

RESEARCH, PUBLICATIONS AND Ph.D.

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ABSTRACT

This article emphasizes the importance of tenacity and learning from failures, especially in the Ph. D. program. It suggests accepting home runs, creating goals, separating tasks from projects, and focusing on the core concept. Self-evaluation is crucial for Ph. D. candidates to focus on the primary concept, differentiate between tasks and projects, create goals, and overcome barriers. A Ph. D. involves advancing knowledge, making discoveries, and contributing to a field. Accepting knowledge, aptitude, brilliance, and compassion growth are also advised. In a Ph. D., research and publications are intimately related, and the significance of a work is determined by the author's thesis or interpretative framework. Dissertations highlight fundamental field procedures, and author development and organization are promoted by peer review. The publication advances the study by offering valuable support for academic arguments in a publication that acquires attention inside and outside the discipline. Publication is essential for academic success during a Ph.D. Ph. D. candidates who want to excel in graduate school must publish their research findings. Writing a journal paper and submitting it to specialist publications are required. While some disciplines emphasize a thorough dissertation, others need several peer-reviewed papers. If no publications are accessible, one should concentrate on doing in-depth study, creating meaningful research agendas, and editing written work before submitting it. Originality fosters acceptance, offers new insights, and establishes credibility.

Keywords: Research, Publication, Ph. D. cycle, Journal Paper, Review report, Supervision, Novelty.

1.0 INTRODUCTION

Ph.D. stands for Doctor of Philosophy. Ph. D. is an abbreviation of the Latin term (Ph)ilosophiae (D)octo. The highest academic degree can be awarded in many fields of study.

A Ph. D. program involves advanced study and research, culminating in the completion of a thesis or dissertation presenting original research findings [1].

The term "Doctor of Philosophy" has its origins in the ancient Greek word "Philosophia," which means "love of wisdom." In the middle Ages, scholars would earn this prestigious title after demonstrating their mastery of a particular subject area and their ability to engage in scholarly research and debate. Over time, the title expanded beyond philosophy to encompass various academic disciplines.

Unlike traditional university-taught degrees, Doctoral degrees focus on developing tacit knowledge and understanding. They originated from early forms in medieval universities and evolved into the current format of autonomous research. The most common doctoral degree, the Doctor of Philosophy (Ph. D.), began in the nineteenth century to train people to become academics. Doctoral students gain new knowledge by sharing experiences and working alongside their supervisors. However, this friendly one-to-one relationship has been replaced with demands for timely completion within four years. Each doctoral student makes an original contribution to the body of knowledge for their chosen discipline, demonstrating their worthiness for the award.[2]

A research degree is an excellent option if someone wants to study and explore new things. Someone may become an expert in an industry and have a deeper grasp of an issue by selecting an interesting topic. It is also possible to perform interdisciplinary research combining knowledge and theories from other areas. Students learn from involved classmates, work autonomously, and hone their time management abilities. A research degree can help further one's career by enabling the scholar to work as a lecturer, instructor, or researcher. There are grants for post-doctoral research available, and certain positions need a Master's or Ph. D. Attending conferences and workshops in other towns or nations also offers networking chances. Studying abroad may be advantageous for international students.

The selection process for new doctoral students in higher education is complex and requires consideration of the needs and abilities of both the student and the proposed supervisor. The quality of the potential doctoral student is assessed based on their research proposal, alignment with the Supervisor's personal research interests, and their potential to create an original contribution to knowledge. Supervisors should be matched with doctoral students based on joint areas of focus and interest to strengthen the relationship between Supervisor and doctoral student.

To be successful, doctoral students need excellent verbal and written communication skills, maturity in thinking, well-developed emotional intelligence, and a high level of resilience. Motivation is another key factor to consider when selecting potential students. Supervisors need to consider how they will supervise a potential new doctoral student and support the doctoral student in developing personal and professional attributes necessary for their subsequent employment within academia or industry. The entire Ph. D. process can be realized as a cycle of five steps. Someone enters it as a scholar and then passes through Replicate, Improve, Design, Create steps to acquire the quality to supervise a new Ph. D. candidate to start another iteration of the Ph. D. cycle, shown in Fig. 1.

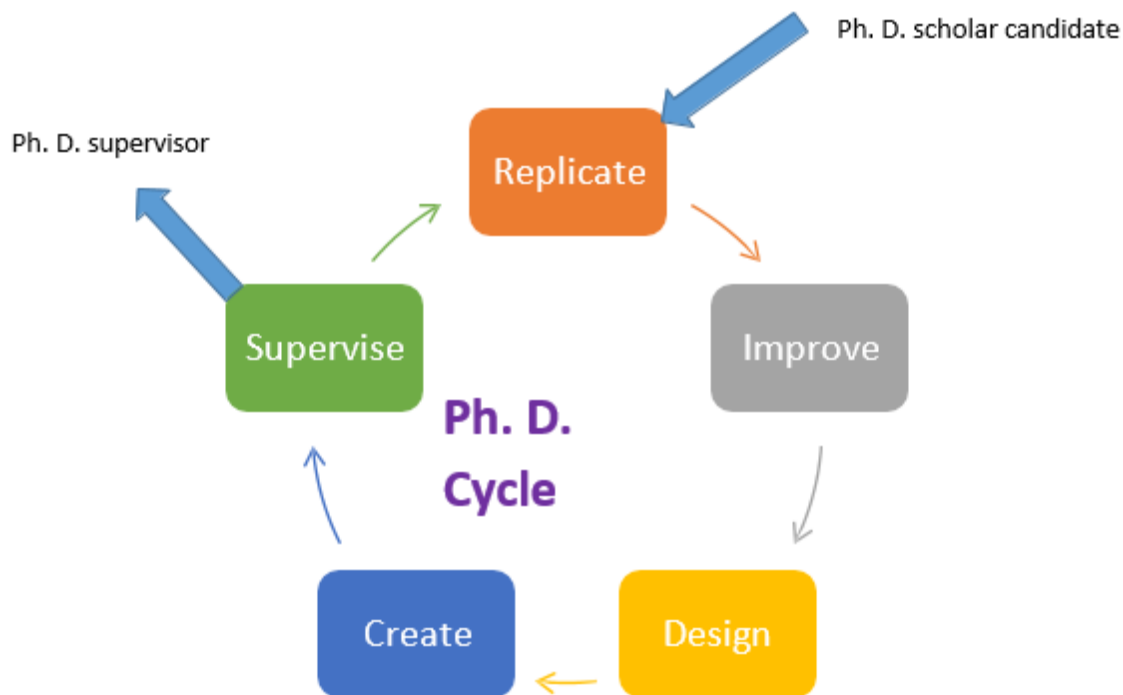


Fig. 1 Ph. D. Cycle

Step 1: Domain study and Implement Existing Techniques.

Finding interests and passions is crucial when selecting a Ph.D. program in a subject since it will help to focus on a research topic and chart the professional path. One way to find research gaps is to do a literature study and ask mentors and experts for advice. Since research domains change quickly with time, it is imperative to stay current on new developments in technology and fashion. Keeping up with reputable journals, online forums, and live conferences might be beneficial. Establishing precise research goals and parameters aids in giving the topic purpose and organization, highlighting knowledge gaps, and opening up fresh lines of inquiry. Candidates may focus initially on those gaps and detailed study or implementation of existing recently developed techniques on the study subject and ensure that they align with the candidate's passion and area of competence. This phase focuses on domain study and replicating existing knowledge to create a base for further research.

Step 2: Get new ideas from the supervisor and implement them.

The supervisor's position changes during the Ph. D. to become more involved with assigned work, mainly when the final thesis takes shape. They could also help the scholar advance to the entire Ph. D. candidacy stage because many universities only register candidates who have already completed research studies. The scholars could consider further growth options and get more recognition for their efforts as junior scholars. By now, the scholars should have a firm plan for their outcome and be starting to gather information and construct the groundwork for the dissertation. The supervisor will be a crucial participant in assessing results and will assist

in determining when the scholar is ready to take on this task. This step expects improvement of existing techniques or some valuable addition to the knowledge. If new designs or concepts are developed based on existing knowledge, then it should be an advantage for the candidates.

Step 3: Generate new ideas, verify with the supervisor, and then implement

Before beginning official supervision, setting expectations and ground rules with the Supervisor is essential. Depending on their personalities and working methods, the scholar and the Supervisor will have different relationships. While people expecting instruction may need to be more forceful, independent researchers may feel constrained or stifled. With the Supervisor, the scholar may create a plan for supervision that includes talking about support and asking for it when required. Establish a timetable and plan the submission process; the Supervisor will grade it. It's crucial to keep in regular contact with the supervisor, whether through unofficial or formal meetings. A different supervisor or a supplementary adviser could benefit the scholar from a particular emerging topic. Creating new ideas and novelty is the target of this phase, which would help the candidate become a confident researcher for the future.

Step 4: Preparing to work independently and to supervise.

A Ph. D. supervisor is an essential resource for helping students with their research since they can offer guidance based on their experience and expertise while also helping them remain on track and make continuous progress. They also give inspiration, feedback, analysis of unprocessed data, and assistance with decision-making. A suitable Ph. D. supervisor should be someone scholars can get along with and work with to help them write a substantial body of work that advances the field of study and adds new insights. A competent supervisor should possess the following essential traits: experience in their field of study, publication history, and a successful track record of supervising. Expertise is necessary, and learning about doctorate studies, taking professional development courses, and learning how to manage are all crucial. It is important to remember that a Ph. D. degree does not guarantee that one knows what they are doing. Extrapolating conclusions from a single data set does not apply to other domains of academic pursuits. This step will shape the candidate as a Ph. D. supervisor and an entity to enter the Ph. D. cycle with a new candidate for Ph. D. to supervise.

2.0 RESEARCH AREA SELECTION

A research topic is a topic or field of study selected for a Ph. D. program to expand on the body of current knowledge with fresh facts and discoveries. It defines the study's scope, direction, and concentration, making it essential to the degree. A study topic must be precise, well-defined, and easily expressed; additionally, it ought to be pertinent, significant, and capable of offering fresh perspectives or valuable applications. It may arise from information gaps, societal requirements, new technology, trends, or individual interests. The entire research process, including developing research questions, creating a methodology, gathering and evaluating data, and coming to conclusions, is based on the study topic.

To start a study to secure a doctorate degree requires several steps, such as determining one's interests and areas of expertise, reading through previous research, speaking with mentors and advisors, creating a research question or hypothesis, choosing an appropriate methodology, creating a research plan and schedule, and writing a research proposal. For a research proposal to be strong, these steps are essential. Understanding one's academic prejudices, evaluating one's work experience, and getting advice from mentors, advisors, and peers are all necessary to determine one's interests. Analyzing approaches, theoretical frameworks, and content is part of reviewing the literature to spot significant trends, prevalent discourse, and possible research gaps. Academic advisers can offer insightful advice on emerging trends and undiscovered discipline areas. Refining the study focus into a precise inquiry is necessary before formulating a research question or hypothesis.

Choosing a research topic for a Ph. D. is crucial as it is central to the course and must be feasible, relevant, and significant enough to be studied. Four reasons for choosing the right topic include:

- a) Not being relevant and interesting enough to secure admission into the Ph. D. program;
- b) Having difficulty finding research guides for the selected topic;
- c) Studying the topic for at least three years, making it engaging and exciting; and
- d) Considering the future ahead of time, the topic must remain relevant even after 3-4 years.

Choosing a Ph. D. research subject is an important choice that needs to be carefully considered and balanced with program requirements and personal interests. It entails avoiding generic subjects and considering factors like passion, viability, effect, relevance, and previous research. It is crucial to have an initial discussion on the topic's significance and relevance with a lecturer or advisor. Research gaps should be determined to help direct the process, and a research proposal should be created. Before turning in the final thesis, it is imperative to avoid generic subjects and ensure the subject is worthy of a paper.

3.0 SUPERVISION

The doctoral student-supervisor relationship is essential to the collaborative process of doctoral supervision. In addition to verbal communication, an excellent supervisor-student relationship considers non-verbal cues like body language, emotions, and actions. Supervisors must take great care in recruiting and selecting prospective students to guarantee a good fit between each student's unique research methodologies and philosophy. Establishing clear expectations and established roles and responsibilities is the first step in building effective partnerships. These should be periodically evaluated and maintained.

Adequate supervision requires clear interpersonal communication, particularly with fresh Ph.D. candidates and international students who might be going through cultural and expectation adjustments. Inadequate communication abilities may hinder the formation of the required connection and possibly impede the research's advancement toward its conclusion. Furthermore, a doctorate student's personal life significantly impacts their motivation,

engagement, advancement, and general capacity to conduct their research program. Supervisors need to look for opportunities to intervene appropriately and for threats to the research to protect it[9].

Usually, a primary initial supervisor and a second supervisor oversee doctoral supervision; the Supervisor serves as both a mentor and a critical buddy. With the recent shift to online instruction, there are now more ways to use educational technology to improve supervision, give flexibility, and promote inclusivity and diversity. On the other hand, not everyone knows what makes for an effective supervision program. Appropriate supervisory practice components must be considered, and implications and repercussions must be discussed.[2] Institutions should establish guidelines on how many Ph. D. candidates a supervisor may take on for supervision at a time so that everyone gets enough time and support. Adequate frameworks must be in place to provide appropriate levels of support, especially language and cultural support, for international doctorate students.

The power dynamic between a supervisor and a doctoral student in doctoral supervision is an ethical activity that has the potential to grow acrimonious and disruptive over time [8]. This mismatch might lead to conflicts but can also be reduced if the relationship develops into a crucial friendship. Supervisors and their students must have clear limits and understand their students' cultural norms and expectations to have a successful supervisory relationship. An institutional policy overseen by an independent senior staff member should be in place to facilitate a smooth separation if the relationship deteriorates. An effective supervisory relationship depends on building rapport since it undermines formality and discourages candid and open communication. Because of their experience, Ph.D. candidates can start to rely too much on their Supervisor.

For academics, doctoral supervision is a demanding but rewarding process. The supervisor facilitates a fruitful collaboration between the supervisor and the doctorate student by guaranteeing that the latter is driven and involved and conducting research on a subject that complements the former's field of study and pursuits. In addition to providing pastoral care and guidance, the Supervisor also carefully manages the power dynamic. They guarantee that the doctorate student achieves their future academic or professional goals by preparing them for the final viva voce exam and integrating them into their field. The supervisory procedure gives the required support and considers institutional requirements [11].

4.0 RESEARCH

Research is a systematic and scientific search for knowledge on a specific topic, encompassing the art of scientific investigation. It involves careful investigation and inquiry, particularly in the search for new facts in any branch of knowledge. Research can be seen as a voyage of discovery, driven by the instinct of inquisitiveness, which drives us to probe and understand the unknown. This inquisitiveness is the mother of all knowledge, and the method used to obtain knowledge of the unknown can be considered research.[3]

Research is a process that involves looking at previous works or data to find and solve difficulties in a subject. There are three levels to it: explanatory, descriptive, and exploratory. While descriptive research employs structured analysis, exploratory research gathers data in an unstructured manner. Structured data analysis and hypothesis creation are used in explanatory research. Qualitative research investigates related circumstances and generates novel answers, whereas quantitative research concentrates on data, statistical output, and numerical analysis. Internal and external motivators, such as success, peer pressure, curiosity, achievement, self-actualization, and ambition, should drive research. The extent of research varies according to the amount of work required; doctorate students use background knowledge to contribute at the global level, while undergraduate students contribute at the local or national level.

Reproducing preexisting knowledge, reworking an authorized contribution, programming projects, or experimenting with technology are not considered forms of research. Faculty members, students, and professionals in the sector can all conduct it. A team or an individual can do research, with each participant contributing to a particular section and offering comments to the next. Some tasks cannot be classified as research, including technology testing, programming projects, book reports, and redoing contributions.

A significant contribution from good research should be made in application, discovery, invention, or integration. A good contribution must be innovative, including cross-disciplinary research, novel solutions, extension, summary, variation, refinement, generalization, and specialization. Utilize highly cited papers from prestigious publications and conferences when selecting research papers. Papers classified as Type A offer 80 percent comprehension, Type B offers 50 percent knowledge, and Type C provides a basic understanding. A subpar literature review can result in subpar research, so using highly cited articles from prestigious conferences and journals is critical.

A methodical strategy for collecting and interpreting data throughout the course of a study cycle is known as research methodology. Three components are involved: the sampling strategy, the data-gathering method, and the study approach. While qualitative research methods concentrate on finding themes and hypotheses through small, semi-structured samples and inductive analysis, quantitative research methods use big, systematically collected data and a deductive analytical procedure. Both strategies are combined in mixed techniques. Using various statistical techniques, deductive analysis establishes a hypothesis and variables, formulates core questions, and measures essential variables. An inductive analysis uses a semi-structured method to examine gathered data and find trends or hypotheses. The resources at hand determine the most influential research strategy, the goal to be accomplished, and the population's accessibility. The objectives, available resources, and motivation determine the ideal research methodology.

There are two types of research methods: qualitative and quantitative. Probability and non-probability sampling and structured data gathering and analysis are all components of quantitative approaches. Non-probability sampling is employed as an indicator, and probability sampling is used in deductive analysis. Semi-structured data gathering, inductive and

exploratory analysis, and non-probability sampling are all components of qualitative approaches. When neither approach can fully understand the problem, mixed methods, which combine the two, are employed. The mixed approach is the best since it can describe every problem qualitatively and quantitatively.

The structured survey approach uses closed-ended instruments such as key informant interviews, household surveys, individual surveys, and group discussions to obtain quantitative data. This approach is frequently used to gauge prevalence, extrapolate results, gauge the scope of the situation, and more. To generalize results and statistically represent data, the structured experimental technique uses an experimental survey design to collect data through individual and household surveys. Surveys and testing observation vs. discussion frequently use the structured observation approach, which gathers data using a standardized checklist with measurable information, including participant observation and direct observation.

A qualitative technique called the semi-structured discussion approach is employed to collect information about a particular population or area. Selected participants are asked open-ended questions and probes to gain a qualitative understanding of trends, viewpoints, experiences, and attitudes. Impact assessment and third-party monitoring work best with the 'Most Significant Change' data. While the sequential mixed methods data collecting enhances the findings of one method with another sequentially, the semi-structured observation approach collects details about behaviors and experiences. The concurrent mixed methods approach triangulates and embeds strategy by combining results from many methods collected concurrently. These techniques are frequently applied in participatory mapping projects and comprehensive assessments.

The scientific research method involves four steps: observation, hypothesis, experimental testing, and predictions. Observations are observations without measurement, while hypotheses are assumptions tested using calculations or experiments. Experimental testing evaluates the hypothesis, considering all alternatives and available instruments. Predictions are made based on scientific, experience, or observation reasons and can be tested against the hypothesis by developing a mathematical model. The process requires extensive research to convert observations into hypotheses.

Mathematical models derived from fundamental principles or experimental observation might be empirical or deterministic. To solve social, commercial, and governmental issues, research is essential for knowledge and guidelines. A specific aim, well-described technique, well-planned procedural design, comprehensive report detailing flaws, sufficient analysis, valid and trustworthy data, and evidence-supported findings are all necessary for scientific research. Systematic, rational, empirical, and repeatable research suits it. Developing an equation for the data without a mathematical model is possible. Formal training for new advancements in an area is provided via research.

Research methodology is a step-by-step approach to problem-solving, whereas research methods are a collection of procedures/techniques for the study. Research methodology

includes the methods a researcher employs to investigate the problem. As a result, a competent researcher must be familiar with research methodology.

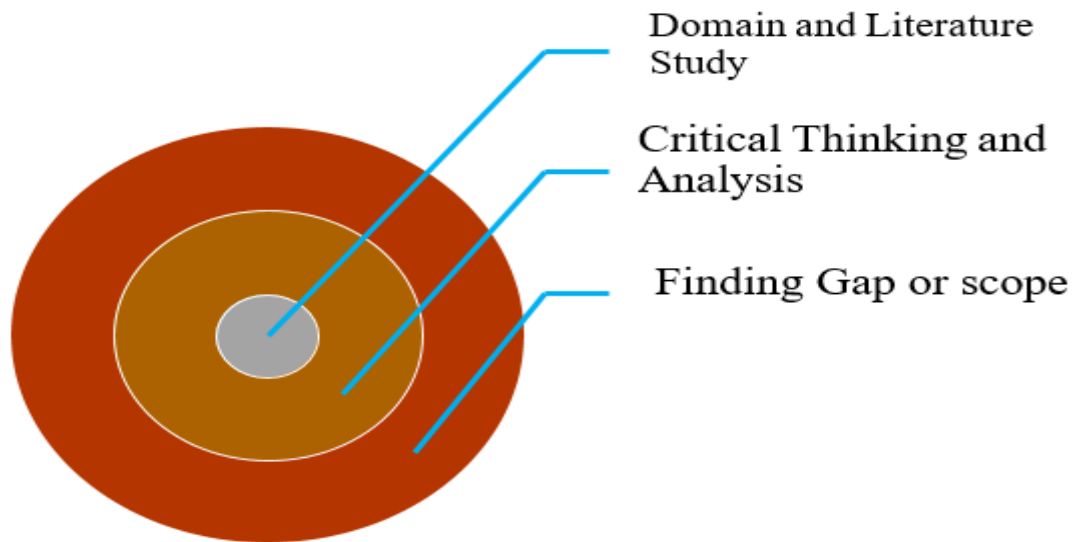


Fig. 2 Research Methodology Hierarchy

The research methodology hierarchy starts with a domain and literature survey. The second part is critical thinking, and the third is finding a gap or scope. This hierarchy, shown in Fig. 2., depicts that finding a gap ensures domain study and critical thinking, and the opposite may not be valid.

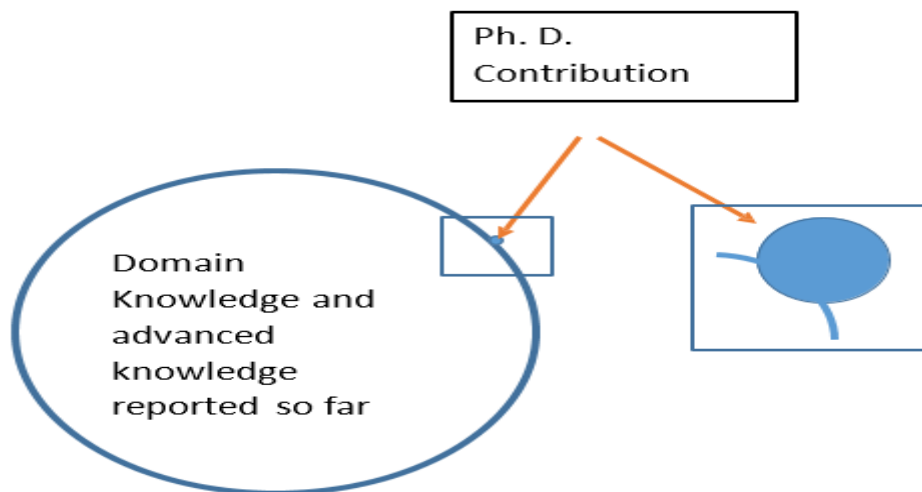


Fig. 3 Efforts of research before contribution

The research contribution is about pushing the boundary of the present knowledge arena further; whatever minuscule it may be. A tiny contribution to the boundary is shown in enlarged form in Fig. 3.

5.0 CONTRIBUTION AND INNOVATION

Generally, the notion of 'contribution to knowledge' in doctoral work may differ based on the area of research. A doctoral thesis should offer something that very few or no one else has said before and add to the corpus of knowledge that illuminates the issues it raises. A Ph. D. candidate must possess the following skills to do this: they must be able to read critically, analyze, ask probing questions, summarize, synthesize concepts and arguments, write persuasively, develop a research design based on theory, collect and process data ethically and rationally, analyze data incrementally, and draw conclusions that demonstrate understanding and have an impact on their field of study.

The discussion concerning the originality of doctorates goes back to the 1800s when doctoral theses were first introduced. This helped to lower deception and make it possible for relevant disciplinary communities to evaluate candidates. The degree has required an output that represents original research since the first doctorate was granted in the UK in 1917, which puts thesis assessors in a strong brokerage position. 'Doctorateness' in a thesis has been contingent upon the doctoral thesis's originality for over a century. Expanding knowledge through original research should be the primary goal of doctorate training, according to recommendations made by the Council for Doctorate Education of the European Universities Association. Doctorate candidates must evaluate and classify current information, make inferences, and decide how best to implement those conclusions. The study's design, knowledge synthesis, conclusions, or presentation can all be considered original.[4]

Table 1 Classification of research contributions (adapted from Bennich-Björkman, 1997, p.25)[4] [5]

	<i>Novel Contribution</i>	<i>No Novel Contribution</i>
<i>Relevant Contribution</i>	Creative	Cumulative
<i>No Relevant Contribution</i>	Original	Replication

Bennich-Björkman characterizes novelty and relevance as the interaction between creativity and originality. One can assess relevance at the human, social, or financial levels. The academic community usually judges the relevance of doctoral work. Novelty is anticipated, akin to blue skies inquiry and knowledge seeking. This point of view is suitable for the Ph. D. since it was in the late 19th century that original research was expected.

The global transition from industrial and manufacturing-based economies to technological and knowledge-based economies has made innovation an essential expectation in doctoral studies. It entails turning inventions into valuable applications, frequently related to the private sector. Through scientific and technological innovation, university research is anticipated to meet industrial needs better as knowledge creation gains importance in national economies. In economic discussions about production processes or products, the term "innovation" is frequently used. Governmental initiatives in higher education emphasize fostering industry-university partnerships and creating research that can be commercially exploited. University research and innovation are linked in the Lisbon Declaration on the mission of Europe's universities (2007), which emphasizes universities' role in fostering technological, social, and

cultural innovation. Innovation is common in many fields, including education and medicine.[4]

6.0 PUBLICATION

Research articles are essential to advancing civilization and the corpus of knowledge. They provide a platform for exchanging new ideas, insights, and discoveries, fostering critical thinking skills, and supporting scientific claims. Research papers are essential for expanding knowledge across various fields, guaranteeing that published research meets stringent academic standards, and preserving the integrity of scientific information. They also build on earlier research, establishing a platform for additional study and promoting collaboration [16]. The researcher's reputation and profile are enhanced by publication, which benefits grant applications, collaboration with other academics, and career advancement. This makes publishing research papers crucial for both academic and professional development. Through the demonstration of their expertise, reliability, and authority, it also positions scholars as significant contributors to their particular fields.

Critical thinking, intellectual curiosity, problem-solving abilities, and the capacity to critically evaluate evidence are all fostered by researching topics and writing research papers. These skills are essential for academic innovation as well as practical applications. Academic research and knowledge sharing require research papers. They encourage the expansion of knowledge, the confirmation of that information by peer review, the strengthening of critical thinking skills, and the sharing of knowledge with society. When we recognize the importance of research publications, we may better appreciate researchers' rigor, collaboration, and commitment to expanding our world knowledge.

Last, research papers bridge the information gap between academics and practical applications in society, resulting in technological advances, evidence-based policymaking, healthcare, and improving society.

Since articles and materials were distributed through printing before the internet and computers, journals were initially formed as printed volumes. These journals offered interested parties a way to find new papers and conferred prestige on the publishers. The internet has made journals unnecessary, but some people continue participating in the commercial-institutional system, which boosts academics and financially benefits publishers. The concept of "peer review" was developed to make published materials seem scientific, which harms the advancement of genuine scientific breakthroughs. This myth highlights the shortcomings of peer review by disseminating erroneous information and stifling significant discoveries.

In academic and scientific contexts, "publication" and "research paper" are commonly used synonymously; nonetheless, their meanings may differ slightly depending on the circumstances. Generally speaking, a research paper and a publication differ in the following ways:

- A formal, detailed document that provides the results of a study or investigation is called a research paper. An introduction, methods, literature review, findings, discussion, and conclusion are all included in the preset structure. Usually written by academics, researchers,

or students, these papers are published in technical reports, conference proceedings, or academic journals. Any written work made available to the public is referred to as a publication; this includes books, articles, reports, essays, and research papers. These publications, which include popular science books, magazines, newspapers, and web pieces, can be academic or non-academic.

- A research paper is a formal document that provides research findings, whereas publications are a more general term that refers to various written works made available to the public. Research papers are a standard publishing format in academia that aids in disseminating novel ideas and knowledge among academics.

Any research publication needs three factors to be accepted in a good publishing platform: contribution, innovation and relevance, shown in Fig. 4. The Relation between contribution, innovation, and relevance are summarised in Table 1.

For researchers, there are several advantages to publishing research papers: career progression, recognition, cooperation, visibility, social effect, legitimacy, professional development, and area contribution. Scholars have the potential to become authorities, win awards, and establish a strong reputation. Credible publications can open doors to collaborations, grants, and speaking engagements. Research papers positively affect society since they increase knowledge and lead to discoveries and technologies. Doing in-depth literature studies to comprehend research methods and ethical considerations is necessary for professional development.

During Ph. D., publishing papers and articles can enhance a scholar's academic profile and CV, making the scholar stand out from competitors. It's a fulfilling experience to know that other academics value and consider the study. Publishing allows the scholar to interact with other researchers and build connections with the academic community. Overall, publishing during Ph. D. can be a valuable strategy for pursuing an academic career.

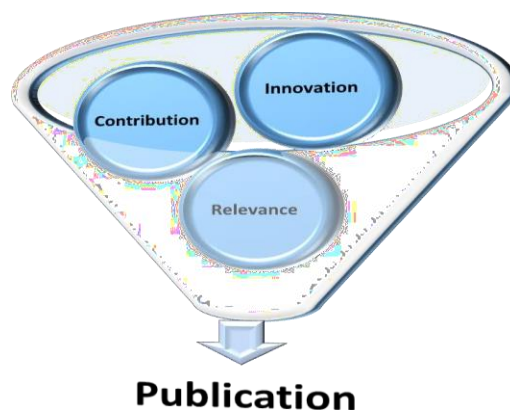


Fig 4 Factors leading to publication

Scholarly study findings that are freely accessible to the public can be disseminated more quickly and widely, helping more people and inspiring additional investigations. An increase in citations and influence in scientific research is a result of this widespread visibility. Companies gain from easy access to cutting-edge concepts, supporting and stimulating the

knowledge economy. Several drawbacks exist for researchers who switch to the open-access publication paradigm. There is debate over the impact factor of newly published journals—traditional and open access. Every subject has a different number of excellent open-access journals, and publishing in an open-access publication might be more expensive than in a conventional journal. Research institutes do not yet cover Author Processing Charges (APCs), and "predatory" open-access publishers may spam researchers. Researchers may evaluate the caliber of open-access publications with the use of databases. Furthermore, copyright restrictions may make providing repositories with full text and publishing data challenging, which might impede the uptake of open access.

7.0 THESIS

The phrases "thesis" and "dissertation" are frequently used interchangeably in academic settings. A thesis is defined as "to place a proposition" and is derived from the Greek word "tithenai," but a dissertation is derived from the Latin verb "discrete" or "dissertate," which means "to (continue to) examine and discuss." A dissertation might be a written description or analysis of a work, while a thesis might be an argument. Verifying the precise format of a Ph.D. thesis or dissertation with the university is essential [17].

A dissertation is a crucial part of a Ph. D., containing technical work that documents and proves one's thesis. It is intended for a technical audience and must be clear, complete, and not exhaustive. The dissertation is not the thesis itself but rather a claim or hypothesis detailing how one proves the hypothesis in detail or disproves it. The thesis must be significant and original and extend scientific knowledge. A valid thesis statement should be no more than three sentences, and the committee must agree. Once the thesis statement is established, the dissertation can be developed, with the abstract being a one-page description of the thesis and its proof, summarizing the results and emphasizing the contributions made to the subject.

The dissertation should be structured into 4 to 6 chapters, with the introduction introducing basic terminology and citing relevant background work. The abstract model should discuss an abstract model of what is trying to prove without discussing any specific implementation. The validation of the model/proof of theorems chapter shows proof of the model, which could be a set of proofs or a discussion of the construction and validation of a model or simulation to gather supporting data. Measurements/data should present data collected from actual use, simulations, or other sources, including analysis, to show support for the underlying thesis. In the introduction, Chapter I, it is essential to state the thesis and its importance, define terms and concepts used elsewhere, and cite appropriate works that give the definitions needed. Every factual statement must have a specific citation. Chapter II, Abstract Model, should be of lasting value. The model should be generic and capture all the details necessary to overlay the model on likely environments. Chapters III & IV, Proof, involve three proof techniques: analytic, stochastic, and proof. The candidate should build something according to the designed model and show that it behaves as per the claims made. Chapter V, Additional results, may be folded into Chapter III in some theses or multiple chapters in a thesis with many parts. It may discuss the effects of technology change on results and point out significant results obtained while

seeking to prove the central thesis but not supportive of the thesis[6]. This chapter segregation is indicative, and several types of chapter organization may exist.

The research question or hypothesis is a crucial part of a Ph. D. thesis, guiding the investigation and discovery of the research topic. The main body of the research is shaped around answering these questions and hypotheses using literature/theoretical frameworks and methodological approaches. A literature review provides an overview of existing research and writing, identifying gaps and problematizing current theories. The methodology/methods section explains how the research was conducted, with the ontological and epistemological basis playing a significant role in data collection, analysis, and discussion. The analysis and discussion chapters form the heart of the research, where unique findings and arguments are discussed and presented.

In unconventional formats or structures, such as those in arts-, media-, or humanities-based disciplines, it is essential to think outside the box and work with supervisors to find the best ways to present the research. Despite unconventional formats, the research should incorporate most elements to demonstrate research skills and understanding of the subject's prominent debates, literature, theory, and methodologies.



Fig. 5 Constituents of Ph. D. thesis

Whatever organization or contents were followed, a thesis must be supported by a written proof of creativity and publication, as shown in Fig. 5.

8.0 CHALLENGES

The major academic path of a Ph.D. is to enhance research, cultivate critical thinking abilities, and increase knowledge [7]. However, many obstacles exist, such as time management problems, the need to publish and give conference research talks, stress, and rejection worries. In addition to having to take out loans or work part-time jobs to support themselves, students may find the thesis defense process to be an extremely stressful experience. To overcome Ph.

D. struggles, the candidate must first acknowledge these problems. The primary worries are going to courses, researching, teaching, stress, fear of rejection, and the terrifying thesis defense procedure. The first step in conquering these obstacles is admitting their existence. The Ph. D. supervisor often underestimates colleagues' achievements, showing a lack of concern for their advancement or academic objectives. They exhibit partiality towards some members and lack uniform rules. They are indifferent to the group's research objectives and show no gratitude for their contributions. The Supervisor is prone to being influenced by others' opinions and discourages team members from submitting award applications. Research scholars face challenges such as inadequate communication, disregard for research objectives,

project advancement, misinterpretation of data, skepticism, inability to nominate for awards, sarcastic assessment of accomplishments, and lack of encouragement[12][13][14][15].

8.1 Higher standards are expected from the candidate.

A doctorate aims to enhance human understanding by addressing the reasons behind phenomena and potential solutions. While intelligence is crucial, the quality of a Ph. D. is not solely influenced by it. A good candidate should be curious, innovative, open-minded, and creative. Discipline is vital for validating ideas and developing them. Effective communication is essential but not always necessary. Working with diverse perspectives and skill sets can lead to greater productivity. An excellent Ph. D. student should be efficient and intelligent and have their advisor generate questions and creative solutions.

8.2 Conflict with the Supervisor

Ph.D. students frequently conflict with their supervisors, who might function as a mix of mentor, boss, and friend. It can be challenging to balance these positions, and conflicts may occur when they do. Having acquaintance with the professor and having a network of fellow Ph.D. students might help overcome these obstacles. It is essential to assign challenges to early-stage Ph D. students so they may practice and gain knowledge in problem-solving techniques. Ph.D. candidates in later stages should be free to design their research agendas, and those who require it can take a crash course in conducting research without the guidance of their Supervisor. However, to help students reach their academic objectives and provide advice, a Ph.D. supervisor is essential. A successful research and thesis process depends on solid rapport with one's Supervisor. To prevent disputes, set up frequent meetings, delegate tasks, and foster respect for one another. Promoting students is critical for academics to secure future scientific networks and collaboration, and mutual respect is necessary for professional advancement. Consult with different mentors if there is conflicting advice. Ph.D. and professional doctorate candidates can benefit from the extensive mentoring, consultation, and support services of Scholars Professional Editing Group.

8.3 Time Management

Because Ph. D. programs are rigorous and time-consuming, time management skills are essential. It may be difficult to juggle coursework, research, teaching duties, and personal obligations, and time management is a problem for many students. It might be harmful to performance and well-being to treat getting a doctorate like a full-time job. Students should adopt strategies that include developing a routine, journaling, setting up a "workspace," scheduling ahead of time, and taking breaks to stay motivated and organized. A daily schedule can help the candidate avoid bad habits and save time. Diary-keeping will help candidates to stay on top of things and remember important dates. Having a dedicated workspace helps to keep work and playtime apart.

8.4 Funding opportunities

Ph.D. candidates confront various financial obstacles, such as scarce financing, competitiveness for assistantships, grants, and scholarships, worries about their chances for

employment in the future, and debt from student loans. There's a chance that overseas students may pay more in tuition and have less access to local financing. The availability of research funding varies by academic discipline, making it challenging for students to conduct research in underfunded fields. Because there are fewer scholarships, grants, and prizes available than there are applicants, obtaining funds can be a difficult situation. It takes time to navigate financing sources and prepare a Ph. D. application, particularly for overseas candidates with no academic background.

8.5 Personal issues

Ph. D. students frequently feel alone because they pursue specialized subjects and spend lengthy hours in the lab or library. This can impede growth and well-being by causing self-doubt and impostor syndrome. Ph. D. candidates should accept peer assistance, stay in touch with peers, join organizations and associations related to their field, and post research on social media to overcome these obstacles. They may also improve it by talking to a layperson about their Ph. D. and explaining their hectic schedule to friends and relatives. Success in social networks, language learning, homesickness, and culture shock depends on managing stress and mental health. It's getting harder to balance personal and professional obligations, and putting off taking care of oneself may make the scholar stressed and mentally exhausted.

8.6 Ph. D. Hell and Heaven

A full-time scholar working in the research laboratory with a good fellowship in hand every month, no burden of family and parents is the best situation, "Ph. D. Heaven" for undergoing Ph. D., but if he/has family and that too with some stressful family issues then the problem becomes complicated. The situation worsens if it is part-time and the candidate is in toxic employment, stays far from the laboratory, has family burdens, and is in a "Ph. D. Hell" situation, as shown in Fig 6.

Life of a Ph. D. candidate				Family		
				No	Yes	
					Burden on Candidate	
					No	Yes
Fulltime	Yes	Fellowship for the entire period	Yes	Ph. D. Heaven	→	
			No		←	
	No	Steady and relaxed Job	Yes		→	
			No		Ph. D. Hell	←

Fig. 6 Ph.D. Hell and Heaven situations

9.0 CONCLUSIONS

Perfection is elusive and frequently contested in academics. Nonetheless, working to the best of one's abilities and accepting failure can be empowering. Success comes from perseverance and the ability to learn from setbacks. It's critical to avoid becoming mired in one scene when writing a Ph. D. because it's complicated. Before continuing, write as much as a scholar can. If a particular argument is difficult to follow, drop it and return to it later. Acknowledging one's genius by appreciating beautiful qualities and unique talents gives strength to fight loneliness, stocking several times in the Ph.D. journey. The doctoral process is arduous and requires perseverance, hard effort, uncertainty, and failure. Each chapter should include a central point that serves as the framework for the remainder of the chapter. It's normal to fail; most of our outstanding achievements come from losing. Despite the difficulties, commitment and tenacity are crucial. Embracing suffering and maintaining confidence in one's path can aid in perseverance. It's acceptable to take days off and not work every day, and evaluating the development of others can help the candidate know if doing things correctly. Neither the supervisor nor the candidate should evaluate or compare one candidate against others, particularly when pursuing a Ph. D. Concentrating on the main idea rather than gauging accomplishment about others is essential. Steps like recognizing the distinction between tasks and projects, making goals at the start of every week or day, learning new skills, and acknowledging that putting in the work is the only path to a good thesis. Seeking unbiased help reduces anxiety. Appreciating good times and treating oneself well can prevent unease. Keeping an optimistic outlook, tracking efficiency, and having a high-level detailed plan can help avoid disappointment. Since errors can have long-lasting consequences, it also promotes learning from them. It also highlights that every Ph.D. candidate approaches their work differently; hence, there is no right or wrong method to complete one.

Faith in one's skills and basing judgments on reasoning is essential. Getting a Ph.D. is not a straight line; thus, it's acceptable to pause. It's critical to remember that life is more than the Ph. D. thesis, to put hobbies outside of it, and to regard oneself as a person first before a Ph.D. candidate. Doctorate PhD.s are challenging but achievable, requiring expanding knowledge, making discoveries, and contributing to a field. Recognizing one's intelligence, skill, and talent and overcoming negativity is essential. Compassion is a valuable skill acquired during a Ph. D., helping to cope with life's challenges.

This article emphasizes the importance of self-evaluation and acknowledging one's bias. It suggests that Ph.D. students can reduce stress and make the process more enjoyable by embracing their path and being content with what they have. It also warns against comparing oneself to others, as each experience is unique. Errors in Ph. D.s are inevitable, but it's crucial to be patient, compassionate, and adherent to limitations. Small steps are to be taken for success, and unnecessary worry should be avoided. As the candidate advances, he or she can surpass their supervisor, and she/he can use their intellectual muscles to discern inappropriate advice. Ph.D. candidates often blame their mistakes on external factors, but learning from them and addressing historical context is crucial. Self-care can be life-changing, such as gratitude notebooks, meditation, and removing unhealthy relationships. It is difficult to say no to Ph.D. pursuits, and the candidate needs to understand the historical context of research issues.

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