Implications Of Values And Technological Interventions In Research Methodology: A Critical Analysis

Reecha Jrall[1]*, **Dr. Kiran[2]**

[1]*Research scholar, central university of Jammu, reechajrall@gmail.com,*

[2]*Assistant Professor, Central University of Jammu, kirannmrc@gmail.com*

*Corresponding Author: - Reecha Jrall

Abstract
Research involves methods for finding the truth, which comprises defining problem or selecting a problem, formulating hypotheses, collection of data, making deductions and reaching conclusions and values are utmost importance at every steps of research. Researcher's interests are shaped by their values at every step of the research process. It is essential to place ethical restrictions on methodologies based on values. It is equally important to respect knowledge itself, so that researchers pursue methods that aim at genuine results rather than predetermined ones. Since the emergence of the internet, research and development using information technology has been an integral part of the globalization era. Online resources have increased researchers' comfort level since the internet and information technology have enabled them to find everything they need. In the backdrop of this researchers critically analyze the values involved in research and how technological intervention in every step of research process helps researchers.

Keywords- research, research values, technological tools, technological intervention, methodology, research tools

Introduction

Research is critical examination for seeking facts or principles or a deep investigation for finding the truth. The main aim of the research is not only to find the truth but a prolonged and Purposeful search. Research involves finding literature, managing references, collaborating and building networks, writing reports, publishing, bench-marking research, and checking plagiarism. Researchers should be able to quickly adapt to technology, so they can enhance their contributions to the field of research. Technology is changing the teaching and learning process (Jrall and Gupta, 2021) The use of Web 2.0 tools and other technologies has replaced paper-based materials and methods as a means of discovering, gathering, and organizing information. Sharma et al (2022) concluded that technology has influenced and revolutionized each and every aspect of our daily lives, so the proficiency of teachers as well as students in modern technologies is the urgent need for their survival in highly competent world. It is important to collaborate and communicate feedback when constructing drafts and disseminating written material or information. Depending on living conditions and internalization of values, there can be a positive or negative correlation between technology and values in this process of influencing and influencing. Diksha portal swayam, NROER, E Pathshala , Swayam Prabha helps all the students to continue their learning and pupil having better browsing habit learn better through the online content and it also increase an achievement of students. (Jrall and Kiran, 2020). To search for literature in the past, researchers went to libraries and needed large spaces to store and organize the literature, not to mention the time and effort required to write reports. Technology must be strengthened and turned into a positive force by strengthening its relationship with values. This is accomplished by not thinking of technology in isolation from values (Gizemagyuz, 2019). The teacher can manipulate the strategies and techniques in the classroom in a way that suits the students . (Jrall And Gupta, 2020)

People are motivated to commit misconduct as a result of institutional pressures, incentives, and constraints, according to the "stressful" or "imperfect" environment theory. For example, publishing and obtaining grants and contracts, career ambitions, profit and fame seeking, poor supervision of trainees and students, and inadequate oversight of researchers can all contribute to misconduct (chauhan). Among graduate and postdoc students (Haustein & Larivière, 2014) and those studying in interdisciplinary fields (Jiang, Ni, He, & Jeng, 2013), academic social networks have become a new source of reading. With the powerful medium namely internet the content can be communicated to the needy target people with

less accost but effectively. (Baliya And Jrall, 2020)

Users are more engaged with research-based features in an academic social network than these social features, according to a study (Jeng, & Jiang, 2015). Moocs course are boon for the learners as accessing these courses needs not any formal institutions and not organized time table (Jrall and Gupta, 2021).

Scholars are finding sources, sharing interests and building networks through academic social networks, which have become an important part of their work. Researcher should aware that research values and ethics have to be practiced at every step for conducting research from selection of topic to dissemination of research work.

The steps in research involves
Selection and defining the problem
Reviewing the literature
Formulation of hypothesis
Designing research or sample design
Selection of methods
Collection of data
Analyze data

Interpret and reporting (dissemination of research) The research integrity is based on the adherence to the core values of the research that are objectivity, Honesty, Openness, Accountability, Fairness, Objectivity, Stewardship. And these values associated specifically to each step of research. Adherence with the research values is utmost importance for a researcher and these research values and ethics must be followed in every legitimate research. Avoidance of values and ethics in research is the results of two ways either researcher unknowingly avoid the values because of lack of knowledge or for greed for publications. In the following sections researcher discussed the core values at every step of conducting research and how technology integrate and contributing in research.

1. Selecting The Topic And Defining The Research Problem

Values and ethics help us to make sure that researcher must be held accountable to the public. So he /she as a researcher should select the problem or topic according to the consideration of the society. How it helps the society or others besides you. Many time researcher select problem according to his or her convenience or sometimes by his own experience or according to current issues. Whenever researcher select and define the topic he/she must be accountable and for the

selection. It can be challenging to identify a problem to study, not because there aren't many topics that could be investigated, but because of the desire to formulate an original problem statement rather than simply copy the work of others and it should be socially relevant and researchable problem statement that is unique (Sacred heart university library). The utmost criteria for selection problem are novelty and avoidance of unnecessary duplication. (Carter V. Good, 1942). Due to emergence of internet and advancement in technology task of research become somewhat easy. Now data exploration is just a snap. Research can now be conducted without the need to go to old libraries and flip through books. The internet offers many E-Books that can be downloaded, read, and searched through in just a few minutes, as opposed to hours of searching for and searching through hard copies. Identification and selection of problem is not remains a difficult job, just browse the broad areas and review the studies related to it from varied and quality journals, books, magazines, blogs etc. The use of digital reconstruction as a tool for research in various scientific disciplines, such as architecture, history of architecture, and archaeology, has grown steadily in the last five years (Harfst, 2012). Depending on the research needs, neither option is particularly recommended, but Google Scholar appears to be a cheap and easy alternative. An online database with a high impact factor and another free database is included in following list.

Table 1. showing the various online tools with their features

| S no.	Tools	Membership	Discipline	Support open access	Export citation	Free abstract	Product
1.	Google scholar	No	All	Yes	Yes	Yes	All kind
2.	Academia	No	All	Yes	Yes	Yes	Books, journals, conference proceedings
3.	Research gate	No	All	Yes	Yes	Yes	Books, journals,
4.	Science direct	Yes	Science , technical, and medical	Yes	Yes	Yes	Journal, article, book chapter
5.	Springer	Yes	All	Yes	Yes	Yes	Journal, book, ref. work, protocol, database
6.	IEE	Yes	Computing and electronics	No	No	No	Journal, proceeding, e-Book, technical standard, course
7.	ACM	Yes	Computing	No	No	No	Journal, proceeding, magazine, newsletter, book
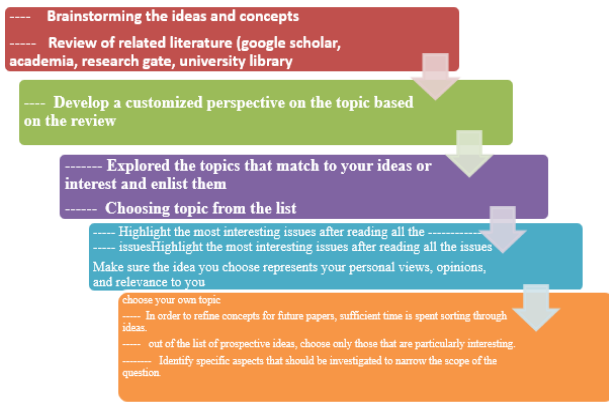
Figure 1. depicting the ways to identification of specific problem

2. REVIEWING LITERATURE

Review of literature is very important aspect of research. Honesty and fairness in reviewing literature contribute a lot to the research process. Now especially during the pandemic researcher adhere to the web resources for review of literature. But sometime web resources did not reflect the original work of the author and on the basis of it we decide the hypothesis and research questions and it is not ethical, for review of literature researcher should have access to the original sources. Citations of others' work correctly and not plagiarize or self-plagiarize is very important and reading carefully the sources of literature without skipping any content without any biasness (Helen Kara, 2021). As part of the review process, participants exercise greater control over the review process to ensure that actionable knowledge is generated in order to transform their practice (Bassett and McGibbon 2013). Technology has opened up a whole new world of resources for teachers. There was an excellent library system thirty years ago, but we needed to know where to look for what we needed. It might be necessary to know someone who could assist us in finding what we wanted. There are almost no limits to the resources we can access online now. Basically, you are limited only by the amount of time you spend searching. Sometimes we're able to find the information we need lightning fast, but at other times it may not come easy to us. To identify books and periodical articles, researchers used a card catalog and indexes in the print era. A DOS-based electronic version of the print finding tools was translated to the initial migration to electronic access and Rather than a discipline- or publication-specific environment, today's amorphous and constantly changing environment puts the onus on the user to differentiate types, formats, quality, and relevance (Martorella and Dolan,

2006). In research papers, dissertations, and PhD theses, referencing tools can make it easier to organize and format references. These tools are often referred to as referencing tools, reference management tools, citation software, citation app, paper software, citation manager and research paper organizers. Investigators can store and format references with these software programs or online tools and make sure to select the right research tool for your project and stay with it.

Table 2. represent some reference management tools

S no.	Name	Characteristics	Free	Download able or installable	Word extension	Browser extension	Available of library	Extract information from PDF automatically
1.	Zotero		Yes	Yes	Yes	Yes	Yes	Yes
2.	MENDLEY		Yes	Yes	Yes	Yes	Yes	Yes
	Endnote		No free for 30 days trial	Yes	Yes	Yes	Yes	Yes
	Refwork		No	yes	Yes	Yes	Yes	Yes
	Citavi		Yes	Yes	Yes	Yes	Yes	Yes
	PaperPile		No	yes	Yes , wrd docs extension	Yes	Yes	yes
	JabRef		Yes	Yes	Yes	Yes	Yes	Yes
	Papers		No	Yes	Yes	Yes	Yes	Yes
	Docear		Yes	Yes	Yes	Yes	Yes	Yes

Top Referencing Tools and Reference Management Software for Academic Writing - Ref-n-Write: Scientific Research Paper Writing Software Tool - Improve Academic English Writing Skills, 12 july 2022.

Formulation Of Hypothesis

As formulation of hypothesis and research questions completely depend upon the review o literature. Sometime researcher formulates the null research hypothesis as they can be tested easily but he/she should know when and how to set up the research questions and hypothesis. As a researcher we must be accountable for the whole process of the research. A relationship between variables must be stated first. The second requirement is that the hypothesis be testable and falsifiable; researchers must be able to verify whether the hypothesis is true or false. The third step is to ensure that it is consistent with the existing body of knowledge. Finally, it should be stated as simply and concisely as possible (Mike Allen 2017). Those who have already decided that the research is going to refute null hypothesis will collect data specifically for that purpose, and might tend to ignore data showing that null hypothesis isn't true, which will affect the validity of the study. A research's validity is determined by its accuracy in reflecting what it found during the study. Researcher bias is a threat to validity. Before the research began, the researcher will attempt to ensure that the data collected matches the preconceived theories and ideas he or she already had.

Designing

In this process many steps involved that includes sample, sampling design, selection of sample, collection of data etc. Researchers should use the same reasoning to consider the ethical implications of errors in statistical inference that they use to consider the ethical parameters of a proposed research design (David J. Pittenger (2001). In traditional research system everything was done manually from identification of population to, data collection. Researcher had to visited all institutions and offices personally for the selection of sample and data collection. For example for conduction of surveys and interview researchers had to carry appliances like audio and video recorder and researcher required training to handle these devices and he/she must have to note down each and every aspect manually on notebooks. Teachers now have access to a whole new world of resources thanks to technology. There was an excellent library system thirty years ago, but you needed to know where to look for what you needed. If you need assistance in finding what you want, you might need to know someone who can help. The resources that are available online today are almost limitless. There is no limit to what you can find, only what you can devote to it. At times, we are able to find information lightning fast, but at other times, the search is more difficult. But now everyone has mobile phone that can be used as multipurpose tools for data collection in research. Now there are multiple options to collect data without any restrictions of time and place. Researcher can collected data that is geographically varied without travelling and get bigger data lots of responses and faster reporting (Latkovikj and Popovska, 2020). Research data is transformed into standardized formats using various IT tools (Shashikala, 2014). It was previously necessary to print thousands of surveys, buy stamped envelopes, and hope all recipients would return them. The organization being surveyed would also have to invest a significant amount of time in the survey. It would be even more complicated to conduct experimental research, requiring busy research assistants to prepare countless scenarios. As a result of technology, researchers could avoid these costly hassles and provide businesses with critical insight into who to hire for high-performing teams (Smith, 2013). Investigators have to just browse about the information he/she want about the population, sample data collection tools and instantly find the information. Google forms, insyt, Jotform Mobile Forms, smartsheet, device magic, forms on fire,

go spot check, Polleverywhere a Live audience polling via text message or internet , Web-based tool Free, paid accounts for larger audiences. Skype is also a Video, audio, and instant messaging via internet. AudioNote-Sync notes and audio Multiple platforms. Flickr-Photo-sharing, Multiple platforms, Free, Daily Routine- Tracks specified behaviors, Path-Attaches an online tool for data collection that geographical coordinate other data are some of the online tools to collect data.

Table 3. presents the data collection tools with its characteristics

S no.	Tools	Features
1.	Forms on fire	The app can be downloaded or worked on online or offline There is an easy drag-and-drop feature that makes it very easy to use Forms designed by the company are aesthetically pleasing Analytics can be captured easily and reports can be generated Data can be sent and received efficiently between systems like Microsoft, Google, Amazon, Dropbox, and more using its advanced integrations
2.	Go spot check	Mobile forms that are fully customizable Order management in real-time Communication, location, and mileage tracking
3.	Insyt	Free app also available in mobile app. Easy to download. It works offline and online.
4.	Fulcrum	Easy to use and require no training Collection and input data both online and offline It also collects signature and capture videos and photos.
5.	Content Snare	Content is snare one online tool that helps to collect secure data and documents of sample. The tool sends a unique link to your client so they can access the secure client portal.
6.	Google forms	Google Forms is an online survey administration tool with which you can make a poll, test, questionnaire, data collection form. It included in the Google Drive software package. It is easy to use no time taken to take menu and setting Automatically save the data on cloud Readymade template and most suitable one
7.	Excel SIRJI.COM	Perfect data management system for random sampling techniques.

It has been debating that social worker and other applied researchers have ethical obligations to construct the smallest representative of sample is possible. As it is believed that random sampling is the gold standard procedure for maximizing external validity and generalization of the results (Patrick Dattalo, 2010). But researcher must understand just for the sake of external validity researcher should not choose the sampling methods, he/she must understand that what research design best define your research. In sociological research, subjectivity can be problematic. Data collected and presented through a researcher's biases may be perceived as an opinion rather than a fact. Sociologists aim to eliminate subjectivity as much as possible in order to conduct reliable, scientific research.

Confidentiality in data collection means researcher knows the identity of the subjects but he / she protect their identity from discovered by others (Karen Kaiser, 2019). Maintaining confidentiality in the qualitative research is challenging task. It is the duty of all of those who are conducting research to protect the rights of the subjects or people involved in the study as well as their privacy and sensitivity and keeping their anonymity and privacy secure and keeping observation confidential (Chauhan, 2018).

Falsification and fabrication of data are the sins in the conduction of the research. And to avoid it we

should take the responsibility for every fact, for example in observation and conduction of interviews first confirm every facts ourselves with credible sources and authoritative documents (Zietman et al 2013). A researcher should avoid exaggeration or making stories in the research process. One of the method to establish objectivity is to set up accurate rules that explain how the observations and interpretation be interpreted. One method is triangulation of data to maintain objectivity in research process. As we know personal bias of the experimenter in experimental research is nil and that is why experimental or scientific research called the objective approach.

ANALYSIS OF DATA

The use of statistics presents researcher with numerous opportunity to misinterpretation of data. For example usage of statistical techniques such as statistical regression and ANOVAs to make ones results to appear more significant but we should not misinterpret the data as it is unethical. And nowadays just for the personal interest false methods are used for the analysis of data. But we should follow objectivity to avoid bias in the research design, data analysis etc. a researcher should open to share data, results and always open to criticism.

If we traced back the process of analysis of data 15 to 20 years ago, a researcher had a lot of task to do with great hard work, jotting down the large amount of data on long sheets, analyze the same manually and spending a lot of time in data analysis process. Researchers had to observe each and every value attentively as missing any values results in error in data analysis that yields unproductive results and it also influenced a researcher psychologically and physically. Working with large amount of data feed it on sheets and then analyze it manually result in defects in eyesight and also enhance the load of researcher. But now task become easier and load get reduced. There are various softwares and online tools available for analysis of data but it require skill to use it. By just clicking we can feed and analyze data and reporting of results also available in it. Technological tools such as data analysis tools includes Dragon-Speech-to-text transcription, Word cloud, Word tree- Data visualization Web-based, Free, Dedoose- Qualitative and mixed methods data analysis, SPSS, STAT, excel, python , R programming, NVivo etc. some tools that lessen investigators efforts for analysis of data. Some of the features of these tools are given in the table. We have to just feed the data in these

tools and give any command or formula according to the data analysis technique we want to apply.

Table 4. displays some data collection tools along with its features

S no.	Name	
1.	Dragon speech to text transcription	It rapidly creates incident report three times faster by voice. Reduce document burnout with custom AI hands-free dictation. Flexible, cloud-hosted AI speech recognition Dragon goes where you go. Speak your notes, memos and more. Easily transform your voice files into text.
2.	SPSS (Statistical Package for the Social Sciences (SPSS)	Users can extract every piece of information from files using SPSS features to run descriptive, inferential, and multiple variant statistical procedures. SPSS software is capable of performing algebraic, arithmetic, and trigonometric operations. It includes the report's text, tables, graphs, and statistical results all in one file. It is used for both parametric and non parametric test. For example frequencies, descriptive ratios, correlation, ANOVA, Chi square etc. Cluster analysis and factor analysis can also perform in it.
3.	Excel	Easy to use require less training, there are multiple statistical techniques adoptions from simple to complex that is average, sum, correlation f test , chi square test etc.
4.	Python	Python extensions can be used as libraries for data analysis Many of them are free and created by the third party One library called Panda is used with python as same way used in excel. We can load large amount of data, do data analysis, create graphs and do lot of other things.
5.	Sas (statistical analysis system)	Visual data exploration Creating insightful and easy analytics Easy integration with MS Office tools like Excel and Outlook
6.	Stata	Stata statistical software is an all-in-one statistical software package that includes everything you need for data analysis, management, and graphics. Stata does not come in modules, so you get everything you need in a single package. You can also get a perpetual license, which means you'll never have to buy anything else.
7.	R programming	It is also a software environment that is used to analyze statistical data, create graphical representations, report on data, and model data.
8.	Nvivo	In qualitative and mixed-methods research, NVivo software is used. This tools is not limited to only interview and focus groups but also used specifically for unstructured text, audio, video and data.
9.	MAXQDA	It is software for qualitative and mixed research data analysis.

INTERPRETATION AND REPORTING

Data interpretation is the review of data through some predefined processes that lead to a meaningful interpretation and a relevant conclusion. Making inferences based on the relationships studied, and then drawing conclusions from them, is part of the process of data analysis. It is the general practice that researcher change or omitted the results to support claims hypothesis or other data etc. sometime researcher fabricate the results according to his/her hypothesis or research. But for intellectual honesty a researcher should interpret results in original form and always ready to say no when there is no evidence or rational argument to answer rather than to fabricate a story. Data, results, ideas, tools, and resources should all be shared. Be open to new ideas and criticism. Methods, materials, assumptions, analyses, and other information required to evaluate your research should be disclosed. (David and Resnik 2020). Misinterpretation of data in research means reporting of results in deceptive manner. The intervention of technology in interpretation and reporting of results also lessen the efforts of the researcher. Citing the original source correctly is crucial for researchers. When it comes to copyright, intellectual property,

patents, and other types of rights, it is critical to act responsibly. Self-plagiarism, or the act of copying one's own work, must be avoided at all costs. (Parveen and Showkat, 2017). Now various paraphrasing tools exist on the web that researchers used in reporting research. These paraphrasing tools just flip the original content into new one by replacing some of the synonyms. An important value in research is the respect for intellectual property and a careful approach to errors and biases, as well as giving credit to others' intellectual property. When researcher is referring to another article or writing, he/she always paraphrase it to avoid plagiarism (**wagle, 2020).** Researchers nowadays are using paraphrasing tools avoid plagiarism and claim that their research as original one, but over use of this practice is unethical and in this way technology mars the creativity of a researcher. To check the originality of research work or ideas and thought plagiarism tools are available online. Some of the plagiarism tools are ithenticate, urkund, turintin.

Table 5. exhibit tools to check plagiarism

S no.	Plagiarism tool	Free	Scan and compare	Check grammar and spelling	Submission stored in database	Availability of Different language
	Turnitin	Yes	Yes	Yes	Yes	Yes
	Ithenticate	No	Yes	No	No, submission can be deleted anytime	Yes
	Urkund	No	Yes	No	Yes	Yes
	Plagiarism Checker X	Yes	Yes	No	No	Seven different languages
	Grammarly	Yes for trial session	Yes	Yes	No	No
	Copy scape	Free, but paid version also available	Yes	No	No	No

DISSEMINATION OF RESEARCH

Dissemination of results and conclusions should be an active process for authors. Promoting the reading and publicizing the study's contribution is of vital importance, since it will allow the scientific community to gain knowledge of the research's contributions. As a result, the manuscript will be more visible, which might lead to more citations and an increase in the impact (Rio, 2021). Objectivity, confidentiality, openness and social responsibility are the vital values that reflected in the dissemination of the results. Avoidance of fabrication, falsification of data and overlapping to just increase the citations is the social responsibility of the researcher. Bakshi and Gupta (2022) concluded that young pupils must be taught about the environment and instilled with environmentally responsible conduct. Openness in research means freedom to access the data, process and results of research by

the interested researchers or candidates. .Shodhganga , shodh gangotri, google scholar, academia etc. are the tools that used for the dissemination of research and these tools are used by the researchers in every step of research. Social media tools such as facebook, tweets, blogs , instagram, linkedIn can be used by the researcher to get research findings to larger audiences with better planning (Barnes, 2020). Professional online platforms such as research gate and academia boast million of users and now TED Talks broadcast on you tube get million of views (Hellauer, et al., and 2020). One of the best ways to disseminate the articles is to publish it in open access journals that will make your paper available to more readers free of charge (Tripathy, et al., 2017).

Conclusion

Overall it can be said that the values are of utmost importance in the research in context to social, moral and educational values. Also, values ensure integrity in our research. Researchers should be reflexive, honest and free in their approach. Confidentiality, honesty, integrity, objectivity are the core values of research. Before making a decision about the research, it is essential to evaluate the credibility of the information. But due to the institutional pressure and greed for publications, researchers are abrogating the values followed in research. Also, due to the advancement in technological field, no doubt the ease of doing any work has greatly influenced, a great productivity can be seen in every field including research. The researcher can get access to information at anytime. Various online and offline tools are available that helps to identify problem and also for other steps of research. Besides this, the use of technology in research, aids the research process by collecting data, analyzing it, building models, and simulating it, thereby increasing the validity of the research. But on the other side, due to intervention of technology, the values of the researcher are greatly influenced. It is usually seen that the researchers mostly got engaged in unfair means while conducting their research work such as using paraphrasing tools etc. The excessive use and dependence on technology is somehow hindering the thinking and creative abilities of the researcher. Hence, there is a dire need to ensure integrity and quality in research by following ethics and values.

Acknowledgement

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