



Evaluating the Effectiveness of an International Research Presentation Workshop: Evidence from a Paired Sample t-Test

Neni Yulianita¹, Anne Maryani², Tresna Wiwitan³, Adhika Putra Rakhmatullah⁴, Raihan Firjatullah Irvanianto⁵.

¹Islam Bandung University, Indonesia, email. neni.yulianita@unisba.ac.id

²Islam Bandung University, Indonesia, email. anmar2005@gmail.com

³Islam Bandung University, Indonesia, email. tresna@unisba.ac.id

⁴Islam Bandung University, Indonesia, email. adhikaputrar@gmail.com

⁵Islam Bandung University, Indonesia, email. rehanga92@gmail.com

Corresponding Author: neni.yulianita@unisba.ac.id

Abstract:

Background. International research presentation skills are essential for global academic engagement. This study evaluates the effectiveness of a presentation workshop in improving participants' competencies using a pretest–posttest design and Paired Sample t-Test analysis.

Aim. This study aims to examine the effectiveness of digital workshops as a strategy for strengthening students' academic communication competence.

Methods. Through the workshop activities carried out, the level of knowledge of participants was evaluated using a descriptive approach. The instruments used to collect data were a pre-test and a post-test.

Results. The findings indicated significant improvements in students' academic communication competence after participating in the workshops. Students demonstrated better skills in organizing academic arguments, using scholarly language, and presenting research findings. In addition, participants reported increased self-confidence and motivation to engage in academic communication activities. The workshop participants were involved in an international forum, namely the International Conference on Communication, Management and Humanities (ICCOMAH VII) 2026.

Conclusions. Digital workshops are an effective strategy for enhancing students' academic communication competence and preparing them for global scholarly engagement.

Implementation. Higher education institutions should integrate digital workshop programs into academic development initiatives to strengthen students' scholarly capacities and support international academic participation.

Keywords: Academic Communication Competence, Digital Workshops, Scholarly Communication, International Journal Writing, and academic performance.



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INTRODUCTION

The rapid advancement of digital technology has significantly transformed higher education, particularly in the ways students communicate, collaborate, and disseminate academic knowledge. In the contemporary academic environment, students are expected not only to master disciplinary knowledge but also to demonstrate strong academic communication competence, including academic writing, scholarly presentation, critical argumentation, and participation in academic discourse communities. These competencies are increasingly recognized as essential attributes for successful engagement in global academic and professional settings (Dauber & Spencer-Oatey, 2023).

Despite the growing importance of academic communication competence, many university students continue to experience difficulties in expressing ideas coherently, constructing evidence-based arguments, and communicating research findings according to international academic standards. Previous studies have reported that students often struggle with academic writing conventions, genre awareness, and scholarly interaction, which may hinder their participation in international publication and academic collaboration (Hamsiah et al., 2026). Moreover, the proliferation of multiple digital communication channels has created additional challenges related to digital literacy and communicative competence in higher education contexts (Ou & Malmström, 2026).

Recent research highlights that digital learning environments offer substantial opportunities for enhancing students' communication competencies. Digital platforms facilitate collaborative learning, peer feedback, interactive engagement, and flexible access to academic resources, all of which contribute to improved learning outcomes (Smith & Storrs, 2023). Similarly, integrating computer-mediated communication tools has been found to strengthen students' writing performance, engagement, and collaborative learning experiences in higher education settings (Zhang, 2024).

Among various pedagogical innovations, digital workshops have emerged as a promising strategy for developing students' academic competencies. Digital workshops provide structured, interactive, and practice-oriented learning experiences that enable students to develop academic communication skills through real-time mentoring, collaborative activities, and continuous feedback. Previous studies indicate that workshop-based interventions can reduce technological anxiety, enhance learner autonomy, and improve academic performance (Ahmed Abdel-Al Ibrahim & Hashemifardnia, 2024).

Furthermore, communication skills can be effectively developed through blended and online learning environments when instructional communication and social presence are appropriately designed (Eklund & Isotalus, 2024).

However, although previous studies have examined digital literacy, online communication, and academic writing separately, limited research has specifically investigated the role of digital workshops in strengthening students' academic communication competence as an integrated construct. Existing literature predominantly focuses on writing performance or digital skills, leaving a gap in understanding how structured digital workshops contribute to broader dimensions of academic communication competence.

Therefore, this study aims to examine the effectiveness of digital workshops as a strategic intervention for strengthening students' academic communication competence in higher education. The findings are expected to contribute both theoretically and practically to the development of innovative pedagogical approaches that support students' readiness to participate in global academic communities.

From the above phenomenon, researchers are interested in researching regarding: what are the participants' levels of understanding of international research presentation before and after attending the workshop? Is there a statistically significant difference between the participants' pre-test and post-test scores following the workshop? How effective is the international research presentation workshop in improving participants' competence in presenting research at international conferences?

The objective of this study is to examine whether the international research presentation workshop significantly improves participants' understanding and competence in delivering research presentations, as evidenced by the comparison of pre-test and post-test scores using a Paired Sample t-Test.

LITERATURE REVIEW

Academic Communication Skills in International Forums

Academic communication skills are fundamental competencies that enable students to participate effectively in international academic activities, including conferences, symposiums, and scientific seminars. These skills involve not only the ability to deliver clear and engaging oral presentations but also the capacity to produce well-organized academic writing supported by sound scientific arguments. Together, oral and written communication

allow students to share research findings, exchange ideas, and contribute meaningfully to the global scholarly community. However, many students still face challenges in developing confidence when presenting their work in public. A recent study by Irfianti et al. (2024) found that expressive writing therapy can effectively reduce public speaking anxiety by encouraging students to express their thoughts and emotions through reflective writing before delivering presentations. This approach helps students better manage anxiety, thereby improving their confidence and readiness to communicate in academic settings.

Participants also showed noticeable improvement in their public speaking performance. They became more confident in delivering presentations, used facial expressions and vocal variation more effectively, and demonstrated greater originality in expressing their ideas, resulting in more engaging and effective communication (Herachwati et al., 2023). Thus, the combination of collaborative public speaking and academic writing training can increase students' self-confidence and the quality of their presentations.

Academic Communication Competence in Higher Education

Academic communication competence refers to students' ability to effectively communicate ideas, arguments, and research findings within academic contexts through written, oral, and digital forms. In higher education, this competence encompasses academic writing, critical argumentation, presentation skills, scholarly interaction, and participation in academic discourse communities. The increasing internationalization of higher education has further emphasized the importance of these competencies for students' academic success and global engagement.

Recent research suggests that academic communication competence involves more than language proficiency alone. It also includes the ability to use digital technologies effectively, communicate across cultural contexts, and collaboratively construct knowledge with others. According to (Dauber & Spencer-Oatey 2023), students need strong global communication skills to actively participate and succeed in international academic settings. In addition, the rapid expansion of technology-enhanced learning has made digital communication competence an essential element of academic literacy, enabling students to engage more effectively in online learning, academic collaboration, and knowledge exchange.

Digital Learning and Communication Competence Development

The rapid growth of digital technologies has transformed the way teaching and learning are conducted in higher education, creating more flexible, interactive, and accessible learning experiences. Digital learning ecosystems integrate virtual learning environments, digital tools, and innovative pedagogical approaches to facilitate competency development among students. Research demonstrates that technology-enhanced learning environments promote interaction, collaboration, flexibility, and learner autonomy, thereby contributing to the development of communication competencies.

Recent studies suggest that the rapid growth of digital learning has transformed the way students develop academic communication competence. Beyond acquiring subject knowledge, students are now expected to combine digital literacy with effective communication, collaboration, and knowledge-sharing skills in technology-supported learning environments. Well-designed digital learning experiences encourage meaningful interaction, collaborative learning, and ongoing feedback, helping students strengthen their communication abilities and engage more confidently in international academic communities (Eklund & Isotalus, 2024; Song et al., 2025).

Computer-mediated communication (CMC) has become an integral component of contemporary higher education by enabling students to communicate, collaborate, and exchange knowledge beyond the boundaries of traditional classrooms. Tools such as collaborative writing platforms, video conferencing applications, and online discussion forums create opportunities for active interaction and collaborative learning. Integrating CMC tools into higher education significantly improves collaborative writing practices while promoting meaningful academic communication among students (Zhang, 2024). In addition, these digital platforms support continuous feedback, reflection, and peer learning, allowing students to refine their ideas, strengthen their academic writing, and develop the communication competencies needed to participate effectively in both local and international academic communities.

Digital Workshops as a Pedagogical Intervention

Digital workshops have become an effective student-centered learning approach that promotes active participation, collaboration, and meaningful learning experiences in higher education. By combining interactive activities with digital technologies, they provide

students with opportunities to exchange ideas, solve problems collaboratively, and apply knowledge in authentic academic contexts (Otto et al., 2024).

The success of digital workshops is strongly influenced by the quality of interaction among students and lecturers. Collaborative learning, peer feedback, and reflective activities help students strengthen their communication skills, increase engagement, and improve learning outcomes (Bach & Thiel, 2024). In addition, workshop-based learning enables students to practice essential academic communication skills, including academic writing, presentations, and research dissemination, while fostering confidence and intercultural communication (Wibowo et al., 2024). Effective implementation also depends on lecturers' digital competence, which plays a key role in creating engaging learning environments and supporting students' academic development in technology-enhanced education (Dang et al., 2024).

Research Gap

Although previous studies have extensively explored digital competence, online learning, and collaborative writing, limited empirical research has specifically investigated digital workshops as an integrated strategy for strengthening students' academic communication competence. Existing literature primarily focuses on isolated dimensions, such as writing performance or digital literacy, rather than examining academic communication competence as a multidimensional construct comprising writing, presentation, interaction, and scholarly dissemination skills. Therefore, this study seeks to address this gap by examining the effectiveness of digital workshops in enhancing students' academic communication competence in higher education contexts.

The Basics of Academic Writing and Its Role in Scientific Forums

Academic writing is a fundamental means of communicating scientific knowledge that requires ideas to be presented in a clear, logical, and well-structured manner. Effective academic writing involves constructing evidence-based arguments, integrating credible references, and maintaining coherence throughout the text. For university students, developing strong academic writing skills is essential because they are expected to complete a wide range of writing tasks, including descriptive, analytical, persuasive, critical, and inquiry-based assignments. Equally important is understanding that writing is an iterative process rather than a one-time activity. As noted by Chauhan (2022), effective writing

develops through continuous stages of generating ideas, organizing and planning content, drafting, revising, editing, and refining the final manuscript before it is shared with others.

In international academic forums, strong writing skills are essential for preparing abstracts, full-length journal articles, and research posters. Effective academic writing goes beyond grammatical accuracy; it requires the ability to communicate ideas clearly, develop logical arguments, and support claims with credible evidence. Producing a high-quality academic manuscript is therefore a demanding process that requires advanced writing skills as well as a thorough understanding of scholarly writing conventions in higher education. As highlighted by Bhandari and Bhandari (2025), academic writing is a formal and evidence-based form of scholarly communication that enables researchers to present knowledge in a clear, objective, and persuasive manner. Likewise, the OECD (2013) emphasizes that writing proficiency is a key component of academic literacy and an important contributor to students' academic achievement across educational systems.

METHOD

This study employed a quantitative approach using a one-group pretest–posttest design to evaluate the effectiveness of an International Research Presentation Workshop. The participants consisted of 38 workshop attendees selected through total sampling. Data were collected using a structured knowledge test administered before (pre-test) and after (post-test) the workshop to assess participants' understanding of effective research presentation at international conferences.

Descriptive statistics were first used to provide an overview of participants' performance before and after the workshop. To examine whether the intervention resulted in a significant improvement in learning outcomes, a paired-samples t-test was performed using SPSS Statistics version 25 with a significance level of 0.05. The workshop was considered effective when the post-test scores were significantly higher than the pre-test scores ($p < 0.05$), indicating that participants achieved meaningful learning gains following the intervention.

DISCUSSION

The findings demonstrate that the International Research Presentation Workshop significantly improved participants' understanding of effective research presentation. The increase in the mean score from the pre-test to the post-test indicates that the workshop

successfully enhanced participants' knowledge of organizing and delivering research presentations for international conferences. The Paired Sample t-Test further confirmed that this improvement was statistically significant ($p = 0.002$), suggesting that the observed learning gains were attributable to the workshop rather than random variation.

The improvement can be explained by the workshop's emphasis on practical presentation strategies, including organizing presentation content, communicating key research findings effectively, and engaging with an academic audience. Such interactive learning experiences provide participants with opportunities to acquire both conceptual understanding and practical communication skills, thereby increasing their confidence and readiness to present research in international academic forums. Another important finding is the reduction in the variability of participants' post-test scores compared with the pre-test.

This result indicates that, in addition to increasing average performance, the workshop also promoted a more consistent level of understanding among participants. The relatively homogeneous post-test performance suggests that the training effectively benefited participants with different initial levels of knowledge. These findings support the growing recognition that structured academic communication training plays a vital role in preparing researchers for global scholarly engagement. Effective research presentation skills are increasingly regarded as an essential component of academic competence because they facilitate knowledge dissemination, foster international collaboration, and enhance researchers' professional visibility. Therefore, universities should integrate research presentation workshops into academic capacity-building programs to better prepare students and early-career researchers for participation in international conferences.

Although the findings demonstrate the positive impact of the workshop, several limitations should be acknowledged. First, the study adopted a one-group pretest–posttest design without a control group, making it difficult to conclude that the observed improvements were solely attributable to the intervention. Second, the relatively small number of participants and the focus on a single workshop may limit the broader applicability of the findings. Future research should consider using experimental or quasi-experimental designs with larger and more diverse participant samples to generate more robust evidence on the effectiveness of research presentation training and its contribution to the development of academic communication skills.

Table Pre and Post Test Results First material " Presenting with Impact: A Guide to Delivering Research at International Conferences"

Name	Material 1 Pre	Material 1 Pre (%)	Material 1 Post	Material 1 Post (%)	Information
Participant 1	1	33,3%	3	100%	Increase
Participant 2	3	100%	3	100%	Constant
Participant 3	3	100%	3	100%	Constant
Participant 4	2	66,6%	1	33,3%	Decrease
Participant 5	2	66,6%	3	100%	Increase
Participant 6	2	66,6%	2	66,6%	Constant
Participant 7	2	66,6%	3	100%	Increase
Participant 8	2	66,6%	3	100%	Increase
Participant 9	1	33,3%	3	100%	Increase
Participant 10	3	100%	3	100%	Constant
Participant 11	1	33,3%	3	100%	Increase
Participant 12	3	100%	3	100%	Constant
Participant 13	3	100%	3	100%	Constant
Participant 14	2	66,6%	2	66,6%	Constant
Participant 15	3	100%	3	100%	Constant
Participant 16	2	66,6%	3	100%	Increase
Participant 17	2	66,6%	3	100%	Increase
Participant 18	2	66,6%	2	66,6%	Constant
Participant 19	3	100%	2	66,6%	Decrease
Participant 20	3	100%	2	66,6%	Decrease
Participant 21	3	100%	3	100%	Constant
Participant 22	2	66,6%	3	100%	Constant
Participant 23	2	66,6%	3	100%	Increase
Participant 24	3	100%	3	100%	Constant
Participant 25	1	33,3%	2	66,6%	Increase
Participant 26	1	33,3%	3	100%	Increase
Participant 27	1	33,3%	3	100%	Increase
Participant 28	3	100%	3	100%	Constant
Participant 29	2	66,6%	3	100%	Increase
Participant 30	3	100%	2	66,6%	Decrease
Participant 31	3	100%	3	100%	Constant
Participant 32	1	33,3%	3	100%	Increase

Participant 33	3	100%	3	100%	Constant
Participant 34	2	66,6%	3	100%	Increase
Participant 35	3	100%	2	66,6%	Decrease
Participant 36	1	33,3%	2	66,6%	Increase
Participant 37	1	33,3%	2	66,6%	Increase
Participant 38	3	100%	3	100%	Constant
Average	2,18	72,6%	2,68	89,33%	

Source: Research Data

Based on the table above, the data are the results of the pre-test and post-test on material 1 for 38 participants, with a maximum score of 3 (100%) for each material. Through data processing with the help of statistical software SPSS version 25, researchers can see how much influence the treatment has on changes in scores between before (pre-test) and after (post-test). One common approach used to test differences in pre- and post-test scores is the Paired Sample t-Test, which is used when measurements are taken on the same group at two different times. In this context, the results of the statistical test serve as the basis for concluding whether the increase is statistically significant or simply occurred by chance. The following are the calculation results using SPSS version 25:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	2.1842	38	.80052	.12986
	Post-Test	2.6842	38	.52532	.08522

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre-Test & Post-Test	38	.078	.642

Paired Samples Test

		Paired Differences			95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	Pre-Test - Post-Test	-.50000	.92269	.14968	-.80328	-.19672	-3.340	37	.002

Based on the results of the Paired Sample t-Test using SPSS Statistics version 25, it was obtained that the number of respondents analyzed was 38 participants. The results of descriptive statistics show that the average (mean) pre-test score was 2.1842 with a standard deviation of 0.80052 and a standard error of the mean of 0.12986. Meanwhile, the average (mean) post-test score increased to 2.6842 with a standard deviation of 0.52532 and a standard error of the mean of 0.08522. The difference in the average value indicates an increase in the score of 0.5000 points after the participants listened to the first material. In addition, the standard deviation value in the post-test which is smaller than the pre-test indicates that the variation or distribution of participants' scores after listening to the first material is lower, so it can be interpreted that the participants' understanding not only increased but also became more even compared to before listening to the first material.

Furthermore, in the Paired Samples Correlations table, a correlation coefficient value of 0.078 was obtained with a significance value of 0.642. This correlation value indicates a very weak relationship between pre-test and post-test scores, while a significance value greater than 0.05 indicates that the relationship is not statistically significant. However, in the Paired Sample t-Test analysis, correlation results are not the primary basis for making decisions regarding the effectiveness of the treatment. This table only illustrates the level of relationship between two measurements taken on the same respondent, while determining whether there is a difference is done based on the results of the difference test in the Paired Samples Test table.

Based on the results of the Paired Samples Test, the mean difference (Pre-Test - Post-Test) value was obtained at -0.50000. This negative value indicates that the average post-test score was higher than the average pre-test score by 0.500 points. In other words, after listening to the first material, participants experienced an increase in scores compared to before listening to the first material. The large standard deviation of the difference of 0.92269 indicates that the difference in score increases between participants still has variation, but not too large. Meanwhile, the standard error of the mean of 0.14968 indicates a relatively small level of error in estimating the average difference, so that the average difference obtained is quite representative in describing the condition of the population.

The analysis also shows that the 95% Confidence Interval of the Difference ranges from -0.80328 to -0.19672. The entire confidence interval range is negative and does not cross zero. This indicates that with a 95% confidence level, the average difference between pre-test and post-test scores is truly significant. Because the confidence interval does not

include zero, it can be ascertained that the increase in scores was not caused by chance or random variation but rather reflects a consistent change after listening to the first material.

The test statistic value obtained is $t = -3.340$ with degrees of freedom (df) = 37. The negative t value appears because in this analysis SPSS calculates the difference between Pre-Test minus Post-Test, so that when the post-test value is higher than the pre-test, the difference result becomes negative. Therefore, the negative sign on the t value does not indicate a decrease in learning outcomes but rather confirms that the score after treatment is higher than before treatment.

The decision-making process is based on a Sig. (2-tailed) value of 0.002, which is smaller than the significance level of $\alpha = 0.05$ ($0.002 < 0.05$). Thus, it can be concluded that there is a significant difference between the participants' pre-test and post-test scores. These results prove that listening to the first material has a significant effect on increasing participants' knowledge or understanding of the material presented.

Substantively, these results indicate that understanding the first material successfully improved participants' ability to comprehend the material presented. This was reflected in the increase in participants' average scores after understanding the first material, accompanied by a more homogeneous distribution of scores during the post-test. This condition indicates that the first material was well understood by most participants, resulting in a smaller gap in understanding between participants compared to before the activity took place. Thus, the first material not only increased the average level of participants' knowledge but also contributed to an even distribution of participants' understanding of the material presented.

Overall, the results of the paired sample t -test provide empirical evidence that there was a significant improvement between the conditions before and after the material was presented. Therefore, the material presented can be declared effective as a medium for conveying information and learning in improving participants' understanding of the material.

The findings of the paired sample t -test demonstrate that the workshop session entitled "Presenting with Impact: A Guide to Delivering Research at International Conferences" significantly improved participants' understanding of effective research presentation strategies. Statistical analysis revealed that the average pre-test score increased from 2.18 to 2.68 after participants attended the workshop, with a statistically significant difference ($t = -3.340$; $p = 0.002 < 0.05$). This result indicates that the workshop successfully enhanced participants' knowledge regarding international conference presentation skills.

The increase in the mean score suggests that the workshop provided participants with new conceptual understanding and practical insights into how research findings should be communicated effectively in international academic forums. Presenting research at international conferences requires more than simply explaining research findings; it involves organizing ideas logically, communicating clearly, engaging audiences, and responding confidently to questions. Therefore, improvements in post-test scores indicate that participants gained a better understanding of these essential competencies after receiving the instructional intervention.

Another important finding is the reduction in the standard deviation from 0.80052 in the pre-test to 0.52532 in the post-test. This reduction indicates that participants' scores became more homogeneous after the workshop. In educational evaluation, a lower standard deviation after learning activities suggests that learning outcomes are not only higher on average but also more evenly distributed among participants. In other words, the workshop reduced disparities in participants' prior knowledge and helped establish a more consistent level of understanding across the group. Such findings indicate that the instructional delivery was effective for participants with different initial competency levels.

Although the Paired Samples Correlation produced a weak and statistically insignificant relationship ($r = 0.078$; $p = 0.642$), this result should not be interpreted as evidence that the workshop was ineffective. The correlation coefficient merely reflects the degree of association between participants' pre-test and post-test scores, indicating how consistently individuals maintained their relative ranking across the two measurements. In contrast, the effectiveness of the educational intervention is determined primarily by the paired-sample t-test, which evaluates whether the mean difference between the two measurements is statistically significant. Contemporary statistical literature emphasizes that, in paired-sample analyses, the primary focus is the significance and magnitude of the mean difference rather than the strength of the correlation between paired observations. Consequently, the weak correlation observed in this study does not diminish the validity of the significant improvement identified through the paired-sample t-test (Hair et al., 2019; Navarro & Foxcroft, 2019).

The negative mean difference (-0.500) further confirms that post-test scores were higher than pre-test scores because SPSS calculates the difference using the formula Pre-test – Post-test. Consequently, a negative mean difference indicates an improvement in participants' learning outcomes rather than a decline in performance. Furthermore, the 95%

confidence interval (-0.803 to -0.197) does not include zero, demonstrating that the observed improvement is statistically reliable and unlikely to have occurred by random variation. In inferential statistics, a confidence interval that excludes zero indicates that the population mean difference is statistically significant at the specified confidence level, thereby providing robust evidence that the educational intervention produced a genuine improvement in participants' learning outcomes (Hair et al., 2019; Navarro & Foxcroft, 2019).

From the perspective of instructional communication, these findings indicate that the workshop effectively facilitated participants' learning by enhancing their understanding of research presentation strategies. The significant improvement in post-test scores demonstrates that participants acquired measurable knowledge and communication competencies following the instructional intervention. Recent scholarship in instructional communication suggests that effective teaching communication is built upon clear message organization, interactive learning environments, meaningful feedback, and active student engagement, all of which facilitate deeper learning and improve students' knowledge acquisition (Morreale et al., 2023; Sellnow, 2023). Furthermore, recent communication scholarship emphasizes that communication-based workshops and instructional communication practices play a crucial role in strengthening researchers' and students' abilities to communicate scientific ideas effectively. Through interactive learning, feedback, and communication skill development, these educational interventions enhance academic competence while improving the dissemination of research findings (LaBelle et al., 2023; Morreale et al., 2023). Therefore, the significant increase in participants' post-test scores provides empirical evidence that the workshop successfully achieved its learning objectives by improving participants' communication knowledge and presentation competencies for international academic conferences.

The findings are also consistent with principles of constructivist learning theory, which argues that learners actively construct knowledge by integrating new information with prior experiences. During workshops, participants are exposed to authentic examples, practical demonstrations, and opportunities for discussion, enabling them to reorganize existing knowledge into more comprehensive conceptual understanding. According to contemporary instructional communication scholarship, meaningful learning emerges when instructional communication fosters active learner participation through interaction,

dialogue, constructive feedback, and collaborative meaning-making rather than passive information transmission (LaBelle et al., 2023; Morreale et al., 2023).

Specifically, the workshop focused on developing participants' competencies in delivering research presentations at international conferences. Effective academic presentations require a combination of clear message organization, audience engagement, visual communication, and confident verbal delivery. Recent scholarship in science communication argues that research presentations are not merely opportunities to disseminate scientific findings but also strategic communication practices that foster meaningful audience engagement, facilitate knowledge exchange, and enhance the broader societal impact of research through interactive and audience-centered communication (Losi, 2025; McCarthy & Grant, 2025). Furthermore, effective presentations integrate coherent narratives with visually meaningful presentation materials to enhance knowledge transfer and audience comprehension (Tufte, 2001). Contemporary research in higher education also highlights that audience-centred presentation strategies, supported by clear visual design and interactive communication, significantly improve participants' learning experiences and presentation effectiveness (Mayer, 2024). Therefore, the improvement observed in participants' post-test scores suggests that the workshop successfully introduced these contemporary principles of effective academic presentation, enabling participants to strengthen both their conceptual understanding and practical presentation skills for international academic conferences.

The workshop format itself may also explain the significant learning gains. Unlike conventional lectures, workshops encourage active participation, reflection, discussion, and immediate application of newly acquired knowledge. Adult learning theory suggests that experiential learning environments facilitate deeper understanding because participants directly relate theoretical concepts to practical situations (Knowles et al., 2025). This instructional approach is particularly suitable for developing communication competencies, where practice and feedback are essential components of skill acquisition.

Although most participants demonstrated improvement, several participants maintained the same score, while a small number experienced slight decreases in post-test performance. Such variations are common in educational interventions because individual learning outcomes are influenced by multiple factors, including prior knowledge, concentration, motivation, cognitive load, and test-taking conditions. Nevertheless, because the overall mean increased significantly and the statistical test confirmed the effectiveness

of the intervention, these individual differences do not diminish the overall success of the workshop.

Overall, the statistical evidence demonstrates that the workshop effectively improved participants' understanding of research presentation skills for international conferences. The significant increase in mean scores, reduced variability among participants, and statistically significant paired-sample t-test collectively provide empirical evidence that the instructional intervention successfully achieved its immediate learning objectives. Consequently, the workshop can be considered an effective professional development strategy for strengthening participants' competencies in presenting research within international academic settings.

CONCLUSION

This study concludes that the International Research Presentation Workshop was effective in improving participants' understanding of research presentation for international conferences. The comparison of pre-test and post-test scores revealed a statistically significant improvement, as confirmed by the Paired Sample t-Test ($p < 0.05$). The findings indicate that the workshop not only increased participants' knowledge but also promoted a more consistent level of understanding across participants. These results provide empirical evidence that structured presentation training can strengthen academic communication competencies and better prepare participants for international scholarly engagement. Therefore, integrating research presentation workshops into higher education capacity-building programs may contribute to enhancing researchers' readiness and confidence in disseminating scientific work at international conferences.

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