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Integrating ICT and pedagogy: A transformative model for teaching translation and interpretation

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Abstract

Background: The integration of information and communication technology (ICT) has transformed the educational landscape, including translation and interpretation education. Technological advancements, such as machine translators (MT), have driven the need for innovative teaching methods that enhance both the effectiveness of instruction and students' translation skills.
Aim: This study aims to examine the effectiveness of teaching translation and interpretation courses using an ICT-integrated and pedagogical approach.
Method: This study employed a pre-experimental design with a one-group pre-test and post-test, involving 26 students selected through random sampling. Data were analyzed using a paired samples t-test to measure significant differences in learning outcomes before and after the implementation of the ICT-based teaching method.
Results: The findings indicate that the ICT-integrated and pedagogical approach effectively improves students' translation skills. The paired samples t-test analysis revealed a significant p-value of less than 0.05 (p-value = 0.00). Overall, students perceived that the use of Machine Translators (MT) significantly facilitated their translation process, especially when structured practice was provided.
Conclusion: The integration of an ICT-based approach in translation instruction has been proven effective in enhancing students' skills. Understanding the concerns and motivations of both students and educators enables curriculum developers to address learning barriers, boost confidence in the use of machine translators, and guide students toward the efficient utilization of technology.

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INTRODUCTION

The advancement of Information and Communication Technology (ICT) has brought significant transformations across various aspects of life, including education. The integration of technology into teaching and learning processes presents new opportunities to create more interactive, flexible, and effective learning experiences (Akram et al., 2022; Hennessy et al., 2010; Schmidt & Tang, 2020). In this digital era, technologies such as machine translators (MT), computer-assisted translation (CAT), and artificial intelligence (AI)-based tools have revolutionized the fields of translation and interpretation (Moneus & Sahari, 2024). These technologies enable translators to work faster, more accurately, and more efficiently while meeting the demands of an increasingly global and competitive industry (Lee, 2020; Mahdi & Sahari, 2024). Consequently, translation and interpretation education must adapt by emphasizing the mastery of linguistic skills and technical competencies in utilizing ICT (AL-Darraji, 2023). Therefore, integrating ICT into translation and

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interpretation education is no longer a mere option but a necessity to prepare students for the dynamic challenges and opportunities in the evolving global landscape.

Era of globalization and technological advancements, the profession of translation and interpretation demands more complex and integrated skills. While technological developments have created significant opportunities in translation education, the implementation of ICT-based teaching methods remains suboptimal. Many educational institutions continue to rely on traditional theoretical approaches, such as text analysis and manual translation, which are less relevant to the demands of the modern translation industry (Dan & Bai, 2024; Esqueda, 2021). This creates a gap between the skills taught in classrooms and the competencies required in the professional world.

This lack of exploration highlights a significant gap between the skills taught in classrooms and the competencies required in the professional world. On the other hand, research on the integration of technology into translation teaching remains limited, particularly in developing effective and practical instructional models (Hastuti, 2020; Li & Gao, 2024). Most studies focus solely on the use of technology as a translation tool without addressing how it can be integrated with innovative approaches to enhance students' understanding and skills. These challenges urge educational institutions to design teaching strategies that effectively bridge translation theory with the practical application of ICT-based (Andriani et al., 2023; Pérez & Pastor, 2022). Therefore, there is a pressing need for an instructional model that systematically integrates ICT with pedagogical approaches, ensuring that students acquire both linguistic and technical skills relevant to industry demands.

Modern education demands effective teaching approaches that harness the potential of technology to foster meaningful learning experiences. A pedagogical model not only utilizes ICT tools as aids but also promotes active learning, collaboration, and the development of relevant problem-solving skills (Msafiri et al., 2023; Webb & Cox, 2004). Therefore, integrating technology and pedagogical approaches in translation teaching is essential to ensure that students not only understand theoretical concepts but are also capable of applying them in practice (Orlando, 2016; Shadiev et al., 2024). This instructional model enables students to independently explore and apply translation concepts. Through this innovative pedagogical approach, students can develop critical, collaborative, and technical skills that align with industry needs (Kivunja, 2014). At the same time, educators can act as facilitators, providing guidance in selecting and integrating technology into the learning process. This ensures that each stage of instruction supports the achievement of the competencies required.

Several prior studies have explored ICT-based learning models in various contexts. Research has examined the enhancement of ICT literacy and academic achievement through the TPACK approach (Nantha et al., 2024), the development of learning media to improve mathematical problem-solving skills (Dewi et al., 2023), learning outcomes (Kumar & Priyanka, 2024), and artificial intelligence (AI), which has proven effective in enhancing students' reading performance (Peng et al., 2023). In the field of translation, (2011) highlighted the application of blended learning in translator training, while Vaičiūnienė and Mažeikienė (2019) discussed the translation of ICT neologisms in ESP classrooms. Azizinezhad and Hashemi (2011) demonstrated that the use of blogs could enhance student engagement in translation learning. Additionally, Sibul (2023) emphasized the importance of ICT competencies for professional purposes, including translation teaching in ecology and energy management fields, while Gharafi (2020) addressed challenges in translation teaching at universities in Morocco. While the application of Information and Communication Technology (ICT) provides innovative solutions to enhance learning effectiveness, previous research has tended to separate the focus between technological and pedagogical aspects. This study addresses that gap by employing an integrated ICT- and pedagogy-based instructional model. Thus, this research also aims to evaluate the effectiveness of this model in supporting translation and interpretation teaching more holistically.

METHOD

This study utilized a one-group pre-test and post-test design under a pre-experimental research framework to determine the effectiveness of teaching activities in the "Translation & Interpretation" course. A one-group pre-test and post-test design was deliberately chosen, as the experimental teaching technique for "Translation & Interpretation" was implemented on an intact

group without a control group for comparison. This setup allowed for an evaluation of the effectiveness of ICT-based teaching within a single cohort of students (Kundu, 2020).

The study involved fifth-semester students enrolled in the evening classes of the 2022/2023 academic year at Cipta Wacana Christian University, Malang, Indonesia. The sample consisted of 26 students who participated as respondents using random sampling technique. To gather data, pre-tests and post-tests were administered to the experimental group. These tests aimed to evaluate students' translation and interpretation skills before and after the implementation of ICT-based teaching techniques. The pre-test was conducted at the beginning of the course to establish a baseline, while the post-test was carried out at the end of the teaching period to assess improvements (Aslan, 2019; Wiener et al., 2022). The comparison between pre-test and post-test results provided valuable insights into the effectiveness of the instructional strategies and the extent of students' learning progress

The students attended online classes via the Zoom platform, with sessions scheduled once a week for 90 minutes. The intervention lasted several weeks, during which students were exposed to ICT tools and pedagogical techniques, including planning, implementation, assignments, and course evaluation. Data collection involved administering a pre-test to evaluate students' initial translation skills before the intervention and a post-test after the intervention to measure the impact of the teaching model. Descriptive statistics, such as mean, standard deviation, and score range, were calculated using SPSS Statistics 27. Inferential statistical analyses, including correlation tests and paired sample t-tests, were conducted to determine the significance of observed performance differences.

The paired sample t-test was conducted to determine whether there was a statistically significant improvement in students' translation and interpretation skills as a result of the ICT-based teaching approach. The results were interpreted based on the significance value. If the significance value was less than 0.05, the null hypothesis (Ho) was rejected, and the alternative hypothesis (Ha) was accepted, indicating a significant difference in students' skills before and after the intervention. Conversely, if the significance value exceeded 0.05, the null hypothesis was accepted, suggesting no significant impact of the teaching approach.

a) Ho : There is no significant difference in the teaching of translation & interpretation with ICT-based and pedagogical integration techniques.
b) Ha : There is a significant difference in the teaching of translation & interpretation with ICT-based and pedagogical integration techniques.

RESULTS AND DISCUSSION

This study examines the impact of an ICT-based instructional model combined with pedagogical methodologies in the teaching of translation and interpretation courses. Its primary objective is to assess how this dual approach can enhance students' translation skills and overall academic performance. The research addresses key issues in translation education, particularly the balance between utilizing machine translation tools (such as Google Translator and online dictionaries) and implementing student-centered pedagogical strategies.

This study is motivated by the growing demand for innovative teaching methods that integrate technology with educational theory to achieve meaningful learning outcomes, especially in an era dominated by digital transformation. The results of the descriptive analysis of students' pre-test and post-test scores are presented in Table 1. This analysis includes the mean, standard deviation, and score range, providing an initial overview of students' performance before and after implementing the instructional model.

Table 1. Descriptive Analysis of Students' Pre-test and Post-test Results

	Mean	N	Std. Deviation	Std. Error Mean
PreTest	66.00	26	6.223	1.220
PostTest__TT_ICT	73.85	26	6.117	1.200

The descriptive statistics revealed significant improvements in student performance. As shown in Table 1, the mean pre-test score was 66.00, while the post-test mean increased to 73.85. This improvement indicates the effectiveness of the ICT-based and pedagogical teaching model in enhancing students' translation abilities. The standard deviation for the pre-test was 6.223, while that for the post-test was slightly lower at 6.117. This suggests that the variability in students' scores decreased slightly after the intervention, reflecting a more consistent level of performance among the participants. The reduction in score variability may be attributed to the uniformity in teaching methods and the structured application of ICT tools during the intervention.

The correlation between pre-test and post-test scores was calculated to assess the relationship between the two sets of data. The results, shown in Table 2, indicated a correlation coefficient of 0.589 with a significance level of 0.002. These findings suggest a strong positive relationship, confirming that the intervention had a measurable impact on students' performance. This correlation underscores the effectiveness of integrating ICT tools with pedagogical strategies. The observed improvements can be attributed to the interactive and student-centered nature of the teaching model, which encouraged active engagement and facilitated a deeper understanding of translation concepts. The results of the correlation test between students' pre-test and post-test scores are presented in Table 2. This test aims to evaluate the relationship between the initial ability and the improvement of students' abilities after the application of the teaching model.

Tabel 2. Correlation Test Result

	N	Correlation	Sig.
PreTest & PostTest__TT_ICT	26	.589	.002

Based on Table 2 above, it can be concluded that the results of the pre-test and post-test correlations on the application of ICT-based and pedagogical teaching models at the MK "Translation & Interpretation" to a number of 26-night class students at Cipta Wacana Christian University showed a correlation of 0.589 (> 0.05) it means that there is a difference in the effect of the application of the model on the treatment that has been applied to lecture activities with the ICT-based and Pedagogy model of the “Translation & Interpretation” course. Taking into account the significance of the paired samples correlation, it also shows a correlation value of 0.02, which means that there is an effect before and after the application of the model. Based on the correlation results, a paired-sample t-test can be used to conclude that the pre and post-test data are normally distributed and that the data meet the requirements for hypothesis testing. Given that the prerequisites for conducting hypothesis testing have been met, inferential analysis in this case is carried out using a paired sample test. The hypothesis testing strategy was used to test whether the experimental approach had a statistically significant impact on students' translation and interpretation. Research findings are shown in Table 3.

Table 3. Paired Sample t Test

	Mean	Std. Dev	t-Value	df	Sig. (2tailed)
Pretest - Posttest	7.846	5.598	7.147	26	0.000

Based on the information in Table 3, the significance value (Sig. 2-tailed) is .000. Since this value is smaller than 0.05, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates a significant difference between the pre-test and post-test scores. Therefore, it can be concluded that the integration of ICT and pedagogy in teaching translation and interpretation to 26 students has a significant impact and can be deemed an effective instructional model.

On the basis of the findings of this study, a number of facts were obtained, one of which was that the advantages of this format are without a doubt the fact that lectures are delivered online, students are at the centre of the learning process, regular assignments are submitted, and various communication methods are utilized. Participants in the educational process have the additional benefit of being able to work in an environment of their choosing, which will have a favourable influence on their mindset and will motivate them to work (Graham et al., 2020). Those who take part in the educational process can enjoy this added benefit. This finding is backed by findings from

prior studies which say that in addition to having access to learning opportunities, students need also to receive regular evaluations and incentives (Carrasco et al., 2021; Schwab & Somerville, 2022). In a synchronous educational setting, lecturers have access to a variety of methods to maintain or increase student enthusiasm (Dewaele & Li, 2021; Rapanta et al., 2020). These methods include interactive discussions, real-time feedback, and the integration of engaging digital tools that foster active participation and collaboration among students

The findings of this study utilize an integrated perspective based on the concept of developing pedagogical translation with a more intentional teaching methodology. Relevant previous research showing that content and language-integrated learning draws on multiple pedagogical views with a dual focus on linguistic and substantive elements corroborates these findings (Czura, 2017). Moreover, over the last few decades, the role of translation in the teaching and learning of new languages has been given increasing scales (Pintado Gutiérrez, 2021) as cited by Díaz-Millón & Olvera-Lobo (2023). There is currently little agreement in the areas of language teaching, second and foreign language acquisition, and translation (Jones et al., 2019). This lack of consensus underscores the need for further research to bridge the gaps and develop integrative approaches that effectively combine translation with language acquisition methodologies.

As students gain more experience, they will have a better understanding of both the advantages of using a free online translation service (such as speed, ease of use, and the absence of any compromises), as well as the disadvantages of using such a service (such as lower accuracy, dependence on language pairs and content types). Additional evidence supporting this understanding comes from the use of trustworthy human translation. After employing the abilities necessary for translation in the process of preparing the translation, you may find that it is simpler to try writing content or translating a document into the target language on your own. These findings are consistent with the findings of a number of other researches, including those that were carried (Killman & Mellinger, 2022). This alignment suggests a broader trend across studies, reinforcing the validity of the results and highlighting the importance of addressing similar challenges in related contexts

We conclude from the statement that translation educators and instructors that most of them have thought of MT in their language education, especially in terms of using internet-based translation services without access, based on research by (Blum, 2022). However, few of them have attempted to assess the nature of the results to ascertain the types of mistakes MT can make and the extent to which they can see these errors in their students' work (Kordić & Jokić, 2022). However, their interest in etymology did not stop them from using the framework to better understand whether producing initial drafts in other languages was feasible (Díaz-Millón & Olvera-Lobo, 2023). The majority of respondents have used an access-free online translation service for the target language, especially for the purpose of translation testing.

This innovative model of research aims to change teaching translation techniques and technologies while taking into account the historical development of the words (Doherty, 2016). According to the findings, translators need to have etymological competence. This refers to the ability to guarantee that the translation is accurate by knowing the etymological roots of words and general concepts and their functional qualities and original meanings. The criteria for developing this competency include the quality of the translation, independence in making judgments regarding translation, and the effectiveness of translation processes (Karagiorga et al., 2024). Given that innovative didactic methodologies are strongly associated with new technologies and are judged appropriate for the promotion of online learning, it seems reasonable to use new pedagogical methods to train new professional profiles in translation. As a result, it seems reasonable to use new pedagogical methods to train new professional profiles in translation.

In response to the discussion on how machine translation (MT) ought to be used in translation classes, the results showed that respondents suggested the following: to increase understanding of the distinctive features of translation content at the amateur level; to enable post-change practice in course translation; and to hone students' abilities to identify errors and the causes of those errors. It is possible to conclude that it is necessary to make an effort to enable post-conversion practice in translation courses, and to make this possible, to show students how evaluating MT results can help improve the quality of their final translation results. This can be done by showing students how evaluating MT results can help improve the quality of their final translation

results. This is consistent with the findings of several studies, which suggest that enhancing the quality of translation is a type of self-evaluation for translators that enables improvements in the growth of translation results that have already been accomplished.

The integration of ICT tools, such as Google Translator and online dictionaries, provided students with practical resources to support their translation tasks. These tools enabled them to work more efficiently, facilitating the acquisition of essential translation skills. The pedagogical strategies, which included regular assignments, interactive discussions, and structured evaluations, ensured that students remained actively engaged throughout the learning process. The findings align with previous studies emphasizing the importance of combining technology with pedagogical principles to create effective learning environments. For instance Chouc (2010) and Hubscher-Davidson and Devaux (2021) highlight the role of regular feedback and structured evaluations in enhancing learning outcomes.

The study contributes to the growing body of research advocating for the integration of ICT tools in translation education. By combining these tools with pedagogical strategies, educators can create a more holistic and effective learning environment. This approach not only enhances students' technical skills but also fosters critical thinking and problem-solving abilities. Moreover, the study highlights the importance of etymological competence in translation education. By understanding the roots and functional aspects of words, students can produce more accurate and contextually appropriate translations. This aligns with the findings of Kerr et al. (2023) and other researchers who emphasize the importance of linguistic and cultural competence in translation.

The study's findings support the integration of constructivist principles in translation education. By actively engaging students in the learning process and providing them with practical tools and resources, the teaching model fosters a deeper understanding of translation concepts. This approach aligns with the principles of active learning, which emphasize the importance of student engagement and interaction in achieving meaningful learning outcomes.

CONCLUSION

This study concludes that the integration of an ICT-based and pedagogical instructional model effectively enhances the teaching of translation and interpretation. The findings indicate that this approach is not only effective but also innovative and adaptable to the evolving needs of translation education. By aligning modern technology with pedagogical principles, this research provides a valuable framework for advancing translation education and preparing future translators to meet the challenges of the digital era. Based on the research findings, it is recommended that educators integrate ICT tools and regular evaluations into their teaching practices to explore alternative techniques or methods related to the integration of ICT and pedagogical approaches across a broader range of skills within the context of translation teaching. Furthermore, students should be encouraged to critically analyze machine translation outputs and develop relevant skills for professional translation tasks. Future research could investigate the long-term effects of ICT integration and its application in diverse learning contexts.

AUTHOR CONTRIBUTION STATEMENT

All authors contributed to the conception and design of the study

Abd Syakur : Conducted the analysis, and led the data interpretation process.
Putu Kerti : Designed the methodology and supervised the data collection.
Rizki : Collected, Organized the data, and review.
Wayan : Reviewed and edited the manuscript, and provided discussion section.

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