

Analyzing Basic Stats in Educational Research: Proficiency in Key Statistical Methods

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ABSTRACT

This study employs a descriptive research approach to investigate graduate students' perceptions of basic statistics in educational research at Baguio Central University. Data collection was conducted using a questionnaire, ensuring reliability and validity through input from primary sources. Data was gathered from 86 students enrolled in statistics and research courses during the first semester of School Year 2023-2024, with rigorous measures taken throughout the process. Analysis was performed using a four-point arbitrary scale, providing comprehensive insights into students' perceptions of basic statistics. The findings indicate that basic statistics play a crucial role across various stages of educational research, with respondents acknowledging their importance from problem selection to result reporting. Overall, the study reaffirms the indispensable nature of basic statistics in educational research, emphasizing their pervasive applicability and essential contributions to scholarly inquiry. In light of these conclusions, recommendations are proposed to enhance the utilization of basic statistics in educational research. These include prioritizing statistical training in academic programs, promoting research methodology courses, facilitating continued professional development for educators and researchers, encouraging collaborative research projects, and promoting access to open-access resources. Implementing these recommendations has the potential to elevate the quality and impact of scholarly inquiry in the field of education.

Keywords: Basic statistics, educational research, Descriptive research, Student attitudes

INTRODUCTION

In the realm of fencing, statistics plays a pivotal role in enhancing understanding and proficiency, particularly among practitioners and researchers. Through meticulous data collection, analysis, and interpretation, statisticians unravel valuable insights crucial for advancing the sport and addressing pertinent challenges. The systematic approach of statistics allows for a thorough examination of variability and uncertainty, ensuring the accuracy and reliability of conclusions drawn from data (Pal, 2023).

Just as in broader research domains, fencing researchers rely on statistics to extract meaningful conclusions from data obtained through various sources, including competitions, training sessions, and observational studies. Regardless of the data collection method employed, maintaining consistency and rigor throughout the analytical process is essential to derive accurate insights. Statistics serves as the analytical backbone of fencing research, facilitating the identification of trends, patterns, and areas for improvement within the sport (Pal, 2023).

In the context of fencing, statistical techniques aid in planning and executing research studies, as well as in summarizing and interpreting gathered data to inform decision-making. By leveraging statistical analysis, fencing coaches, athletes, and policymakers can evaluate performance, refine training methodologies, and develop strategic approaches to enhance competitive outcomes (Snedecor and Cochran, 1980; Isotalo, 2006; Obiaraije, 2021). Moreover, statistics enables researchers to assess the impact of rule changes, equipment innovations, and training interventions on athletes' performance and well-being, driving continuous improvement within the sport.

Despite the widespread acknowledgment of statistics' importance in fencing research, there exists a notable research gap concerning its practical application and integration into training and coaching programs. While existing literature predominantly focuses on the theoretical aspects of statistics, there is limited exploration of how this theoretical knowledge translates into practical skills for enhancing performance and decision-making in fencing contexts. Understanding and addressing this gap are critical for designing training programs that adequately equip athletes and coaches with the statistical literacy necessary for optimizing performance and strategic planning (Pal, 2023).

Furthermore, there appears to be a disconnect between the recognition of statistics' significance and its integration into fencing education and training curricula. Despite its potential to enhance performance analysis, talent identification, and coaching effectiveness, statistics remains underutilized in fencing education. By bridging this gap and integrating statistical concepts into fencing curricula, educators can empower athletes and coaches with the analytical skills needed to excel in the sport and contribute to its advancement (Pal, 2023).

Nonetheless, statistics serves as a powerful tool for enhancing understanding, performance, and decision-making in fencing. By leveraging statistical analysis, researchers, coaches, and athletes can extract valuable insights, optimize training methodologies, and drive continuous improvement within the sport. However, there is a need for greater integration of statistical concepts into fencing education and training programs to ensure that practitioners possess the necessary skills to excel in an increasingly data-driven sporting landscape.

REVIEW OF RELATED LITERATURES

Statistics is not just a tool for scientific research; it is deeply intertwined with various philosophical perspectives that shape its application and interpretation. The fusion of statistics with relevant philosophical frameworks enriches our understanding and utilization of statistical methods in research. Statistics serves as a fundamental tool for researchers, enabling them to comprehend their data and draw statistical inferences applicable to broader populations. Embedded within statistical analysis are philosophical considerations regarding the nature of knowledge, causality, and inference. For instance, the philosophy of empiricism underscores the importance of empirical evidence in scientific inquiry, aligning with the empirical foundation of statistical analysis. Moreover, the philosophy of logical positivism, which emphasizes the verification of statements through empirical observation, resonates with the objective and verifiable nature of statistical analysis (Pal, 2023).

Furthermore, the philosophy of statistics delves into deeper questions regarding causality and correlation. Philosophical debates surrounding causation, such as the distinction between correlation and causation, are crucial for statisticians to navigate when drawing conclusions from data. This philosophical underpinning guide researcher to be cautious in making causal claims based solely on statistical associations, thus ensuring the validity and reliability of research findings (Kalla, 2010).

In educational research, statistics is imbued with philosophical perspectives such as pragmatism, positivism, and interpretivism. Pragmatism, with its focus on practical solutions and dynamic research designs, aligns with the flexible and problem-solving nature of statistical analysis. Positivism emphasizes objectivity and empirical observation, guiding researchers to maintain a neutral stance and rely on observable data in statistical research. Conversely, interpretivism acknowledges the subjective nature of reality and encourages researchers to consider the cultural and contextual factors influencing statistical phenomena (Business Research Methodology, n.d.).

Moreover, the philosophy of science, particularly the problem of induction, plays a pivotal role in shaping statistical reasoning and inference. Philosophical debates surrounding the interpretation of probabilities and the theoretical foundations of statistical methods inform researchers' understanding of uncertainty and inference processes. By grappling with these philosophical concepts, statisticians are better equipped to navigate the complexities of statistical analysis and draw meaningful conclusions from data (Stanford Encyclopedia of Philosophy, 2014). The integration of statistical analysis into fencing research and practice holds a multitude of implications and impacts, each extending far beyond the confines of the sport itself. Moreover, in the realm of fencing, where split-second decisions and finely-honed skills define success, the application of statistical analysis emerges as a game-changer. It's not merely about tallying wins and losses; it's about peeling back the layers of performance to uncover nuanced insights that can reshape strategies and elevate outcomes.

Consider the quest for performance optimization. Behind every graceful lunge and swift parry lies a wealth of data waiting to be mined. Statistical analysis becomes the lens through which coaches and athletes scrutinize every movement, every tactic. By delving into the depths of this data, they unearth hidden patterns, identify areas of strength and weakness, and sculpt training regimens tailored to individual needs. It's a process of refinement, of honing in on what works and discarding what doesn't, all in pursuit of that competitive edge that can make the difference between victory and defeat.

But statistical analysis isn't just about fine-tuning technique; it's about making informed decisions that ripple throughout the sport. No longer are choices based solely on gut instinct or anecdotal evidence. With a firm grounding in statistical insights, coaches and administrators navigate the labyrinth of options with clarity and confidence. They allocate resources judiciously, craft strategies with precision, and chart a course towards success that is rooted in data-driven intelligence.

Yet, perhaps the most profound impact of statistical analysis lies in its role in talent identification and development. Here, numbers become the compass guiding scouts and coaches as they navigate the vast sea of potential. Through meticulous analysis of performance metrics and key indicators, they pinpoint the rising stars amidst the crowd, nurturing their talents with tailored training programs and unwavering support. It's a journey of cultivation, of transforming raw potential into polished prowess, ensuring that the sport's future burns even brighter than its present.

Moreover, statistical analysis extends its reach beyond the realm of competition, delving into the realm of athlete well-being. Here, it becomes a tool for safeguarding health and preventing injury, as coaches and medical professionals sift through mountains of data to identify risk factors and trends. Armed with this knowledge, they craft targeted interventions and implement preventative measures, creating a safe and supportive environment where athletes can thrive and excel. And as the sport evolves, so too does the body of knowledge surround it. Statistical analysis serves as the cornerstone of fencing research, driving innovation and pushing the boundaries of understanding ever further. Through rigorous analysis of fencing-related data, researchers uncover new insights, validate existing theories, and forge new paths

forward. It's a relentless pursuit of excellence, a quest to unlock the secrets of success and share them with the world. In the end, the integration of statistical analysis into fencing research and practice isn't just about numbers on a page; it's about the transformative power of knowledge. By promoting evidence-based decision-making, optimizing performance, enhancing athlete well-being, and advancing the scientific understanding of fencing, statistical analysis becomes a force for continuous improvement and innovation, enriching the sport and all who are touched by it.

Thus, integrating relevant philosophical perspectives enriches our understanding of statistics and enhances its application in research. By considering philosophical considerations regarding knowledge, causality, and inference, researchers can employ statistical methods more effectively, ensuring the validity and reliability of their findings. Philosophical engagement with statistics not only deepens our understanding of the discipline but also fosters critical thinking and reflective practice in statistical research.

METHODOLOGY

The study's research design and methodology center on a descriptive research approach, employing a questionnaire to collect data. The primary objective is to uncover characteristics and patterns within the graduate and post-graduate student population of Baguio Central University in Baguio City, particularly focusing on their perceptions and understanding of basic statistics in educational research. To ensure the questionnaire's reliability and validity, inputs from primary sources were incorporated, and the finalized version was approved by the Research Proposal Committee. The questionnaire was then distributed among 86 students enrolled in statistics and research courses during the first semester of School Year 2023-2024. Stringent measures were taken throughout the data gathering process. This involved securing necessary permits, preparing respondents adequately, distributing the questionnaires during Saturday classes, and retrieving them after a week for subsequent analysis. In order to facilitate analysis, interpretation, and discussion, a four-point arbitrary scale was utilized for each question during data treatment. This systematic approach ensured that the data collected would be effectively analyzed, allowing for comprehensive insights into the perceptions and understanding of basic statistics among the student population.

DISCUSSIONS

Extent of Applicability of Basic Statistics in the Different Stages of Educational Research

Table 1 presents the data gathered on the extent of applicability of basic statistics in the different stages of educational research as observed by the respondents. The results showed that basic statistics are very much applicable in the different stages of educational research as proven by the obtained average weighted mean of 3.78. This meant that basic statistics or statistical tools are important and very much applicable in the different stages and/or activities in educational research.

Table 1								
Extent of Applicability of Basic Statistics in the Different Stages of Educational Research N = 86								
Indicators	Extent of Applicability				TWP	WM	DE	R
	VMA	MA	MoA	SA				
	4	3	2	1				
1. Selection of the problem	72	14	0	0	330	3.84	VMA	1

2. Formulation of hypothesis	70	16	0	0	328	3.81	VMA	3
3. Determination of research method	69	17	0	0	327	3.80	VMA	4
4. Data collection	65	20	1	0	322	3.74	VMA	5
5. Analysis & interpretation of data	71	15	0	0	329	3.83	VMA	2
6. Reporting the result	62	24	0	0	320	3.72	VMA	7
7. Drawing conclusions & inferences	63	23	0	0	321	3.73	VMA	6
Average Weighted Mean						3.78	VMA	

Legend:

Arbitrary Scale	Numerical Limits	Descriptive Interpretation	Symbols
4	3.51 – 4.00	Very Much Applicable	VMA
3	2.51 – 3.50	Very Applicable	VA
2	1.51 – 2.50	Moderately Applicable	MA
1	1.00 – 1.50	Slightly Applicable	SA

The garnered weighted means indicate the extent of applicability of basic statistics in the stages of educational research ranked as follows: Rank 1 Selection of the problem, 3.84; Rank 2 Analysis & interpretation of data, 3.83; Rank 3 Formulation of hypothesis, 3.81; Rank 4 Determination of research method, 3.80; Rank 5 Data collection, 3.74; Rank 6 Drawing conclusions and inferences, 3.73; and Rank 7 Reporting the results, 3.72. These findings not only imply but also affirmed the value and applicability of statistics in educational research. The statistical methods and tools provide the education researcher with descriptive and analytical methods in dealing with the variability and meaning in gathered and observed data. With statistics, the researcher can ably conduct his/her educational research.

Statistics in research deals with basics in statistics that provides statistical randomness and law of using large samples. Statistics teaches how choosing a sample size from a random large pool of sample helps extrapolate statistical findings and reduce experimental bias and errors. Basic statistics is very much applicable in the following research stages: 1) Establishing a sample size - Statistics in research deals with basics in statistics that provides statistical randomness and law of using large samples. Statistics teaches how choosing a sample size from a random large pool of sample helps extrapolate statistical findings and reduce research bias and errors; 2) Testing of Hypothesis - When conducting a statistical study with large sample pool, biological researchers must make sure that a conclusion is statistically significant. To achieve this, the researcher must create a hypothesis before examining the distribution of data. Furthermore, statistics in research helps interpret the data clustered near the mean of distributed data or spread across the distribution. These trends help analyze the sample and signify the hypothesis, and 3) Data interpretation through analysis. When dealing with large data, statistics in research assist in data analysis. This helps researchers to draw an effective conclusion from their experiment and observations. Concluding the study manually or from visual observation may give erroneous results; therefore, thorough statistical analysis will take into consideration all the other statistical measures and variance in the sample

to provide a detailed interpretation of the data. Therefore, researchers produce a detailed and important data to support the conclusion (<https://brainly.ph/question/13976163>), (Info4mystery (2015)).

Similarly, Agarwal (2012) explains the applicability of basic statistics in the many stages and/or processes in research such as in measure things; examining relationships; making predictions; testing hypotheses; constructing concepts; exploring issues; presenting information; making comparisons to find similarities and differences; and drawing conclusions about populations based only on sample results. In addition, Pal (2023) notes that basic statistics are very much applicable in these research activities: a) Checking the validity of research - in research, accuracy of results is significant, and statistics help with this. By using statistical methods to analyze data, researchers can avoid any possible biases that could lead to misinterpretation of data. Through the use of statistics, researchers can be more confident that their results are valid, reliable and that they can have confidence in the application of such results; b) Making generalizations - research seeks to understand and solve real-world problems. Therefore, the results obtained from research should be generalizable from the sample to the entire population being studied. Statistics make this possible by enabling researchers to calculate the probability of random errors occurring in the observed results of the study. By understanding this, researchers can confidently generalize the results of their research, c) Making predictions – research is utilized to make predictions, and statistical analysis plays a critical role in making accurate predictions. A well-executed research study that utilizes statistical tools can provide reliable and valid predictions. This is important, as predictions are used to make decisions in fields such as public policy and strategic planning; d) Determining significance – the use of statistics helps determine the significance of a particular study. Statistical significance in research is used to establish the level of confidence one has in the results. Determining the significance of a particular study can be the difference between acting on the research's findings or ignoring it altogether; e) Visualization of results - statistics can create a visual representation of data, making it easier for researchers to interpret the results of the study. Data visualization techniques such as graphs and charts can provide a quick and efficient way to interpret data, which can lead to better decision making; and f) Drawing conclusion - in conclusion, the use of statistics in research is essential as it enables researchers to make sense of their data, make informed and valid claims, and generally support scientific inquiry.

The role of statistics in research cannot be overstated as it has become increasingly crucial in today's data-driven world. Researchers can now use advanced statistical methods to model a broad range of phenomena, analyze data sets of various sizes and complexity, and draw reliable conclusions. Statistics continues to play a critical role in research, helping scientists make sense of large, complex data sets, enabling them to make predictions and allowing them to draw valid and reliable conclusions.

Therefore, the second assumption of this study which states that basic statistics are moderately applicable in educational research negated from the actual findings of the study which found that basis statistics are very much applicable in the different stages in educational research as confirmed by the obtained average weighted mean of 3.78.

Extent of Knowledge on the Major Types of Statistics Used in Educational Research

Table 2 presents the data gathered on the extent of knowledge on the major types of statistics used in educational research as perceived by the respondents. The respondents were found moderately knowledgeable on the major types of statistics used in educational research namely, descriptive statistics, and inferential statistics as proven by the obtained by the overall average weighted mean on 2.00.

The descriptive statistics got a slightly higher average weighted mean of 2.23 as compared to inferential statistics which got an average weighted mean of 1.76 however, both average weighted means are described as moderately knowledgeable. Regarding descriptive statistics, the respondents have rated themselves as very knowledgeable on frequency distribution based on the garnered the highest weighted mean of 2.51 among the six types of descriptive statistics. This may be so because the frequency count or distribution is the easiest among the descriptive statistical tools.

Table 2: Extent of Knowledge on the Major Types of Statistics Used in Educational Research N = 86								
Indicators	Extent of Knowledge				TWP	WM	DE	R
	VMK	VK	MK	SK				
	4	3	2	1				
A. Descriptive Statistics								
1. Frequency distribution	18	23	32	11	216	2.51	VK	
2. Measures of central tendency (Mean, Median, Mode, Skewness, Kurtosis, Normal distribution)	15	19	36	16	205	2.38	MK	
3. Measures of variability (Range, Standard Deviation, Variance)	14	18	33	21	197	2.29	MK	
4. Measure of Partition (Quartile, Decile, Percentile)	12	20	28	26	190	2.21	MK	
5. Measure of relative standing (T-score, Z-score)	10	18	25	33	177	2.06	MK	
6. Measure of relationship (Pearson Product Moment Correlation, Spearman Rank Order Correlation, Phi Coefficient, etc.)	8	13	30	35	166	1.93	MK	
Average Weighted Mean						2.23	MK	1
B. Inferential Statistics								
1. Parametric statistics (T test, Z test, F test, ANOVA)	7	12	28	39	159	1.85	MK	
2. Non-parametric statistics (Mann-Whitney U test, Wilcoxon Signed-Rank test, Kruskal Wallis test, Chi Square, etc.)	5	10	23	48	144	1.67	MK	
Average Weighted Mean						1.76	MK	2
OVERALL AWM						2.00	MK	

Legend:

Arbitrary Scale	Numerical Limits	Descriptive Interpretation	Symbols
4	3.51 – 4.00	Very Much Knowledgeable	VMK
3	2.51 – 3.50	Very Knowledgeable	VK
2	1.51 – 2.50	Moderately Knowledgeable	MK
1	1.00 – 1.50	Slightly Knowledgeable	SK

According to Manikandan (2011) the frequency or absolute frequency of an event or response is the number of times the observation/response has occurred in the study or experiment. These frequencies are often presented graphically or in tabular form. A frequency distribution shows a summarized grouping of data divided into mutually exclusive classes and the number of occurrences in a class. It is a way of showing unorganized data notably to show results of an election, income of people for a certain region, or responses on a particular question, and other similar situations. Some of the graphs that can be used with frequency distributions are histograms, line charts, bar charts and pie charts. Frequency distributions are used for both qualitative and quantitative data.

The respondents have also manifested moderate knowledge on the other types of descriptive statistics in the following descending order based on their garnered weighted means: Measures of central tendencies (median, mean, mode, skewness, kurtosis), 2.38; Measures of variability (range, standard deviation, variance), 2.29; Measure of partition (quartile, decile, percentile), 2.21; Measure of relative standing ((T-score, Z-score), 2.06; and Measure of relationship (Pearson Product Moment Correlation, Spearman Rank Order Correlation, Phi Coefficient, etc.), 1.93.

In like manner, the respondents have reflected their moderate knowledge in inferential statistics namely parametric statistics (T test, Z test, F test and Analysis of Variance), and Non-Parametric Statistics (Mann-Whitney U test, Wilcoxon Signed-Rank test, Kruskal Wallis test, Chi Square, and others) with weighted means of 1.85 and 1.67 respectively. IBM (2021) explains that parametric statistics are based on assumptions about the distribution of population from which the sample was taken, while nonparametric statistics are not based on assumptions, that is, the data can be collected from a sample that does not follow a specific distribution.

These findings imply or confirm that the respondents have not sufficiently acquired the needed knowledge and skills on these two major types of basic statistics used in educational research. One of the reasons may be the application of formulas in statistical computations. Though nowadays, there are gadgets or applications which can be used, most graduate and post graduate students find statistical and/or mathematical computations quite challenging. Therefore, the professors in research statistics in the graduate and post graduate schools are encouraged to expose their students in hands-on statistical computations.

As a matter of fact, graduate and post graduate students have to take upon themselves to learn and understand the importance and use of both descriptive and inferential statistics because they need them in their thesis and dissertation research. Simplilearn (2023), Bhandari (2023), and Abduljabbar (2020) explain that descriptive statistics describes the characteristics of a data set. It summarizes and organizes characteristics of a data set. A data set is a collection of responses or observations from a sample or entire population. It is a simple technique to describe, show and summarize data in a meaningful way. Just simply choose a group you are interested in, record data about the group, and then use summary statistics and graphs to describe the group properties. There is no uncertainty involved because you are just describing

the people or items that you actually measure, and not aiming to infer properties about a large data set. On the other hand, inferential statistics involves drawing conclusions about populations by examining samples. It allows us to make inferences about the entire set, including specific examples within it, based on information obtained from a subset of examples. These inferences rely on the principles of evidence and utilize sample statistics as a basis for drawing broader conclusions.

The Indeed Editorial Team (2022) suggests that whether one is a statistician, data analysts, or just a plain professional, understanding statistic fundamentals is essential for tasks that involve collecting data, making important business decisions and using information to make mathematical predictions. To use statistics effectively, it's important for an individual to have math, research and analysis skills. Learning about statistics can help anyone excel at work and become more comfortable calculating critical statistical techniques and formulas. Statistics skills are capabilities and competency traits that allow someone to use statistics in order to gauge the probability of a particular outcome. Statistics are generally a combination of several qualifying traits, including math, computer literacy, data analysis and critical thinking. This skill gives people a better understanding of how to review data critically to gather useful information. This information serves to help in important problem-solving and decision-making processes.

The CodeAvail Blog (n.d.) shares the following best tips to improve one's basic statistical skills: 1) Understand the basics such as understanding the key concepts. Statistics is a study that requires one to have a basic understanding or foundation. The solution is to continue trying until you find the solution. For example, in lower grades, the students study tables which they apply in the higher grades. It is a step-by-step method like climbing a ladder which one require to take step by step to reach the peak. Statistics is a subject where you require your basics to be clear because what students learn in the lower grades requires the same concepts in the higher Grade levels; 2) Practice every day - the biggest secrets on how to improve one's statistical skills lies in improving and growing statistical skills and practicing them daily. Consistency in every work is essential. Some people think that mathematics skills are a gift given by nature. While other people think it is an intelligent environment around a person that develops his abilities. These skills are not developed naturally or developed because of your surroundings; 3) Help others in solving their problems in statistics – sharing knowledge with others will enhance one's skill in statistics. Every time one solves someone's problem, he/she learns something new from them. Sometimes people ask questions which one has never heard of. Understanding others' problems and investigating them, giving them the solution that will leave one much more learned than before; 4) Try solving the problem yourself – keep trying because there are several ways to solve a single problem, and just keep finding those ways; 5) Don't try to memorize formula – a good instructor will never ask his/her students to memorize the formula but rather encourage them to remember the concepts; and 6) Take help from online tutors – students and even professionals can take help from online math and statistics experts. This assistance is accessible round the clock and can be accessed by everyone at anytime and anywhere around the world.

These findings agree with the third assumption of the study which states that there is moderate knowledge of the respondents on the basic types of basic statistics in educational research as confirmed by the obtained overall average weighted mean of 2.00.

CONCLUSION

In conclusion, the research findings underscore the crucial significance of basic statistics throughout various stages of educational research, highlighting its fundamental role in shaping academic inquiry and

analysis. The consistent acknowledgment of statistical tools' importance by respondents across all stages—from problem selection to result reporting—demonstrates their integral role in navigating the complexities of educational research. Contrary to initial assumptions, the empirical evidence decisively confirms the widespread applicability of basic statistics in this context. Moreover, insights gleaned from literature further reinforce the diverse contributions of basic statistics, ranging from ensuring research validity to aiding in predictions and conclusions. Overall, these findings underscore the indispensable nature of basic statistics in educational research, emphasizing its pervasive applicability and essential contributions to scholarly inquiry.

RECOMMENDATIONS

Based on the conclusions drawn from the research findings, several recommendations can be made to enhance the utilization of basic statistics in educational research. Firstly, educational institutions should prioritize the integration of statistical training across academic programs, ensuring that students develop proficiency in statistical methods early on through dedicated courses, workshops, and practical exercises. Secondly, institutions should promote research methodology courses that provide practical guidance on the application of basic statistics in educational research, covering key topics comprehensively. Thirdly, educators and researchers should engage in continued professional development opportunities to enhance their understanding and application of basic statistics, including attending workshops, seminars, and seeking mentorship. Additionally, institutions should encourage collaborative research projects involving interdisciplinary teams with expertise in education and statistics, leveraging the strengths of each discipline to produce high-quality research. Lastly, promotion of open access resources, such as statistical software packages and online tutorials, should be encouraged to facilitate access to statistical tools and promote transparency in research. Implementing these recommendations can enhance the utilization of basic statistics in educational research, thereby improving the quality and impact of scholarly inquiry in the field of education.

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