



## Technical communication: A study on knowledge, attitude, and skill among Banaras Hindu University students

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### ARTICLE INFO

Keyword: Technical Writing, Research skill, Soft Skill, Paper Publications, Knowledge, Attitudes, Communication.

### ABSTRACT

The best way to write a scientific paper is to know about technical communication. This type of communication is crucial but the skill is not common among many young faculties and research scholars. Realizing this problem among university students, the Department of agricultural extension made a massive campaign to educate young faculties and PhD scholars on research writing through the IoE project, of Banaras Hindu University. In this project, different workshops were conducted to enhance the knowledge and skill of technical writing among the scholars. In the first phase, workshops were conducted in the Faculty of Visual Arts, Department of German Studies, Department of Home science, Department of Geology, Department of Extension Education, Faculty of Ayurveda, and Institute of Science through collaboration with experienced instructor and of scientific writing on technical communication. Seven days' workshop were conducted in every Faculties. Data were collected through questionnaire before starting of the workshop and after completion of the workshops. Approximately 210 scholars attended the research paper writing in the whole workshop. Conducted during 2021-2022 Subjects covered in the training was on research paper writing, descriptive data analysis using MS-EXCEL&SPSS software, academic writing and publication, communication skills, capacity building in scientific writing & communication skills. By administering self-evaluation questionnaires immediately before and after each session, students' confidence, skill and familiarity with the research writing skills were evaluated. It was found that the workshop was effective in enhancing the participants' knowledge, abilities, and self-assurance regarding specific technical writing skills in their respective disciplines. We conclude that a brief, structured workshop can enhance the confidence and knowledge of bachelor's, master's, and research students, thereby better preparing them for the writing challenges they face in their professional life. This paper elaborates the change in their knowledge, attitude and skills towards confidence, research writing and academic publications.

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## INTRODUCTION

Technical writing is a necessary talent for institution and researchers in the workplace. This lack of formal training has led to inconsistent preparation in professional writing skills, which has resulted in insufficient publication and productivity rates, as well as a lack of confidence in both writing and supervising (McGrail, M. R et.al., 2006). Knowledge of effective technical communication is consistently cited as an essential workplace skill, and students who effectively develop this ability are now viewed as more marketable for academic advancement. Writing is a recursive cognitive process that includes planning, preparation, composition, monitoring, and evaluation. Writing is an indispensable skill for critical reasoning. Writing enables the production of thought and is not merely a means for students to convey their knowledge; it also facilitates their comprehension of that knowledge (Mowbray et.al., 2010). Technical writing demands a high level of organisation in the development of information, ideas, or arguments, as well as a high level of precision, and there is no ambiguity in meaning. Writing is essential to earning a doctorate or postdoctoral degree and maintaining a successful career in science. PhD students are exposed to much more complex and demanding forms of writing at the graduate level, including proposals, journal articles, dissertations, and grant/fellowship applications. Academic Writing is a crucial aspect of academic success; however, the uniform writing style required for scholastic legitimization prevents cohorts of students from achieving academic success. Students, especially those entering higher education from academic, social, or economic disadvantage, are frequently disoriented by the language of academia and repelled by the prospect of appropriating the metalanguage of academic discourse in their writing (Morales et.al., 2004). Publication of original research in journals that have undergone peer review is a crucial milestone for researchers. Moreover, academic and scientific career advancement is frequently facilitated by the publication of research as a reflection of increased scientific engagement.

## Review of Literature

Bellicoso et.al. [2022], studied the effectiveness of a manuscript writing workshop in increasing the confidence of nursing and health disciplines clinicians in writing for publication. The positive outcomes reported by the participants emphasize the importance of creating an enabling environment that supports clinicians in overcoming barriers and honing their writing skills. Healthcare organizations should consider implementing similar workshops to promote evidence-based practice and enhance the dissemination of practice-based research findings among frontline clinicians.

G. Rayner et. al. [2014], emphasizes the significance of writing skills development programs in fostering students' writing abilities and confidence. The study illustrates the impact of an iterated writing skills development program on students' confidence levels, although it indicates a disconnect between confidence and actual writing ability. Future research should explore strategies to bridge this gap and promote students' accurate perception of their writing skills. By addressing these issues, educational institutions can better equip students with the necessary writing skills to excel in their academic endeavours.

S. M. Pet. et. al. [2023], This literature review underscores the significance of integrated writing tasks in promoting thinking skills and enhancing writing proficiency among Indian ESL learners. The study by Shabitha M. P.A and Mekala S.B demonstrates the positive correlation between task variables, thinking skills, and writing abilities. By integrating meaningful tasks that are relevant and interesting to learners, educators can effectively engage students in the writing process and facilitate their cognitive growth. Further research is needed to explore additional variables and long-term outcomes to enhance the implementation of integrated writing tasks in ESL classrooms.

C. D. Brún. et. al. [2023], reviewed and underscores the significance of overcoming resistance to academic writing and building student confidence in higher education. Christa de Brún's paper proposes an integrative writing strategy that embraces critical consciousness and encourages students to engage in reflective and interpretive writing practices. By addressing resistance and fostering confidence, educators can empower students to become critical thinkers, challenge inequities, and contribute to positive social change. Further research is needed to explore effective pedagogical approaches and the transformative impact of writing practices in higher education.

E. E. McDowell et. al. [1982], in this communication assessment study conducted and sheds light on the perceptions of technical communication skills and language proficiency among United States and international graduate students. The findings underscore the importance of incorporating technical communication courses in graduate programs and addressing any gaps in communication proficiency. By understanding students' perceptions and needs, educators and institutions can develop targeted interventions and support mechanisms to enhance graduate students' communication skills and facilitate their academic and professional success. Further research is warranted to explore effective pedagogical approaches and address the specific challenges faced by international graduate students in developing their communication competencies.

S. A. Gardner et. al. [2018], examines an integrated, structured writing intervention described in the study by Gardner et al. offers valuable insights into supporting the writing productivity of biomedical graduate students. The

findings highlight the positive impact of a writing specialist in enhancing students' confidence, reducing writing apprehension, and fostering productive writing strategies. By implementing similar interventions in graduate programs, institutions can empower students to develop their writing skills and improve their publication records, ultimately preparing them for successful careers in the biomedical field. Further research is needed to identify the most effective components of such interventions and assess their long-term impact on students' academic and professional trajectories. Lenzi. L.et.al. [2011], In this communication workshop for Italian oncologists demonstrated positive outcomes in terms of improving self-efficacy, knowledge of communication skills, attitudes towards disclosure of medical information, and the ability to address patients' concerns and fears. These findings highlight the importance of tailored communication training programs for healthcare professionals, emphasizing the need for ongoing education in this critical aspect of oncology care.

Kimi G. et.al. [2018], The writing-intensive course described in this study effectively addressed the need for formal instruction in science-specific writing skills for microbiology/health science students. By combining disciplinary content with writing assignments, the course improved students' confidence, skills, and knowledge in science writing. The use of "fiction" writing as a learning tool proved engaging and facilitated exploration of the subject matter. The findings highlight the potential value of incorporating similar approaches and assignments into science writing courses at other institutions.

Jeeyoung Min. et. al. [2023], This study sheds light on the conceptualization of writing fluency by a teacher and the instructional practices employed in an intensive English writing course for college-level emergent multilingual students. By adopting an activity theory perspective, the study offers insights into the complex interplay between the teacher, institution, and students in shaping writing fluency development. The instructional practices of prompted writing, blackboard writing, and free writing demonstrated their effectiveness in fostering quick associations, peer learning, and creative exploration. These findings provide valuable insights for educators, researchers, and policymakers seeking to enhance writing fluency instruction for college-level emergent multilingual students.

D. Vest et.al.[1995], highlights the need for improved communication training in undergraduate electrical engineering programs to align with workplace requirements. The identified key communication skills, such as effective face-to-face and small group communication, electronic mail proficiency, and audience adaptation, can be integrated into the existing curriculum without the need for additional courses. By emphasizing the importance of these skills in course content and evaluation, engineering programs can better prepare graduates for success in their professional

roles. The findings of this study have practical implications for curriculum development in engineering education and contribute to bridging the gap between academic training and workplace expectations.

According to a review of the above relevant literature, no studies have been published on the benefits and effects of organising seminars and systemic assessments on the outcomes of technical communication practises in Indian universities. The results of these studies indicate that Indian students have difficulty reading and writing technical papers; consequently, additional coursework and workshops related to technical education are necessary to improve the university's research output.

## METHODOLOGY

The Banaras Hindu University is one of the oldest and multi-discipline university. It has six institutes 14 streams and 140 departments. It mostly offers undergraduate, Master's, and Doctoral courses with a little number of postdoctoral fellows. For the purpose of technical writing skill improvements of students and faculty of BHU campus, IoE project "Technical writing and Communication among the student of BHU" was sanctioned. In the first phase scientific writing training was offered in Faculty of Visual Arts, Department of Statistics, Department of German Studies, Department of Home science, Department of Geology, Department of Extension Education, Department of Ayurveda Network, and Institute of Science. The 8-hour (weekly workshop) learning opportunity was offered without cost for participants and on a voluntary basis without academic credit. However, participants who took part in at least five of the six sessions earned a Certificate of Participation issued by the training organiser. The instructor were a faculty members from different Departments with long-standing experience in teaching scientific communication. Each workshop session focused on a different topic, and the delivery format was a combination of lectures, group discussions, and in-class writing exercises. An accompanying workbook, designed by the instructor contained examples for analysis, exercises, and some bedrock principles. Feedback on students' work in progress was taken on volunteer basis, either during sessions (students and the instructor would describe what is working and offering advice for improvement) or in writing from the instructor between sessions. To assess the impact of the workshop sessions while keeping the burden on participant's minimal, participants were asked to complete short surveys regarding their confidence and familiarity with the content, delivery, reading material before and after each workshop session. The different workshop organised in different department considering there need in technical and scientific writing.

## QUESTIONNAIRES

Participants from Banaras Hindu University (BHU) of different departments completed questionnaires that assessed their demographics, practice experience, characteristics, knowledge, attitudes, and skill. These questionnaires were administered both before and at the end of each workshop. At the conclusion of the workshop, participants were asked to complete an anonymous evaluation of the faculty members conducting the course. The questionnaires used in this study were originally developed for a communication workshop based on experience and expert faculty in technical writing. To make them suitable for the BHU students of every department, a translation process was undertaken. The process involved translating the questionnaires from English to Hindi, ensuring the content's accuracy and cultural appropriateness for the BHU student population.

## Measurement Variables

### *Knowledge*

Knowledge can be defined as the understanding, information, and expertise acquired through study and experience (Davenport & Prusak, 1998). It encompasses a broad range of facts, concepts, principles, theories, and practices that are relevant to a particular field of study or domain of knowledge. In this paper knowledge is operationalized as the understanding, information and expertise towards technical writing.

Participants from Banaras Hindu University (BHU) who were enrolled in the Communication and Technical Writing course had their knowledge of skills assessed using various question types. The assessment consisted of three different types of questions: case scenarios, true-false items, and a scale measuring the level of agreement (ranging from 1, strongly disagree, to 5, strongly agree) with different breaking bad news skills and strategies. For the case scenarios, participants were presented with two different scenarios and asked to select the best course of action from multiple-choice options. A total of 16 questions were included, and different scenarios were presented in the pre-and post-questionnaires. In addition to the case scenarios, participants answered 13 true-false questions related to various skills in communication and technical writing. These questions assessed skills such as asking open-ended questions, avoiding medical jargon, distinguishing unrealistic expectations from denial, and obtaining informed consent. Furthermore, participants responded to five skills-related questions designed to explore their knowledge of best communication practices for delivering bad news. Examples of these practices included communicating bad news in person rather than over the phone, allowing patients to ask questions at each step of the

process, and providing patients with time to prepare for the news rather than delivering it abruptly. These knowledge assessments were specifically tailored to the Communication and Technical Writing course for BHU students, taking into account the specific learning objectives and content covered in the course.

### *Attitudes*

Attitude can be defined as a psychological construct that represents a person's predisposition to evaluate, respond, or behave in a particular manner toward an object, person, situation, or idea (Eagly & Chaiken, 1993). It involves a combination of beliefs, emotions, and behavioral tendencies that influence one's thoughts and actions.

Five attitudes related to the disclosure of unfavourable medical information and assessing patients' concerns and fears were explored specifically for the Communication and Technical Writing course at Banaras Hindu University (BHU). These attitudes focused on the following aspects: Willingness to disclose the true severity of bad news to maintain the patient's hope. Selecting how much information to share with patients based on the doctor's experience. Avoiding eliciting patients' concerns to prevent upsetting them. Considering the patient's emotional well-being when delivering bad news. Recognizing the importance of addressing and understanding patients' fears and concerns. Participants were asked to indicate their level of agreement with these attitudes on a scale. They could choose a response ranging from 1 (strongly disagree) to 5 (strongly agree). This assessment aimed to explore the participants' attitudes towards disclosure, empathy, and patient-centred communication in the context of communicating unfavourable medical information. These attitude-related questions were specifically tailored for the Communication and Technical Writing course at BHU, aligning with the course's emphasis on effective communication strategies, ethical considerations, and empathetic patient interactions.

### *Skill*

Skill can be defined as a learned ability or expertise that enables an individual to effectively and proficiently carry out a specific task, activity, or set of tasks. (Gagne, 2018, p. 45).

Participants enrolled in the Communication and Technical Writing course at Banaras Hindu University (BHU) had their skills assessed through an 11-item questionnaire. This questionnaire aimed to measure their confidence in performing specific communication skills taught in the course.

The questionnaire included items that addressed various communication skills as following

1. Allowing patients to express their feelings and concerns regarding diagnosis and treatment.
2. Providing support to patients at the end of life.
3. Discussing a diagnosis with a patient in denial.

Participants were asked to indicate their level of confidence

in their ability to perform these skills. The response options ranged from 1 (not confident at all) to 5 (extremely confident). The purpose of this assessment was to gauge the participants' self-perceived skills in applying the communication skills covered in the Communication and Technical Writing course.

These skills items were specifically developed for the BHU course, taking into consideration the unique communication challenges and requirements relevant to the field of communication and technical writing. By assessing self-efficacy, the questionnaire aimed to evaluate participants' perceived competence in utilizing the taught communication skills in real-life situations.

## RESULTS AND DISCUSSION

In the current study, ten workshops were conducted in the BHU campus in various departments to analyse the outcome of the technical communication and research writing. The covered workshop had different titles as, workshop 1: Technical communication for research scholars; Workshop 2: Training of master trainers on technical writing; Workshop 3: Research paper writing in Visual Arts; Workshop 4: Academic Writing and publication; Workshop 5: Communication Skills; Workshop 6: Descriptive Data Analysis Using MS-EXCEL & SPSS Software; Workshop 7: Research writing and publishing; Workshop 8: Capacity

Building in Scientific Writing & Communication Skills; Workshop 9: Academic Writing and Publication; Workshop 10: Quantitative Data Analysis Using EXCEL & SPSS. In each workshop, there were a minimum of 18 participants and max. 50 participant. The questionnaire of each workshop had mixed questions to check candidates' improvement in knowledge, attitude and skill of scientific writing.

Before and after the workshop, questionnaire scores were analysed for the analysis. Fig. 1 shows the individual marks of students before and after the workshop (Ayurveda) and their individual marks improvement or decrement. It was found that in most cases, there is improvement in individual marks but in some cases, there is a decrement in marks too. And also analysing the results it can be seen that some students did not show improvements in the marks. The reason behind some students did not show positive improvement in their marks after the workshop might be due to their inattentiveness or lack of regularity in the class.

Table. 1, shows the avg. marks of students in different workshops before and after, and improvement in marks of students. It can be clearly seen that workshops 3 and Workshop 4 had maximum output and p value of individual workshop shows that the analysed data are less than or equal to 0.05, which suggest that the results are significant. The questioner had no. of questions which consist to check student's knowledge, attitude, and skill before and after the workshop. To differentiate the students' improvements in each workshop in terms of knowledge, attitude and skill, the

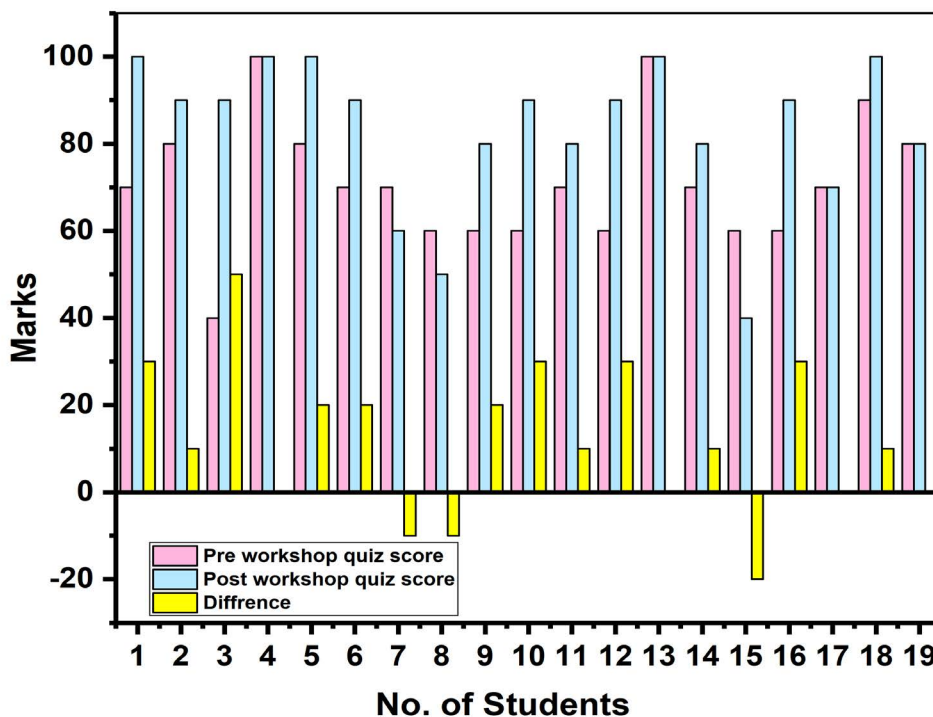


Fig. 1. The individual questionnaire marks of students of workshop 4 (Ayurveda)

bar diagram of each workshop of knowledge, attitude and skill is presented in Fig. 3, 4 and 5.

Fig. 2, shows the average marks of students before and after in each workshop, it can be clearly seen that 3 and 4 had max improvements which can also be seen in Table 1.

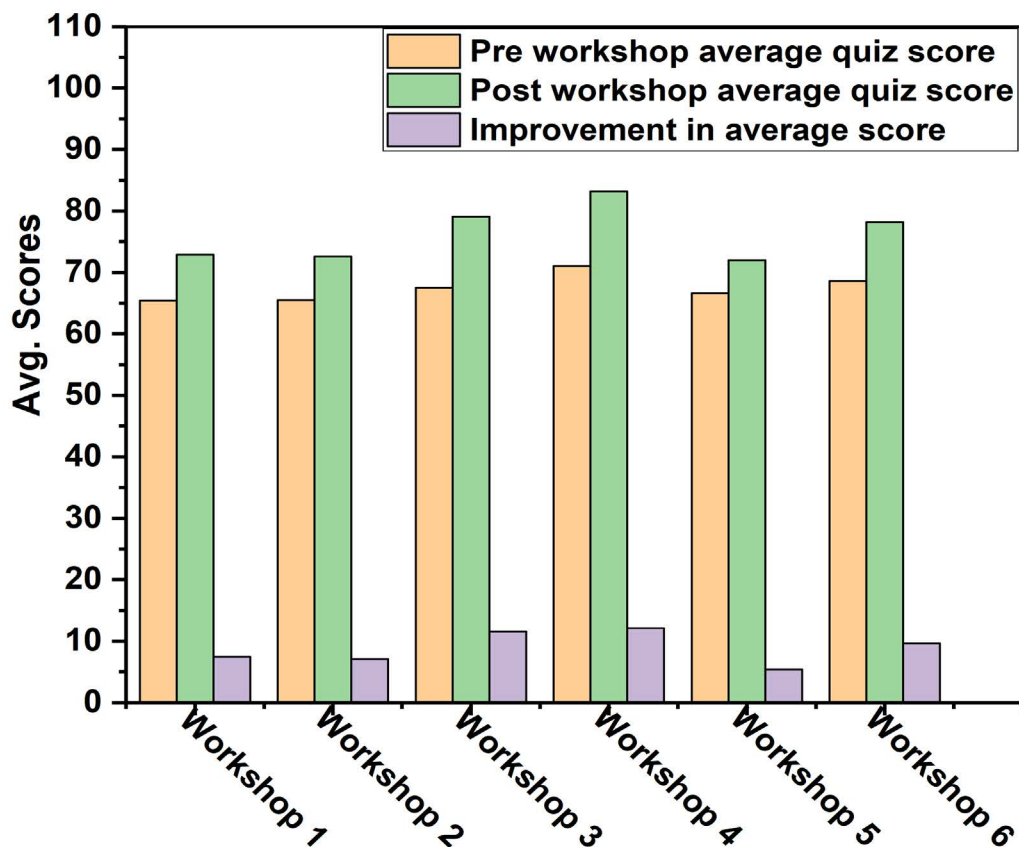
The knowledge of students in each workshop presented in Fig. 3, suggests there is always improvement in knowledge which proves the workshop on technical writing helped to improve knowledge. Analysing the knowledge improvement

in each workshop it suggests, workshop 1 and Workshop 2, had max improvement in the knowledge of students, and always there is a positive impact of conducting workshops.

The questionnaire, a question which checked the attitude of students was categorised and presented in a bar diagram in Fig. 4. Which suggests there is significant improvements in attitude mainly in workshop no. 5 and 1. The difference in attitude in each workshop is enough which suggests such workshops helped a lot to the students for their scientific

**Table. 1** Average marks in each workshop and their percentage improvement.

S.No	Name of Workshops	Pre workshop avg. marks	Post workshop avg. marks	Percentage improvement in marks	p- value
1	Workshop 1	65.46	72.88	11.3	0.00115
2	Workshop 2	65.52	72.62	10.83	0.00118
3	Workshop 3	67.5	79.04	17.09	0.00029
4	Workshop 4	71.05	83.15	17.03	0.00741
5	Workshop 5	66.6	72	8.10	0.0258
6	Workshop 6	68.6	78.2	13.99	0.00039



**Fig. 2.** Each workshop quiz score

writing. The minimum improvement in attitude was found in workshop no. 10. Further the skill set developed after the workshop were analyzed and compared with the previous skill of students which they had before the workshop. The

skill questioner results are presented in fig.5 which shows there is always improvement in skill among the students after the workshop and max. improvement observed for workshops 4 and 5.

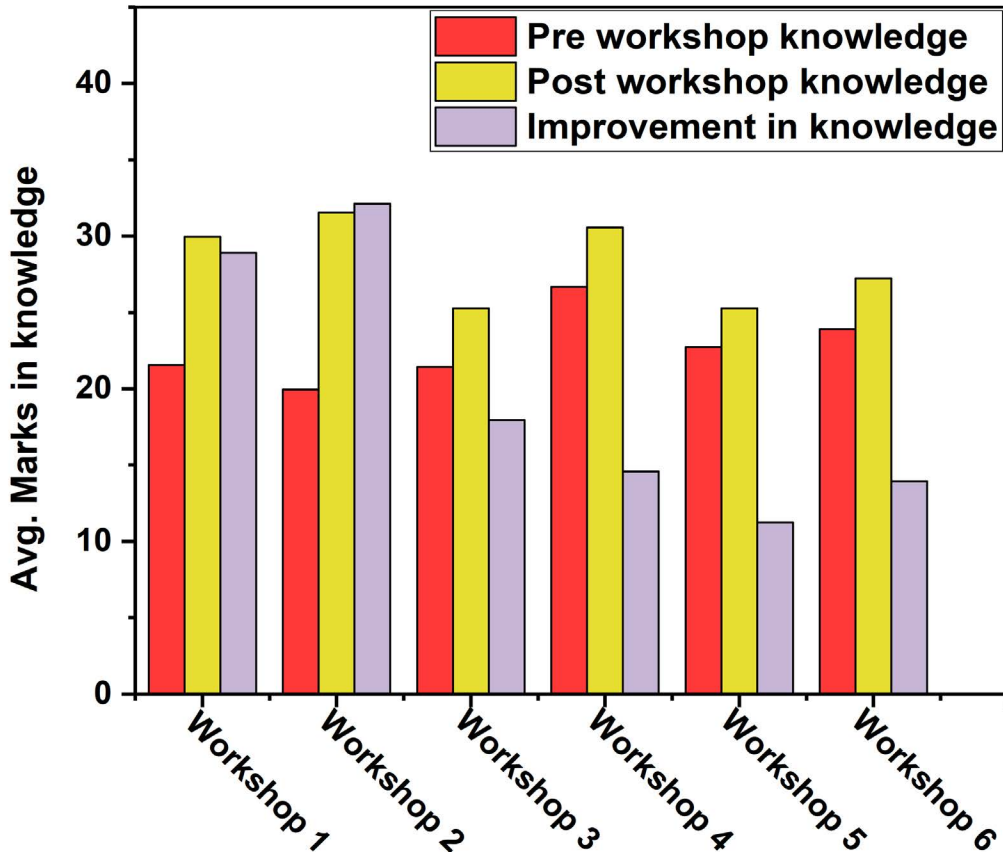


Fig. 3. Knowledge in different workshop and their improvement

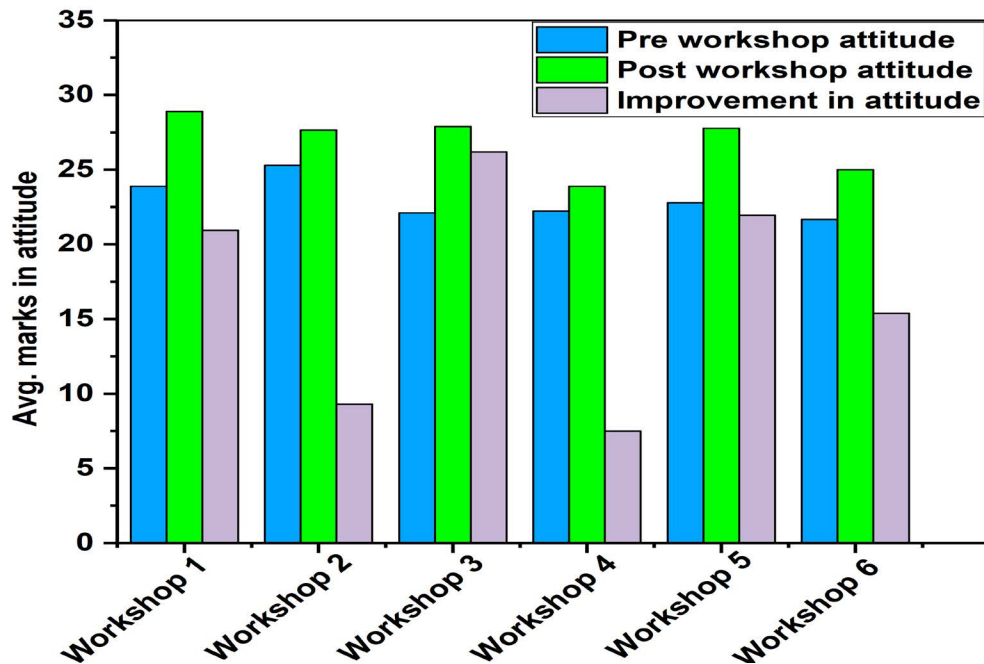


Fig. 4. Attitude of students in different workshop and their improvement.

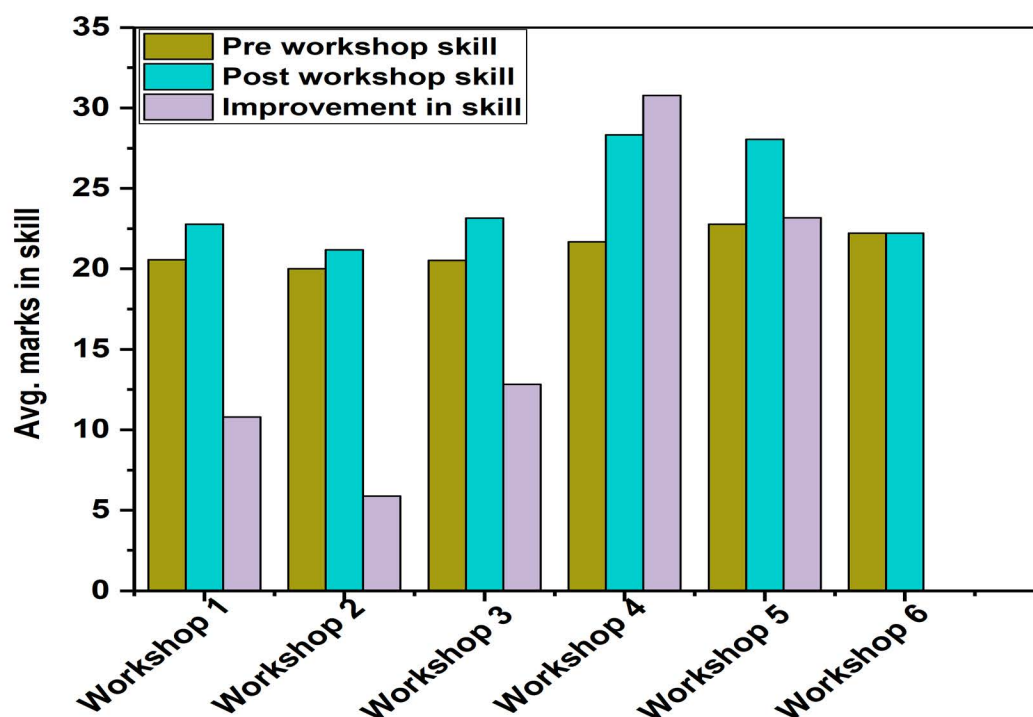


Fig. 5. Skills of students in different workshop and their improvement.

## CONCLUSION

From the above study the following conclusion can be drawn. The performance of students were improved in every workshop on Technical writing. More benefit of workshop were obtained by the departments of (Ayurveda and Arts) in which medium of study was Hindi. It might have helped them in details as teaching was given in mother tongue. Individual study suggests that is improvement in knowledge, attitude and skill among students due to workshop. It can be concluded that such workshop on technical writing should be conducted in universities to improve the efficiency or productivity of researchers in any university.

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