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EXPLORING THE INTRICACIES OF CONTEMPORARY PhD RESEARCH PROCESS

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ABSTRACT

The process leading to a PhD degree award has evolved over a period of many years to become what it is today. There are important considerations and emphasis continually being placed by the degree awarding authorities on the PhD research process leading to this award. The authors of this communication wish to highlight some of the basic knowledge and current ingredients needed in articulating and writing of a research proposal for a good thesis that forms a major part of this award. Specifically, the communication provides an appraisal of the existing proposal writing knowledge, available research opportunities and suggestions on the improvement and mastery of good research proposal writing that would result in a good PhD thesis.

INTRODUCTION

History has it that earlier in the thirteenth century, one would start academic studies at the age of approximately 13 to 16 years, and would go through a 4-7 year-programme that was called in Latin as *trivium* (1). This programme comprised Latin grammar and literature, rhetoric and law and logic (or dialectic), and on completion, the student would be awarded the degree of Bachelor of Arts (baccalaureate or licentiate) (2), which was regarded as a preliminary step to the mastership or doctor or professor. The type of doctorate awarded then was quite different from the current doctorate degree, since it was not an advanced scholarship award, but just a license to teach. After this initial award, a student could undergo through a further three year course referred to as the *quadrivium*, which dealt with arithmetic, geometry, geography, natural history, music and astronomy, Hebrew and Greek philosophy. A graduate of this course was awarded a Master of Arts degree, a certificate of fitness to teach at a university (3, 4). However, after several years of teaching, the holders of the Masters degree, frequently required, before being admitted to one of the higher faculties, to undertake further studies that led to the degree of a higher faculty, sometimes referred to as doctorate (5).

In those Middle Ages (the medieval period of 5th to 15th century), particularly in the renaissance age of discovery, the academic institutions had their

curricula based upon the *trivium* and the *quadrivium*, but in the 19th century the two courses became lumped together and divided into what we now know as sciences and humanities. The educational reforms that took place in Germany during this century, particularly at the Humboldt University of Berlin, led to the naming of the Arts Faculty as the Faculty of Philosophy, and the institution begun demanding contributions to research, attested by a dissertation and which would lead to an award of a final degree called Doctor of Philosophy (or PhD). The PhD derived its name from the Latin language of *philosophiae* doctor or doctor *philosophiae* (6), and the degree then was just the German equivalent of the Master of Arts degree, but this marked the beginning of the award of Doctor of Philosophy (PhD) in other Universities in the world (7). The present PhD, therefore, is based on largely research work in a specific area of study. The current available knowledge has been generated through various researches, and in particular PhD research works. Knowledge, as we know is simply the ability to recall previously learned ideas and information and to interpret and analyze them with a clear understanding of the background theories, and a PhD research offers the means to create new knowledge.

To be able to undertake a research for a PhD, most institutions make it mandatory for the candidate to have already obtained a Masters degree in the relevant area of study from a recognized institution.

PhD researches an original study undertaken and submitted in support of a PhD academic degree. It should advance a proposition that offer an argument or a series of arguments describing and discussing through an in-depth analysis of the findings of the research, so as to give an answer to the research question contained in the initial proposition. The length of time for the PhD research up to the Thesis defense usually ranges from two years to five years, depending on the University administering the programme. But, at the end of the period, the researcher compiles the research findings in a bound document that can be reviewed and read by other competent persons for the purpose of establishing and utilizing the new knowledge generated in the field of study (8).

CONCEPTUALISING RESEARCH FOR A PhD

Since the intention of a PhD research work is generally to generate new knowledge, transform the student into a professional researcher and to strengthen institutional research capacity, various research options are open to the student. They consist of mainly but not exclusively:

- a. Opening up of new areas of research in the chosen area.
- b. Resolving long-standing question arising from gaps identified from previously other researches.
- c. Contradicting existing knowledge obtained from other works.
- d. Experimentally validating an advanced theory in a particular area of study.
- e. Production of new systems in a given area of study.
- f. Developing new methodology to support existing or non-existing ones.
- g. Developing new tools for use in a given area of study.
- h. Producing of negative results to those already existing.

Since, a PhD research is intended to have a significant impact in the area of study, the candidate has to carefully select an appropriate research that is likely to fulfill this. A good PhD thesis will only ensue when the student stays away from researching in areas that have been thoroughly mined by other researchers and which will not stand a chance of hitting something big or at least new with a significant impact in the area of study. A thorough and well-stated gap analysis can help to achieve this objective. Once the student has developed and settled on a particular research concept, the Department housing the research has a duty to consider the concept and if acceptable, give approval for the student to begin translating the concept into a research proposal that achieves a clear scientific research question that will be the driving force of the intended research. It may also be

prudent for the student to undertake some feasibility analysis to determine the possibility of carrying out the proposed study. This is because a good study should be viable, feasible to be done, provide appropriate academic values and eventually result in publishable papers and sometimes, hold commercial values or interests.

MENTORSHIP AND RESEARCH PROPOSAL

In order for the student to develop the research proposal, undertake the research and write a PhD thesis for defense, the host Department in consultation with the student, makes a selection of appropriate supervisors to mentor and assist the student. Those faculty members selected should be specialists in the area of study, and be ready and available to provide guidance to the student in order to achieve the required goals of the research. Sometimes, one of the supervisors may be chosen from a different Department in the same University or from a totally different University. In such cases, approval is sought from the University's Postgraduate authority, before such supervisor is included (9). At least two academic staff members, with appropriate qualifications in the subject area in focus, should supervise a PhD research. In some Universities, the lead Supervisor must be a Full professor, as in the case of Universities in the Netherlands. Other Universities have more relaxed rules, but in general senior staff members are considered for supervision of such research projects. In any case, the supervisors are required to, prepare the student psychologically for the research process, as it can be extremely long and treacherous, and can be affected by other competing interests, family pressures, financial pressures, equipment needed, changes in the life of the supervisors etc. Before accepting the role of Supervisor of a doctoral student, the appointee should carry out an in-depth advisory discussion with the doctoral student, to address the following issues: the doctoral student's motivation, any risks during the research, and the prospects for the candidate after completing the doctorate. This information may help in further motivation of the student so as to work through the project at desired rate.

The supervisors should be ready to meet with the student on a regular basis to discuss the progress of the research. During such meetings that should take place at least monthly, the supervisors and the student chart the student's small, achievable tasks to be done before the next meeting. In most cases, the supervisors and the student enter into an agreement on the various tasks that should be undertaken within a given period. It is advisable to have the discussions minuted by the student, circulated to the supervisors and copied to the Head of the host Department, clearly stating the agreed time lines for

given tasks to be accomplished (9). This process saves for any future disagreements between supervisors and the student, and also act as a basis of evaluation by the University's Board of Post graduate studies for continuous supervision of a student. Further it provides clear indicators on what achievements have been made and any pending issues in regard to the study. The PhD student also provides timely and regular progress reports through the department, to the School and the University body in charge of Postgraduate Studies, clearly stating what has been achieved, difficulties experienced and the scheduled activities. In the case of the University of Nairobi, quarterly reports are a must for each student, and are made in consultation with the supervisors and forwarded through the Departmental Chair and the Dean of the School to the Board of Postgraduate Studies (10). In the reports, the supervisors also state the progress of the student, citing the student performance on scheduled tasks, explanations for super-or sub-standard performance if any (11).

The supervisor, therefore, plays the roles of supervision and guidance/mentorship to the student through the provision of intellectual expertise and as a counselor to the student's in building confidence and morale for the research. Poor supervision can either be a result of inadequate supervision or inconsistent supervision. Both of these factors can result in a poorly prepared student who will have difficulties in either writing the thesis or using good research methodologies to get the results. On the other hand, a University with good PhD supervision mechanisms will not only raise student confidence and attract donor funding, but also raise its research standards.

In regard to the supervision of the student, the supervisors can be classified as product oriented to the student, and who provide solutions and methods to the student, or they can be process oriented, and who focus on student learning rather than the production of a perfect result. The supervisors can also be *laissez-faire*, who expect the student to learn mostly on their own or as some other observers have suggested, they may just be incompetent, over-worked or not interested. Other supervisors known as control-oriented supervisors tend to control the research work to make sure the research work is acceptable. It is therefore important for the student to be aware of different supervisor-approaches and to know which type of supervisor the student is dealing with, in order to establish a harmonious working relationship. For the student, it is extremely important to know that the study is the student's own work, and the student needs to keep a good relationship with any of the type of supervisors and learn how to navigate in the waters. It is true that the supervisors have great influence on the way things run, but also they need to listen to the student's views and guide the student accordingly. In many cases, a good supervisor will most likely

remain a mentor to the student for the entire life of that student. Hard work, focus, determination and consultation with supervisors are the whole mark of a committed student, and can yield rapid results of the research.

CURRENT APPROACH TO RESEARCH PROPOSAL WRITING

A research proposal is built step by step from the original concept approved by the hosting Department, through the enquiry into findings of research works in the area of focus, and detection of any existing gaps that need to be filled with extra research work. The key features of the proposal is the defining of the key question(s) to be addressed in the research, and the determination as to whether the question requires evidence to be established through scientific systems/verifiable answers or requires evidence and reasoning within conflicting scientific systems/answers that cannot as yet be verified or requires answers derived through scientific judgment. Thus, the proposal should present a clear purpose of the research, main assumption(s) and an appropriate research question that has a clear depth, breath and logic. The design of the proposal is, therefore, made in consultation with the supervisors, who should always be available to support and guide the student in setting the specific goals to achieve within the period of study, and in regard to the research work and eventual thesis writing. Each University may have guidelines on the layout of the proposal. While the student will have to take these guidelines into consideration when writing the proposal, it is incumbent upon the supervisors to make sure the University guidelines on proposal writing are followed (12-16). Nonetheless, the proposal should be arranged in a clear format, with a title page, a declaration page stating that the intended study is original, a page giving joint approval for the proposal by the supervisors, an abstract page, introduction and literature review, objective of the study, methodology, hypothesis, ethical clearance where required, data collection/processing, expected results, impact of the results, references and appendices. Most universities prescribe the limit in terms of the length of the proposal, which on average will be between eight to ten thousand words.

As the research proposal continues to be developed, the supervisors should encourage and even facilitate the student to present the draft proposal to various forums, including the Departmental and Faculty, for critique. This helps in improving the form and depth of the study, thus guaranteeing the quality of the research. Upon approval of the proposal by the Department in consultation with the supervisors, the student applies to the relevant University or National

Committee on Ethics (for Research on Humans), for approval of the research. Unless there are any major revisions suggested by the Ethics Committee, any minor amendments will normally be dealt with by the student in consultation with the supervisors, until the Ethics body grants the final clearance. This proposal becomes the basic document that the student uses for the PhD degree registration and for the research. In some cases, like the Health-related research on randomised controlled trials, the researcher has to follow standard guidelines for the study design called consolidated standards of reporting trials (referred to as CONSORT) in order to end up with appropriate results that are reliable and which can be validated. Other studies as Cohort and case controlled studies must also adhere to the Strengthening the reporting of Observational Studies in Epidemiology Statement (STROBE) criteria. There are also many other criteriae for reporting specific health-related studies, and which the concerned student must observe if the results of the study are to be acceptable.

Consequently, the research proposal stage is the most crucial stage of the entire PhD research process. It enlightens on the background of the research work to be undertaken, the research question, answers to the study approach, what could be new in the research, how the progress of the study would be determined, the inclusion and exclusion criteria, and for medical research, infringement on the privacy of persons (patients or subjects) taking part in the research should be avoided. Any experiments that would be required in the study, the criteria for any measurements in the study and how the expected results could impart, change or influence the current scientific situation are included in the protocol of the proposal. The proposal further provides possible theories grounded in research, the models of analysis of the data collected, any requisite calibrations, any equipment, experts/consultation needed in any of the areas of study. It is also during the proposal stage that the student is provided with an opportunity to ask important questions, consult with other experts in the field and plan for the research. Once all the relevant matters have been resolved, the student can commence with the research, provided the financial, scientific and any other legal approvals and permissions have been obtained.

DATA COLLECTION AND MANAGEMENT

A serious study should generate its own data, and therefore, it is wrong to meddle with data to produce better results and select or omit unwanted data (e.g. outliers) to doctor the results. The use of statistical techniques for purpose of producing more desirable conclusions, distorted interpretation of data or distorted conclusions are all wrong methods of approach in any research. In any case, the fabrication of data and the alteration of experimental results for personal benefit from the research amounts to

committing fraud. The use of someone else's text or data without acknowledgement is plagiarism. It is wrong and must be avoided at all cost by a student of PhD research to commit fraud and plagiarism. Supervisor can help prevent this situation by closely following the student's research work.

As a means of improving the research project and broadening the knowledge in research, the student is expected to attend Research Workshops, familiarise with computer software on research that may help to ease the writing and presentation of research outcomes. Endnote, for example, is a very useful program that can make it easier to perform tasks like filling in citations, maintaining a consistent style, creating a Table of Contents, and importing work done on other software. Statistical Package for the Social Sciences (SPSS) and NVivo for qualitative data analysis are some of the helpful software for analyzing data, in addition to the use of the electronic databases available online. The supervisor is expected to advise the student on these issues so as to ease the workload during the final stages of the research. The supervisors have advisory duties to the student in making sure the data collected during research is correctly processed and interpreted. Further, the supervisors should assist the student in seeking for any other relevant professional help and arrange for any appropriate consultations with statisticians. This can be done during the proposal development, data collection, data processing and also later as the thesis is reviewed and examined.

TRANSLATING THE PhD RESEARCH FINDINGS TO A THESIS

The writing of the thesis, which should normally have a length of about 60,000 to 100,000 words, should follow the conventions provided by the University. Conventions are the standardised rules that take into consideration the format of the thesis, the referencing and citations, bibliographies, style, the page setup, language, figures and tables, and other graphics, and help the student to maintain consistency throughout the write-up. The format of the thesis should, therefore, be discussed and agreed upon at the onset with the supervisors. The student should remember that writing of the thesis is a thinking process, and thinking can change to redefine the trend of thought, resulting in the re-shaping of ideas that are being put in writing. Early commencement of writing of the thesis will provide ample time for a pre-plan and organisation of ideas generated from the research. Generally, a PhD thesis will consist of the following components: a cover, title, declaration, Table of contents, list for illustrations, abstract, introduction, literature review, methodology, results, discussion, conclusions, recommendations, references and appendices pages, in that order.

The *Cover page* of a thesis identifies the research topic, the writer, the institution and the Award

being sought. The Title page contains the name of the student, the degree, Faculty, University, month and they year presented. It will also be the page where the student provides the joint approvals by the supervisors agreeing with the student to the submission of the thesis for examination with their full knowledge. A Declaration page has a statement attesting to the fact that the material presented in the thesis has not been used for any other award, the sources used have been acknowledged and that the requisite ethical research approvals were obtained, including any other relevant research registrations. It is also the page where the student acknowledges his or her supervisors, any person or institution that provided support to the study and the participants (keeping in mind confidentiality). It is the section that is least bound by conventions and allows the writer to speak from the heart. This page is followed by the Table of Contents that contains numbered lists of all major divisions and subdivisions with indications for the corresponding page numbers for each item. The page with the Lists of Tables/ Figures/ Illustrations/ Appendices will usually follow with lists of corresponding pages where each item appears.

An *Abstract* is a must for a thesis, and summarises the thesis' main objectives, the focus of literature review, the site of the research, the methodology used, data analysis, results and the implications of the results in the area of study. It is the abstract that orients a reader to the focal points of the thesis, so that the reader can have a clear vision of the intention of the research. Following the abstract will be the *Introduction section* of the thesis. This section provides the background information and rationale for the research, and outlines some of the research works that have been undertaken in the area of study, the results obtained and the gaps that may exist and which need further research. It, therefore, provides the framework within which the student arrived at the need to undertake the research, the research question(s) and the argument or rationale for the research. It is in this section that the Objective of the study is clearly stated, the personal motivation behind the research and the theoretical framework of the research. This section can sometimes be merged with the Literature Review section. The Literature review familiarises the reader with the issues and debates relating to the field of study, and the fact that there exists an area in the field to which the researcher can contribute. This section provides an opportunity to build up the relevant theory to the intended research and supporting data to the aims of the thesis. At the end of the review, the researcher introduces the gap in the review of the researches that have been done, and also clarifies the research question and the need to find solutions to the research question. It is at this stage that the objectives of the study are then stated, and the hypothesis is laid out. The hypothesis is a statement of what would be expected to occur if certain concepts and relationships hold true.

The *Methodology* permits the reader to understand the philosophical framework within which the research was done, the rationale for the methodological approach, the site for the study, participants, the steps taken to ensure ethical research practice, the issues of validity and reliability and/or credibility of the subjects, instruments, procedures and statistical tests used in gathering and analysing the data obtained. The student is expected to provide clear details of the study, including any requisite experiments performed in the study that can allow any other researcher to replicate the study and also assess appropriateness of the methods to the purpose of the study. The *Results section* summarises the main findings, through the use of the tables, graphs and charts. In the results, the application of the statistical analysis is shown with clarity, with some tests providing information on significance of the test results obtained. The **Discussion**, which follows the result section, concentrates on detailing the extent to which the expectations in the hypothesis were fulfilled and also reasons as to why they were not fulfilled. It enlightens on the methodology adopted, the findings of the research and provides an explanation of the results obtained and the link to the aims of the study and the Findings of other researchers with similar studies. In this section, the student should justify the results obtained by referring to other studies done in the same area. It is the section that also allows the student to explain why the results obtained in the research could have differed with other results from similar studies, and also speculate on the reasons why there the differences might be there and the meaning of the variations. While discussing the outcome of the research, the student should exercise intellectual humility (avoid biases) and at the same time maintain intellectual courage by strongly stating personal feelings about the issues in the study, even if it means standing out against the majority. It is similarly important to maintain intellectual integrity by reasoning through scientific issues without self-deception.

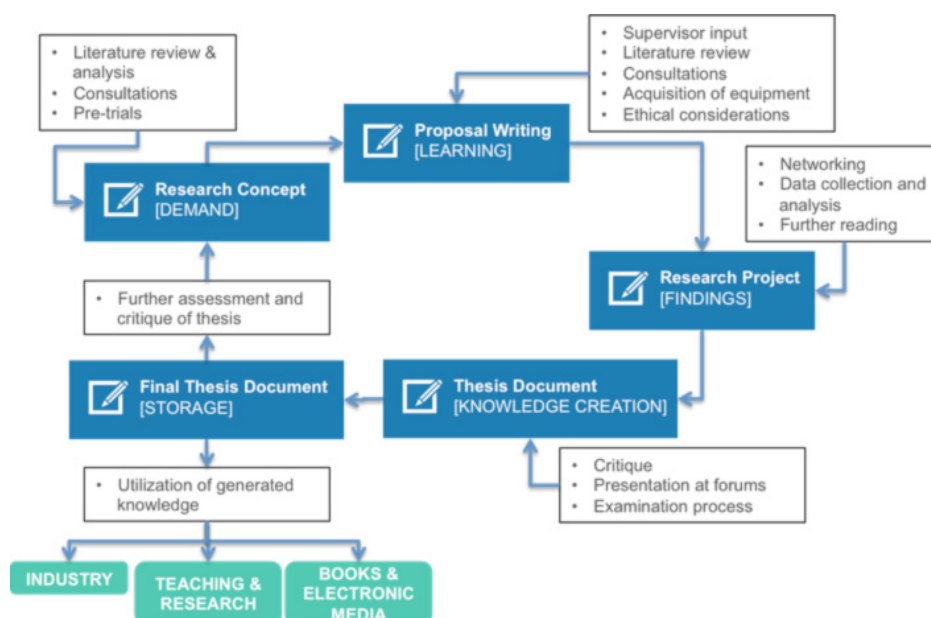
The *Conclusion* section contains the major findings, any limitations of the study, implications of the results obtained, and suggestions for further research. It will also contains a statement or statements drawn from all the arguments and findings of the study, and should leave the reader with a strong sense that the work set out in the research was worthwhile. The conclusions made should be guided by the objectives of the study and the results obtained in the study, and not other studies or other anticipated results. *Appendices* follow the conclusion, and contains the important information like raw data, questionnaires used, copies of certificates of ethical clearance or other instruments used in the study. This information helps the reader know what could have been used to obtain the results and if the study requirements were met and followed. A *References/ Bibliography* section provides the reader with

information on texts / materials that were consulted, in alphabetical order. There are many ways of making references, for example, the Harvard referencing style, AMA (Vancouver) Style, APA Style, MLA style etc. the format adopted should be in line with the requirements of the University and in consultation with the supervisors.

The *draft thesis* will be subjected to critique in various scientific forums, for purpose of exchange of knowledge, appropriate critique and subsequent improvement in the form and layout of the final thesis. The incorporation of such information helps to improve the quality of the thesis. During this period and before submitting the draft thesis for examination, the student can develop appropriate manuscripts on various themes or objects of the thesis and submit them to appropriate Journals for publication. The various comments received from the

reviewers of such Journals always help the student in further improvement of the final thesis. Once the student and the supervisors are satisfied with the draft thesis, that the document is then submitted for examination and subsequent thesis defense, a process, which in itself must be managed correctly to reflect a competent examination process that allows for orderly exchange of views on the research and clarification of any unclear issues. The thesis becomes the document that many researchers, industrialists, teachers etc could rely on in the application to new relevant issues facing them and relating to the area of study. Figure 1 summarises the process of a PhD research and the influencing factors to the process that will almost always lead to the generation of new knowledge (17). The thesis defense process will be a subject of discussion in the next subject in this series.

Figure1
Contributors to effective development of a PhD research and the generation of new knowledge



CONCLUSION

The process of writing a good doctoral research proposal suitable for a PhD degree award involves the consideration of various facets that come into play from the conception, execution of the research, the processing of the results of the study, to the writing of the thesis. If well articulated, this process offers the means through which new knowledge in various areas of research is generated and utilised by scientists and the general public for the good of mankind.

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