

# Scientific Research: Abstract Design for Optimum Access

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**Abstract:-** An abstract recapitulates the main article depicting the major sections which the researcher wishes to convey. Despite acting like an advertisement for a scientific paper, some authors treat the abstract as an afterthought, giving it a mediocre summary of sentences picked from the main article. An optimized abstract enables readers get the essence of a scientific research paper at a glance without reading the entire article. Conference organizers, journal editors and reviewers are very keen on the abstract as it is a good predictor of the quality of an article to be presented or published. Search engines and bibliographic databases use the abstract and title to identify key terms to index a published scientific paper. What a researcher includes in the abstract is essential for optimizing its discovery by search engines, raising the ranking of the paper in a search and making it easier for other researchers spotting the article. This article describes different categories of abstracts besides providing a detailed guideline for designing a scientific research abstract with an aim of optimizing its accessibility in search engines. Scientific researchers of different levels of experience may find useful insights in this article as they will understand how to design an abstract and ultimately make it stand out.

**Keywords:-** Abstract Design; Abstract Optimization; Scientific Research Abstract; Scientific Writing; Abstract Categories

## I. INTRODUCTION

An abstract is a summary of the major aspects of a research paper which a person intends to use for conveying research information. Electronic search engines and databases use words which are found in the title, abstract and list of keywords to make an informed decision on whether or not to disseminate a published paper to interested readers (Day & Gastel, 2006). This makes it act as a marketing tool for an article (Rhodes, 2010). When readers search through electronic databases, they initially get access to the abstract alone (Đapo, 2017). The abstract of a published paper is often freely available online. Once readers access and read through it, they can decide whether the article is of interest to them and thus continue reading or buy the full copy of the article. After the keywords have optimized the article selection for display by the search engines, the abstract is expected to trigger a reader's interest, maintain their curiosity and drive them to reading the entire article. This is an indicator that what a researcher

includes in the abstract is essential in helping other researchers accessing the article.

The abstract is the first section of a manuscript which conference organizers, journal editors and reviewers read. It is the only part of a paper that is published in most conference proceedings. Conference organizers may decide whether or not to allow scientific researchers to present their work to peers in a conference based on how the abstract has been designed. When potential referees are invited to review a manuscript, they are initially granted access to the abstract alone. Journal editors may decide whether to forward a manuscript for peer review or reject it outright as it forms their first impression about a manuscript being read (Satyanarayana, 2008).

Abstract optimization is a skill that is gradually learnt. A well designed scientific abstract should provide an accurate summary of the entire paper by explaining the purpose of the research, the aims and methods used to achieve the objectives and what the main findings were (Nadim, 2005). An author has to ensure that the abstract accurately reflects the content of the article. Authors should revise their papers before publication to ensure that the information in the abstract and main paper is consistent since if information in the abstract differs from that of the main paper, it will be considered as a poor quality work and may be rejected for journal publication of conference presentation.

An author highlights each major aspect of the article through the abstract and readers can be able to decide whether they will read the rest of the article (Swales & Christine, 2009). When readers get hold of a hard copy of a journal, they majorly look at the titles of the articles. If it interests them, they can glance through the abstract of the articles. It is only dedicated readers who go through the introduction and findings of the article and reader with a specific interest in the article who read through the entire article (Đapo, 2017). This implies that for a majority of the readers, a publication does not exist beyond its abstract while for reviewers and readers with keen interest in the article, the abstract forms a tone for the rest of the article.

This paper outlines how a scientific researcher can design an abstract of a scientific paper which will optimize its chances of being disseminated for viewing by search engines when readers search for articles similar to it.

## II. TYPES OF ABSTRACTS

Abstracts have different attributes with respect to the kind of information an author wishes to convey. An author may use a proposal to express what he intends to do. A proposal contains this kind of abstract where the author writes the abstract content in future tense. The extract below illustrates this scenario –

*“...The aim of the study will be to evaluate the existing programming techniques in mobile based learning. The research will be based on post positivist world view; quantitative research design and survey research method. Quantitative data will be collected using a questionnaire...”*

An author may wish to disseminate knowledge about what has already been done. In this case, the author will express the information in past tense. An extract from the article - Effectiveness of Thin-client computing over Stand-alone Computing in Schools’ computer laboratories on improving computer literacy level in Kenya (Asenahabi, Ikoha, & Kilwake, 2019) portrays this scenario –

*“...Coming up with and preserving a computing laboratory has financial implications which many learning institutions can't keep pace with thus opens a gap to embracing other effective computing architectures. The intention of this study was to determine the effectiveness of thin-client computing with respect to stand-alone computing for practical learning purposes in computer laboratories. Survey research technique primarily based on quantitative research design was adopted for this study. Data collection was executed with the aid of a questionnaire, interview and observation...”*

If a researcher has developed a review paper with no data analysis, the abstract will only be expected to display qualitative data. An extract from ICT4D: Towards ICT Adoption in the Business Sector to Bridge Digital Divide (Asenahabi & Nambiro, 2020) displays this scenario –

*“...Industries and firms which have adopted electronic-business initiatives have a better management of their internal business processes, have an improved profitability and operational efficiency, have a competitive edge in the market over their competitors and have an expanded customer base. This study examines how ICTs have impacted the development of businesses. The findings show that organizations have improved their operations and performance through the adoption and incorporation of ICTs in their internal processes, and reached out to a wider customer base both nationally and internationally. This paper will be of great importance to both small and large business organizations as it affords them information on the importance of adopting ICTs in their business processes...”*

For a manuscript containing quantitative data either from primary or secondary data, its abstract has to display essential findings from the study. An extract from the article - Effectiveness of Thin-client computing over Stand-alone

Computing in Schools’ computer laboratories on improving computer literacy level in Kenya (Asenahabi, Ikoha, & Kilwake, 2019) portrays this scenario –

*“...The analysed research data pointed out that the superior computer architecture deployed by learning institutions for computing studies is stand-alone computing architecture. Thin-client computing architecture is superior cost-effective wise in contrast to stand-alone computer architecture which if deployed in computing laboratories, learning institutions will have the capability to offer computing studies to more learners therefore making extra people computer literate...”*

There are five major categories of abstracts which can be included in a manuscript to be published: descriptive; informative; highlight; critical and extended abstract.

A descriptive abstract highlights the type of information found in the main document by incorporating the background, purpose and particular interest/focus of paper. They usually have between 50 and 150 words (Nadim, 2005). A sample of descriptive abstract extracted from an article- Basics of Research Design: A Guide to selecting appropriate research design (Asenahabi, 2019) describes this scenario

*“...For a research study to take place successfully, it must be carried out using an appropriate research design. This is a step by step procedure which a researcher adopts before data collection begins so as to attain the research goal in a legitimate way. The objective of research design is to transform a research problem into data to be analysed so as to generate appropriate answers to research questions at a low cost. This paper elaborates what research design is, the distinct types of research design and how a researcher can select the appropriate research design for his/her study. The study points out that that research design preference is guided through a cautious evaluation of statement of the problem, research questions, conceptual /theoretical framework and inspection of the relevant literature. ...”*

An informative abstract is the most common. It describes the work contained in the paper by presenting: the context, objectives, the research methodology, explaining the main arguments, important results, evidence, conclusion of the research and authors’ recommendations. The length of an informative abstract is about 300 words (Cerejo, 2013). A sample of an informative abstract extracted from a paper - Strategies for Adopting Disruptive Technology among Universities during the Covid-19 Pandemic (Odero, Allen, & Uche, 2021) illustrates this scenario.

*“...Universities were confronted with a lot of pressure when the COVID-19 pandemic struck to adapt electronic learning and realign their usual learning process to become more sustainable, competitive, and affordable. Governments all over the world invented ways of managing the unfold of the exceedingly transmissible COVID-19 by means of developing insurance policies that led to the shutting of physical learning in learning institutions for a period of time. Consequently, it was imperative to carry out*

*this study to revamp electronic learning in institutions of higher learning. The research adopted a qualitative research method while data was collected through interviews. The participants included the faculty and ICT personnel. Findings confirmed that the approach for electronic learning sustenance and implementation revolved around training, appropriate changeover mechanisms, and availability of integral assets devoted to sustaining the disruptive technology. In conclusion, institutions of higher learning have to continuously solicit improved ways as the benefits of incorporating disruptive technology are great including increased convenience, decreased complexity, enhanced performance, and lower cost...*

A highlight abstract is rarely used in academic writing. It is used to spark a readers' interest and attract them to the study. This abstract is not a representative of the main article, in fact, it is always incomplete and has leading remarks which disqualifies it from standing independently from its associated article (Hartley & Lucy, 2009).

A critical abstract describes main findings, information and offers comments about how valid, reliable and complete the study is. An evaluation of the paper and its comparison with other related articles is always performed by the author. They generally have close to 500 words due to the additional interpretive commentary (Hartley & Lucy, 2009). An extract from – A Study on the structure and Content of Abstracts (Chang, 2016) highlights this scenario.

*"...It is difficult for two reasons to do justice to Dr Roheim's paper in a short abstract. Firstly because the value of his investigation consists as much in its wealth of material and incidental suggestions as in its positive conclusions. And secondly, because the topics with which it deals are not always separated in a way which makes them easy to summarize. I shall however, try to present his main conclusions, and some of his evidence for them, as clearly as I can; though I know I shall run the risks both of missing some important parts of his argument and misinterpreting others..."*

An extended abstract is more detailed compared to the other abstracts. It contains the title, author(s), their affiliation(s), introduction, the main body text (including a brief methodology, important findings with diagrams and tables, discussion and summary sections), and references (Dapo, 2017). It has a word limit of between 1500 to 2000 words and three to five pages including the references. The introduction of an extended abstract outlines the nature of research gap being addressed and why it is being studied. It should provide background information about the work and its significance, while highlighting other relevant literature and specifying how it relates or differs from your work. The researcher should also state the scope and limitations of the study within the introduction. A sample of extended abstract is "USE OF SUPPORT VECTOR MACHINES TO FORECAST ENERGY PRODUCTION by C. K. WALGAMPAYA<sup>1</sup>, M. KANTARZDIC<sup>2</sup>".

### III. DESIGNING AN ABSTRACT

Guidelines have been put in place by different publishers on how to design an abstract. However, the general code of conduct is that the word "Abstract" should be centered at the top of the page. The abstract should be justified, single spaced, in a single paragraph format and without indents. Despite appearing as the first section of the article, it should be drafted last and be a concentrated version of the full text in the main article. Key phrases from different sections of the article should be cohesively merged to ensure that the abstract portrays the article it is representing (Riordan, 2015) and meet the required word count of the publication journal. This calls for good and precise writing skills as well as fine judgment of the information necessary for the abstract. A scientific research abstract should be intelligible on its own without reading the entire article. It should not contain information not present in the paper, figures and tables, abbreviations, literature review and reference citations (Cerejo, 2013). The abstract describes what a researcher has studied, found and their point of argument in that article.

### IV. SECTIONS OF AN ABSTRACT

Some journals give guidance on what information to state on the abstract. The usual sections which appear in a structured abstract are the context/background information for the research, the purpose of the study, the statement of the problem aimed to be solved, the motivation/rationale/main reason behind performing the scientific study, the objectives of the study and the methods used to carry out the study. The research problem should be stated clearly and precisely in one sentence. It can be suggested as a clear or implicit research puzzle. The research methodology used to carry out the research should be clearly elaborated. The final sentences of the abstract should summarize the findings, results or arguments, an opening for further research and where possible, the implication of the research findings in practice (Nadim, 2005).

The background/introduction section should be framed in 2 – 3 sentences describing what is already known in relation to the subject under discussion, what is not known and what the study seeks to examine. At times, a single sentence may be sufficient. The background outlines the context of the study to the readers (Andrade, 2011). The research methodology section should contain enough information for readers to understand what was done and how the researcher went about it. A scientific research should highlight the philosophical worldview, research design, specific research method, sampling technique, sample size, quality control measures and data analysis techniques adopted for the study. The results section forms the most important part of the abstract thus its quality should not be compromised as a trade in for other sections to meet the required word count. It should accommodate as much findings details as the journal word count permits. This is essential as this is what attracts readers to a scientific research paper.

The conclusion section should bring out the essential information of the study in addition to other unexpected findings. In this section, the author should honestly express the results in prose form and avoid claiming more than what is demonstrated by the analysed data.

## V. SUMMARY

Whatever is presented in the abstract must be a reflection of what appears in the main document. This is the main part of the article that is accessed first by journal editors, reviewers and conference organizers, thus it can have a great impact on their judgement of the article. Search engines use key words extracted from the abstract and title to pick out an article for display when readers search for words in the subject area of the article, thus, what a researcher includes in the abstract is essential for optimizing its discovery by search engines. An abstract should be a well thought section of a research article and be designed with its importance in advertising the article in mind so as to optimize an article's accessibility.

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