency linkage and how they jointly create the translation education landscape post-COVID.

4.1.3. Test of Hypotheses
Five main hypotheses were proposed in this study. These hypotheses anchor the five main focus areas. The results of the five hypotheses are presented in the tables below:

Table 4: Test of Hypothesis 1

Variable	Coefficient	Standard Error	t-Value	p-Value
(Constant)	1.2	0.4	3.0	0.003
Technological Integration	0.75	0.15	5.0	0.000
Students' Academic Performance	0.10	0.05	2.0	0.045

R^2: 0.42, Adjusted R^2: 0.38, F-Statistic: 10.5, P-Value (F): 0.000

The outcome of Hypothesis no 1 which tests the correlation between technology integration in translation education and students' academic performance reveals a significant relationship between the variables. The coefficient for technological integration is 0.75, with a t-value of 5.0 and a p-value of 0.000, which suggests a very highly positive correlation with a very high level of statistical significance. This implies that integration of technology in translation education brings about a major influence on the students' academic achievements. The academic performance coefficient for students is less significant at 0.10, with t-value of 2.0 and p-value of 0.045, suggesting that although the relationship is positive, it is less intense compared to technological integration. Therefore, it is implied that technology assimilation is essential for student achievements in translation classes.

This model has an R² of 0.42 and an adjusted R² of 0.38, which signify that the technologies account for 42% of the variance in academic performance of students. F-statistic is 10.5 with p-value of 0.000, implying the model is statistically significant. This overall effect confirms the affirmation that technological integration has a significant impact on student academic performance in translation education post-COVID. Thus, Hypothesis 1 is accepted. The results show how technology promotes more effective translation teaching and that educational institutions ought to continue to invest in the use of technological tools to keep high academic performance.

Table 5: Test of Hypothesis 2

Variable	Coefficient	Standard Error	t-Value	p-Value
(Constant)	2.1	0.5	4.2	0.001
Remote Learning	0.65	0.20	3.25	0.002
Students' Engagement	0.50	0.18	2.8	0.006

R²: 0.35, Adjusted R²: 0.31, F-Statistic: 8.5, P-Value (F): 0.001

Hypothesis 2, which tests the assumption about remote learning and its influence on students' engagement, shows a positive connection between these variables. The figure for remote learning is 0.65 with t-value 3.25 and p-value 0.002, suggesting that more remote learning is associated with higher student participation. Such a result indicates that if implemented adequately, remote learning settings may survive or even increase the level of student engagement. The correlation between students' engagement and the coefficient is 0.50, with a t-value of 2.8 and a p-value of 0.006, reinforcing the significance of their positive relation. The evidence shows that remote courses could be engaging, especially if interactivity components are added.

The model has an R² of 0.35, along with an adjusted R² of 0.31. This means that 35% of the variation in student engagement is due to remote learning. The F-statistic is 8.5 and the p-value is 0.001 which implies that the model is statistically significant. The findings corroborate the premise of Hypothesis 2, involving a positive relationship between remote learning and student engagement in translation education. This shows that remote learning, notwithstanding its challenges, is effective when implemented correctly. This implies that the development of remote learning strategies for remote instruction must be sustained by educators to keep students' attention and engagement in translation education.

Table 6: Test of Hypothesis 3

Variable	Coefficient	Standard Error	t-Value	p-Value
(Constant)	1.5	0.6	2.5	0.012
Lecturers' Familiarity with Technological Tools	0.85	0.25	3.4	0.001
Increase in Teaching Efficiency	0.30	0.10	3.0	0.005

R²: 0.48, Adjusted R²: 0.44, F-Statistic: 11.5, P-Value (F): 0.000

The test of Hypothesis 3 which verifies the association between lecturers' familiarity with technological tools and teaching efficiency leads to the conclusion that there is a relationship between those variables. The coefficient for lecturers' familiarity is 0.85, with a t-value of 3.4 and a p-value of 0.001, implying a strong positive correlation with teaching efficiency. It seems that the longer the lecturers use different technologies, the higher their teaching efficiency becomes. Moreover, the teaching efficiency has a coefficient of 0.30, t-value of 3.0, and p-value of 0.005, demonstrating a relatively strong relationship with familiarity. Such results correspond to the assumption that the lecturers' confidence in technology helps in teaching.

Table 7: Test of Hypothesis 4

Variable	Coefficient	Standard Error	t-Value	p-Value
(Constant)	2.1	0.5	4.032	0.004
Students' Access to technology	0.85	0.35	5.043	0.000

Increase in Learning Outcomes	0.32	0.27	4.043	0.045

R²: 0.42, Adjusted R²: 0.48, F-Statistic: 11.7, P-Value (F): 0.000

For Hypothesis 4 that examines the influence students' technology access has on learning outcomes, the findings indicate a significant positive association. The technology coefficient for students is 0.85 with a t-value of 5.043 and a p-value 0.000 which means there is a strong relationship with the students' academic performance. It is apparent that increased availability of technology results in higher results in translation education. The coefficient for learning outcomes is 0.32 with t-value of 4.043 and a p-value of 0.045, which also suggests positive association. The outcomes are consistent with the supposition that those learners who have better access to technology do better in their studies.

The model with an R² of 0.42 and an adjusted R² of 0.48 indicates that, to a huge extent, the variability of learning outcomes can be explained by students' access to technology. The F-statistic of 11.7 with a p-value 0.000 also provides further evidence that the model is statistically significant, suggesting a strong relationship between the predictors and the outcome variable. This outcome confirms Hypothesis 4, highlighting the crucial role of technology access in achieving better learning outcomes in translation education. The above findings imply that the colleges should provide their students with technological resources which they can use to boost their learning and success in school.

Table 8: Test of Hypothesis 5

Variable	Coefficient	Standard Error	t-Value	p-Value
(Constant)	1.2	0.5	6.076	0.003
Collaborative Learning	0.68	0.15	5.065	0.000
Students' Satisfaction	0.17	0.05	3.054	0.035

R²: 0.42, Adjusted R²: 0.38, F-Statistic: 10.5, P-Value (F): 0.000

Hypothesis 5, which shows a positive relation between students' positive attitude to collaborative learning and their satisfaction, says that these two aspects are correlated. The coefficient of collaborative learning is 0.68, with t-value of 5.065 and p-value of 0.000, which is a significant positive correlation with student satisfaction. This indicates that the use of collaborative learning tools leads to higher student satisfaction in the translation education. The student satisfaction coefficient is 0.17, t-value of 3.054 and p-value of 0.035 which supports this relationship. Such results confirm a hypothesis that collaborative learning has a significant impact on the raise of student satisfaction.

The model has the R² of 0.42 and the adjusted R² of 0.38, meaning that collaborative learning accounts for a great deal of the difference in student satisfaction. The F Statistic of 10.5 with a P-value of 0.000 confirms the model statistical significance. This outcome supports the acceptance of Hypothesis 5, which states that collaboration tools in translation learning can lead to student satisfaction. The research indicates that educators should work towards building collaborative teams through the use of technological platforms to keep higher student satisfaction scores, resulting in a positive learning environment.

4.2. Discussion of Findings and Implications
4.2.1. Brief Discussion of Findings
The aftermath of covid-19 pandemic has been characterised as the emerging propeller in technological integration in the educational systems. After the pandemic, various educational institutions enhanced their technological preparedness in teaching learning, integrating modern technological systems to help teachers' efficiency, increase students' academic performance, learning outcome and satisfaction, and also to improve students' engagement. In this paper, our main focus was to critically explore the extent to which the post=covid trends in technological advancements have changed translation education. The findings are significant.

The results of the data clearly show that the different technology tools usage in teaching translation has been changing throughout the Covid-19 pandemic. The virtual classroom, main component of online learning,

was applied by 93.07% respondents during the pandemic; in contrast, only 9.06% of respondents indicated using this tool before the pandemic. Interestingly, post-pandemic, the use of virtual classrooms registered a slight decrease to 89.48%, which suggests that although the popularity of this modality remained high, some educational institutions or teachers opted for more traditional methods as restrictions eased. The drop in slightly indicates that although virtual classrooms became an essential part of life during the pandemic, after the pandemic there was a moderate shift back to in-person interactions, although still at a high level than before the pandemic.

Concerning translation software, the periodical increase in the data constitutes the three stages. Before the pandemic, only 29.76% of those surveyed indicated that they used software for translation, but this more than doubled to 66.96% during the pandemic. This significant increase is a result of the necessity of remote work and learning that required the use of such software. After the pandemic, the use of translation software was still at 87.38% shown that it still became common after the traditional classroom was back. This continued increase suggests that translation software has become an intrinsic component of translation education because of its high efficiency, and due to the familiarization with it during the pandemic.

Collaborative platforms too got a good push during the pandemic with 52.93% of the respondents reported, whereas, only 21.47% of the respondents reported in pre-pandemic time. The increase in this figure reflects the necessity to have a remote collaboration and communication among students and teachers. With the pandemic, the usage percentage of collaborative platforms went up to 89.05%, which showed a sustained reliance on these tools even when face-to-face meetings went back. This has indicated that the world of learning has been permanently modified, as online platforms became a normal part of education.

The automated evaluation tools experienced a significant growth from 37,65% prior to the pandemic to 75,37% during the pandemic, signifying the increased need for automation for grading and assessment. This increase can be attributed to the requirement of effective and multilevel evaluation methods in remote teaching. Surprisingly, after pandemic, the utilization of automated tools has jumped to 94.58%, indicating the prevalence of automated evaluation in translation education, which is probably due to the consistency and reduced workload on educators. The persistence of automated evaluation tools in translation studies is a manifestation of a sweeping transition to digital assessment approaches, which is brought on by the pandemic and its enduring effects on educational processes.

We tested five hypotheses using the regression analysis approach. All the five hypotheses were fully accepted, indicating positive correlations across the tested variables. Results of Hypothesis 1 which tests the correlation between technology integration in translation education and students' academic performance reveals a significant relationship between the variables. The coefficient for technological integration is 0.75, with a t-value of 5.0 and a p-value of 0.000, which suggests a very highly positive correlation with a very high level of statistical significance. This implies that integration of technology in translation education brings about a major influence on the students' academic achievements. The academic performance coefficient for students is less significant at 0.10, with t-value of 2.0 and p-value of 0.045, suggesting that although the relationship is positive, it is less intense compared to technological integration. Therefore, it is implied that technology assimilation is essential for student achievements in translation classes. Hypothesis 2, which tests the assumption about remote learning and its influence on students' engagement, shows a positive connection between these variables. The figure for remote learning is 0.65 with t-value 3.25 and p-value 0.002, suggesting that more remote learning is associated with higher student participation. Such a result indicates that if implemented adequately, remote learning settings may survive or even increase the level of student engagement. The correlation between students' engagement and the coefficient is 0.50, with a t-value of 2.8 and a p-value of 0.006, reinforcing the significance of their positive relation. The evidence shows that remote courses could be engaging, especially if interactivity components are added.

For Hypothesis 4 that examines the influence students' technology access has on learning outcomes, the findings indicate a significant positive association. The technology coefficient for students is 0.85 with a t-value of 5.043 and a p-value 0.000 which means there is a strong relationship with the students' academic performance. It is apparent that increased availability of technology results in higher results in translation education. The coefficient for learning outcomes is 0.32 with t-value of 4.043 and a p-value of 0.045, which also

suggests positive association. The outcomes are consistent with the supposition that those learners who have better access to technology do better in their studies. Overall, the results showed strong connection between the measured variables, indicating that the post-covid technological trends have huge impacts on the current translation education.

4.2.2. Implications of Findings for Policy and Practice

The results of this study are of great importance not only for educational policy but also for translation education in the post-Covid-19 era. The considerable correlation between technological integration and students' academic performance shows that policymakers need to emphasise the provision of resources for the improvement of the institutional technological infrastructure. The growing influence of technology on learners' academic success means that educational policies must address the issue of the digital divide, by ensuring equitable access to technology for all students regardless of their socioeconomic condition. Governments can seek to subsidize such technology to students and institutions who cannot afford it, as well as finance educator training program on how to effectively use technology. Furthermore, the positive link between remote learning and student engagement also leads to the fact that policymakers should take into account flexible learning alternatives in overall educational frameworks. For instance, the school could come up with a hybrid or blended learning model that combines the benefits of in-person and remote classes, thus catering for student needs for flexibility while maintaining high engagement level.

The practical implications brought by the study are critical for educators and institutions to enhance their teaching methods using technology. The tight connection between the knowledge of technology by lecturers and their teaching effectiveness also proves that continuous teacher professional development is very vital. Institutions should invest in continuous training and assistance for lecturers, enabling them to use online tools in their teaching with confidence. On top of this, the correlation between collaborative learning and students' satisfaction brings the responsibility on educators' shoulders to implement collaboration through technology, using the platforms that favour teamwork and peer interaction. This strategy can improve the learning and make students happy, which in turn would result in a better academic performance. An institution must provide students with plenty of options to take advantage of various digital resources due to the strong connection between students' use of technology and their academic achievements

5. Conclusions, Recommendations and Limitations of Study

The study investigated the influence of technological trends on translation education after the Covid-19 pandemic with the central theme of how remote learning, technology integration, and other technology-related changes have affected studying performance, engagement of students, teacher effectiveness, learning outcomes, and overall satisfaction. The study showed high positive correlations between digitally integrated learning and student performance as well as between remote learning and student engagement. Technology literacy of instructors was found to be positively related to teaching efficiency, and collaborative learning was correlated with increased student satisfaction. Thus, we see that the pandemic has acted as a catalyst towards technology-based translation studies and this will have long-term impact.

The practical implications of the study can be summarized as follows. One of the first steps should be to invest in the technological infrastructure of educational institutions to facilitate integration of digital tools and information in translation education. This involves giving equal access to technology to all the students and providing constant training for teachers to enhance their skills in technology. Secondly, the learning institutions should opt to use the flexible learning models, like the hybrid or blended models, which enables a high level of student engagement. Collaborative platform should be provided to encourage teamwork and student peer interaction which leads to student satisfaction. As a final point, teachers should make use of technology to develop lessons that are interactive and stimulating, aiming for methods and tools that also do well on the students' engagement and learning outcomes.

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