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Assessing Research Knowledge among Postgraduate Students across Disciplines

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ABSTRACT
This study assessed the research knowledge of postgraduate students across various disciplines at Kakatiya University, Telangana State, India, using a descriptive survey method. A total of 120 students were sampled from commerce, science, and humanities & social sciences, employing a stratified simple random sampling technique. A self-constructed Research Knowledge Test (RKT), covering key areas such as research methods, research tools, sampling techniques, and data processing, was utilized in this study. Descriptive statistics and ANOVA analyses were employed to analyze the data. The findings revealed that postgraduate students possessed a moderate level of research knowledge, with significant differences noted across disciplines. These results underscored the necessity for targeted training programs to enhance research competencies, particularly in areas identified as weaknesses. Recommendations for future educational practices were proposed to foster a more understanding of research principles essential for academic success.

KEYWORDS
Research Knowledge, Postgraduate Students, Research Methods, Sampling techniques, Statistical Methods

1. Introduction

Research plays a crucial role in the advancement of knowledge across various fields, fostering critical thinking and innovation. According to National Educational Policy-2020 recommendation, the ability to engage with research methodologies, data analysis, and academic writing is essential not only for the academic success of postgraduate students but also for their future careers in academia, industry, and public service. As educational institutions evolve, it becomes imperative to assess the research knowledge of students to identify strengths and areas for improvement. Kakatiya University, located in Telangana, India, is committed to fostering a strong academic environment that encourages research and inquiry. However, the extent of research knowledge among its postgraduate students remains under-explored.

Understanding this knowledge base is vital for enhancing curriculum design, providing targeted support, and cultivating a culture of research within the university. In the context of research knowledge among postgraduate students, conceptual understanding encompasses several key components essential for academic success. Familiarity with various research methodologies qualitative, quantitative, and mixed-methods enables students to

select appropriate approaches for their studies and know when to apply specific techniques like surveys or experiments (Creswell, 2014). The ability to interpret and analyze data is crucial; students must grasp statistical concepts and tools that facilitate meaningful conclusions from their findings (Field, 2018). Ethical considerations play a vital role in research integrity, requiring awareness of guidelines such as informed consent and confidentiality (Beauchamp & Childress, 2013). Effective academic writing is fundamental for clearly communicating research results, necessitating knowledge of paper structure and citation practices (Day & Gastel, 2012).

Postgraduate students should also be adept at applying their knowledge to real-world situations, adapting their research skills to address specific challenges within their fields (Kolb, 2014). Familiarity with key theoretical perspectives enables students to contextualize their inquiries and develop research questions (Buchanan & Bryman, 2009). Critical thinking enhances this understanding by allowing students to evaluate and critique existing theories, promoting deeper engagement with literature and fostering innovative ideas (Facione, 2015).

The rationale for investigating research knowledge among postgraduate students stems from the increasing demand for skilled researchers in various fields, particularly in a rapidly evolving academic and professional landscape. As higher education institutions emphasize the importance of research competencies, understanding the gaps in knowledge and skills among students becomes crucial. This study aims to assess the current level of research knowledge, identify areas for improvement, and explore the factors influencing postgraduate students' research capabilities. By identifying existing disparities in research knowledge and skills, the study will provide a foundation for developing targeted interventions and support systems that enhance students' research competencies. Improved research knowledge among postgraduate students contributes to the advancement of knowledge within their respective fields and supports the generation of innovative solutions to pressing societal challenges.

2. Objectives

The first objective of this study is to assess the level of research knowledge among postgraduate students. Second objective of the study is to evaluate the variations in knowledge of research methods, examining how proficiency in research tools, understanding of sampling techniques, data processing and statistical procedures of postgraduate students across the specified disciplines.

3. Scope and Methodology

The scope of this study is focused on assessing the research knowledge of postgraduate students at Kakatiya University, Warangal, across various disciplines, specifically commerce, science, humanities, and social sciences. By examining the research competencies of students in these fields, the study aims to identify gaps in knowledge and understanding related to research methodologies, tools, sampling techniques, and data processing. The findings are intended to inform educational interventions and support systems to enhance research skills among postgraduate students. The study is limited to a sample of 120 postgraduate students from Kakatiya University, which may restrict the generalizability of the results to other institutions or regions.

The study employed a descriptive survey method to assess the research knowledge of postgraduate (PG) students across various disciplines at Kakatiya University, Warangal, Telangana State. A total sample of 120 PG students was selected using a stratified simple random sampling technique to ensure adequate representation from different fields. Specifically, the sample comprised 30 students from commerce, 42 students from science, and 48 students from humanities and social sciences. This sampling approach allowed for a comprehensive understanding of research knowledge across diverse academic backgrounds. To measure research knowledge, the researchers developed a tool i.e. Research Knowledge Test (RKT), constructed through a comprehensive review of existing literature and consultations with academic faculty to ensure both relevance and rigor. The RKT focuses on four key content areas: research methods, research tools, sampling techniques, and data processing & statistics, reflecting insights gathered from extensive literature surveys. The final version of the test consists of 51 multiple-choice questions, each providing four answer options, with only one correct response. Each correct answer is awarded 1 mark. The reliability of the RKT was evaluated using Cronbach's alpha, yielding a coefficient of 0.72, which indicates an acceptable level of reliability. Additionally, the tool was subjected to expert evaluation to establish content validity, further affirming its appropriateness for the study. Data collection involved obtaining permission from the heads of departments at Kakatiya University to engage second-year PG students in their last semester. The RKT was administered in a controlled environment to ensure consistency and reliability in responses. For data analysis, descriptive statistics and ANOVA were employed to interpret the findings

effectively.

4. **Literature Review**

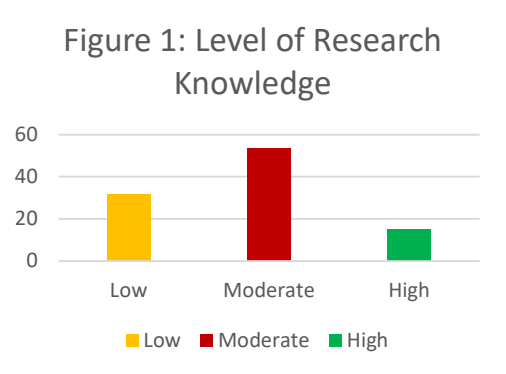
Creswell (2014) emphasizes that many postgraduate students lack adequate training in methodologies relevant to their fields. Proficiency in utilizing research tools is equally crucial for effective data collection and analysis. Statistical software, such as SPSS and R, along with qualitative analysis tools like NVivo, play vital roles in contemporary research practices. However, Buchanan & Bryman (2009) found that many postgraduate students report feeling underprepared to use these tools effectively. Levy and Lemeshow (2013) report that misconceptions about sampling techniques are common among postgraduate students, leading to biased results and flawed research outcomes. Addressing these misconceptions through targeted workshops or coursework can significantly enhance the integrity of students' research endeavors. Despite the availability of statistical software, many students experience difficulties in interpreting results (Field, 2013). Therefore, integrating statistical training within research methodology courses is essential for equipping students with the skills necessary to analyze data rigorously and interpret their findings accurately. Many students possess a solid theoretical foundation, significant gaps often emerge in the practical application of research knowledge (Kumar, 2019). This literature review suggests undertaking research to evaluate students' research knowledge and identify disparities across disciplines. The findings may support the development of robust research skills, ultimately benefiting students in their academic and professional pursuits.

5. **Result and Discussion**

One of the objectives of the study is to assess the level of Research Knowledge among post graduate students at Kakatiya University Warangal, Telangana state. The total scores obtained from the Research Knowledge Test (RKT) were categorized based on the Normal Probability Curve (NPC). This categorization aimed to delineate different levels of research knowledge, allowing for a clearer understanding of students' competencies in this area. Mean and standard deviation (SD) were calculated for grouping the students in to three distinct groups of research knowledge levels according to their performance on the test. The categorization resulted as the first group, known as the **Low-Level Research Knowledge Group**, consists of students whose scores fell below the mean minus standard deviation (Below the score of (Mean – SD)). The second group, termed the **Moderate-Level Research Knowledge Group**, includes students whose scores ranged from the mean minus standard deviation to the mean plus standard deviation (Mean - SD to Mean + SD). Third group, the **High-Level Research Knowledge Group** comprises students whose scores exceeded the mean plus standard deviation ((Mean + SD) to Maximum score). Table 1 and Figure-1 illustrates the different levels of research knowledge, providing a comprehensive overview of distribution among the postgraduate participants.

Table 1: Distribution of Research Knowledge Levels among Postgraduate Students

S. No	Level of Research Knowledge	Frequency	Percent
1	Low (below 25)	38	31.66
2	Moderate (25 to 41)	64	53.34
3	High (above 41)	18	15



According to the data as illustrated in Table 1, 31.66% of students demonstrated low research knowledge, 53.34% exhibited moderate knowledge, and 15% were classified as having high research knowledge. This distribution aligns with the study of Creswell (2014). The high knowledge group indicates a subset of students who have effectively mastered research competencies, resonating with Kumar's (2019) findings. Most students' research knowledge is at a moderate level. Field (2013) supports this finding, while Levy & Lemeshow (2013) highlight that a lack of understanding of research concepts can lead to biased results.

Second objective of the study is to examine the research knowledge of PG students from diverse fields, including commerce, science, and humanities & social sciences. Hypothesis formulates as post-graduate students' knowledge of research methodologies, research tools, sampling techniques, data processing & statistics and overall research knowledge does not differ significantly depending on the various disciplines. A one-way ANOVA (F-test) was employed to evaluate the significance of observed differences. A summary of the One-Way ANOVA results, detailing the mean scores and standard deviations for research knowledge, along with the corresponding F-test statistics are presented in Table 2.

Table 2: ANOVA Results for Research Knowledge Scores across Disciplines among Postgraduate Students

Dimensions	Subject	N	Mean	SD	F-ratio	p-value
Research Methods	C	30	6.67	1.63	264.63**	<0.01
	S	42	17.18	1.02		
	HS	48	12.65	2.58		
	Total	120	12.73	1.92		
Research Tools	C	30	4.38	1.09	472.31**	<0.01
	S	42	12.12	0.68		
	HS	48	8.27	1.28		
	Total	120	8.57	1.06		
Sampling Techniques	C	30	3.22	1.45	91.41**	<0.01
	S	42	4.16	0.88		
	HS	48	6.27	0.85		
	Total	120	4.77	1.64		
Data Processing & Statistics	C	30	4.72	1.66	88.79**	<0.01
	S	42	9.39	1.12		
	HS	48	6.73	1.68		
	Total	120	7.16	1.48		
Overall Research Knowledge	C	30	29.11	2.62	99.01**	<0.01
	S	42	42.03	2.12		
	HS	48	34.86	5.48		
	Total	120	35.93	3.90		

Note: C- Commerce; S-Science, HS-Humanities and Social Science; ** Significant at 0.01 level

From Table 2, in the dimension of Research Methods, the mean scores reveal that science students (17.18) outperformed those in commerce (6.67) and humanities and social sciences (12.65), resulting in a high F-ratio of 264.63 with a p-value of less than 0.01, indicating a statistically significant difference among the groups. This finding is consistent with the work of Levy and Lemeshow (2013), who noted that students in disciplines such as science are generally more proficient in applying various research methods due to their curriculum's emphasis on experimental and quantitative approaches. Conversely, commerce and humanities students often face challenges in methodological application, reflecting similar conclusions drawn in study of Kumar (2019). Hence it is suggested research based pedagogies in the country like India to be implemented (Hegde & Indrani, 2021).

For Research Tools, the data indicates a similar trend, with science students again achieving the highest mean (12.12) compared to commerce (4.38) and humanities and social sciences (8.27). The F-ratio of 472.31,

accompanied by a p-value of less than 0.01, further confirms significant differences in proficiency across disciplines. These results support the study of Buchanan & Bryman (2009).

In Sampling Techniques, the F-ratio of 91.41 and a p-value of less than 0.01 show notable differences among the students and commerce students had a mean score of 3.22, while science students scored 4.16, and humanities and social sciences scored 6.27, suggesting varying levels. These results are substantiating findings by Field (2013), who highlighted misconceptions regarding sampling methods among postgraduate students. Furthermore, in a study by Delice (2018), it was noted that inadequate training in sampling techniques among postgraduate students led to poor research outcomes.

Regarding Data Processing & Statistics, the mean scores again highlight a discrepancy in knowledge levels, with science students (9.39) outperforming commerce (4.72) and humanities and social sciences (6.73). The F-ratio of 88.79 and a p-value of less than 0.01 indicate significant variance, aligning with Kumar's (2019) findings that many students struggle to interpret data effectively. This highlights the need for educational institutions to prioritize statistical literacy across all disciplines.

Finally, the Overall Research Knowledge dimension shows the highest mean for science students (42.03) compared to commerce (29.11) and humanities and social sciences (34.86). The calculated F-value of 99.01, with a p-value of less than 0.01, signifies a strong statistical difference, emphasizing the necessity for targeted interventions to enhance research competencies, particularly in commerce and humanities and social sciences. A study by Hegde et al. (2020) found similar disparities in research competencies across disciplines, highlighting that students in scientific fields typically exhibit higher research knowledge compared to their counterparts in the arts and humanities. The post hoc analysis conducted after the ANOVA revealed significant disparities in research knowledge among the various groups of postgraduate students. The results suggest an urgent need for educational institutions to implement targeted interventions to enhance the essential research skills for their respective disciplines as recommended by Tanna et al. (2021).

6. **Findings**

The study identified three distinct categories of research knowledge: Low-Level, Moderate-Level, and High-Level. Notably, 31.66% of students fell into the Low-Level Research Knowledge category, indicating a substantial need for improvement in their understanding of research methodologies. Conversely, the Moderate-Level group, comprising 53.34% of students, displayed a satisfactory grasp of research concepts but showed considerable room for enhancement. Only 15% of participants achieved a High-Level Research Knowledge score, underscoring a small yet competent cohort ready for advanced research endeavors.

The study also highlighted notable disciplinary differences in research knowledge. Science students consistently outperformed their peers in Commerce and Humanities and Social Sciences across all dimensions of research knowledge. In Research Methods, Science students had a mean score of 17.18, while Commerce students scored only 6.67. This trend persisted in Overall Research Knowledge, where Science students achieved a mean of 42.03 compared to Commerce's 29.11. Humanities and Social Sciences students fell in between, with an overall mean of 34.86, indicating some understanding but still below the optimal level exhibited by their Science counterparts. The F-ratio for Research Methods was 264.63, illustrating the pronounced disparities in proficiency among the student groups. Such findings suggest that discipline significantly influences research knowledge, reinforcing the need for targeted educational interventions. Moreover, the study identified specific knowledge deficiencies among students in Commerce and Humanities. These students exhibited critical gaps in essential areas such as Research Methods, Research Tools, Sampling Techniques, and Data Processing & Statistical Procedures.

7. **Limitations and Research Gaps**

This study offers valuable insights into the research knowledge of postgraduate students; however, it has several limitations that should be acknowledged. The assessment of research competencies relied heavily on self-reported measures, which may not fully encapsulate the complexities of students' skills. Self-reported data can introduce bias, often fail to account for practical abilities. Furthermore, the focus on a single institution Kakatiya University restricts the generalizability of the findings to other educational contexts, given that research knowledge can differ significantly across various universities and disciplines.

The study also did not sufficiently investigate the specific factors contributing to students' difficulties with research methodologies, such as curricular shortcomings or individual learning styles, which could be crucial for developing more effective educational interventions. Additionally, the influence of students' prior educational backgrounds on their research competencies remains unexamined, as does the potential for longitudinal studies to monitor the evolution of research skills over time. Lastly, the predominance of quantitative data analysis, without

integrating qualitative insights from students' experiences, results in a lack of understanding regarding the challenges they encounter and the types of support they deem most beneficial. Addressing these limitations in future research will be vital for achieving a more comprehensive understanding of postgraduate students' research competencies.

Identifying research gaps in postgraduate education concerning research knowledge highlights several critical areas that warrant further investigation. First, there is a deficiency of comprehensive studies exploring the specific factors that influence students' difficulties in grasping research methodologies. While existing literature emphasizes the need for enhanced training, it frequently overlooks underlying issues such as curricular inadequacies, teaching strategies, or individual learning preferences that may impede student proficiency. Additionally, the effect of prior educational experiences such as undergraduate training or work experience on postgraduate research capabilities remains largely unexplored. Understanding these influences could help tailor educational interventions more effectively. Moreover, there is a notable lack of longitudinal studies tracking the progression of research skills over time, which could shed light on key moments for intervention and the efficacy of training programs. Another area that requires further exploration is the qualitative dimensions of students' experiences with research training. Collecting qualitative data through interviews or focus groups could enhance our understanding of the barriers students face and the types of support they find most advantageous.

Finally, research that compares the research competencies of students across various institutions and disciplines is essential for identifying broader trends and best practices, thereby improving the generalizability of findings in this field. Addressing these gaps is crucial for developing more effective educational strategies and enhancing research competency among postgraduate students.

8. Conclusion

The study reveals significant variations in research knowledge among postgraduate students at Kakatiya University, with a notable majority positioned within the low to moderate knowledge categories. Such findings highlight an urgent need for enhanced training programs that focus on critical areas such as research methodologies, tools, and ethical considerations, thereby equipping students with the essential skills required for effective research engagement. The identification of students with high research knowledge underscores the potential for targeted educational interventions to yield positive outcomes. Furthermore, fostering a collaborative and supportive learning environment can serve to enhance overall research competency, allowing students to thrive academically and professionally.

The research findings also emphasize substantial disparities in research knowledge across different disciplines, with science students demonstrating the highest proficiency levels. Addressing these gaps is particularly crucial for students in commerce and humanities, as it will better prepare them to contribute meaningfully to their respective fields.

Institutions should be encouraged to develop and implement comprehensive training workshops tailored to the distinct needs of various disciplines, integrating research skills development into existing curricula and making courses on research methods and data analysis mandatory. Additionally, establishing mentorship programs where experienced researchers guide postgraduate students can significantly bolster their research capabilities. Such initiatives, alongside peer mentoring and regular assessments of research knowledge, will ensure that training programs remain responsive to student needs. Access to essential resources, interdisciplinary workshops, and expert-led seminars will further enrich the research training landscape, ultimately cultivating a robust research culture that equips postgraduate students with the requisite skills for academic and professional success.

Conflict of Interest

None

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