

Inductive vs. Deductive Research Methods: A Comprehensive Methodological Guide for Bachelor's and Master's Theses

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Abstract

In this review, both inductive and deductive research approaches are examined in detail, highlighting how they serve the needs of academic thesis writing and assist scholars lacking research experience at various stages of higher education. Focusing specifically on social science, business, and educational research, this paper offers a systematic comparison of the hypothetico-deductive model of deductive research with the theory-building model of inductive research. Through integration of existing academic literature, common methodological misunderstandings, and specific examples from published research, this guide helps nascent researchers make sense of their research design decisions. Furthermore, the conversation reaches mixed methods as a 'gateway' or synthetic form of integration between qualitative depth and quantitative generalizability. This article, in Harvard referencing style, can serve as a starting point or structured reference for students preparing their theses and for academic supervisors evaluating the methodology.

KEYWORDS: Research, Inductive, Deductive, Methodology, Thesis

Introduction: Navigating the Methodological Crossroads

The shift from coursework to independent research is a critical time in the development of academic work, especially at the undergraduate and master's level, where students are required to make the move from 'knowledge users to knowledge producers' (Saunders et al., 2019). At the core of this switching point lies a basic methodological decision, such as whether to proceed from established theory (a deductive approach, commonly used in empirical studies) and test that theory in a concrete field. Or from data (inductive approach).

Although deductive strategies of inquiry have typically dominated disciplines with an emphasis on quantitative precision, such as psychology, economics, and natural sciences, inductive approaches have been recognized for enabling a more subtle, contextually rich understanding of sociological life, including (but not limited to) sociology, anthropology, and organizational research (Charmaz, 2014). Unfortunately, this dichotomy is not always understood, especially by beginners in the research field, who fail to maintain consistency between the various methods, thus weakening both the evidence of validity and the power of the obtained results.

In this paper, we aim to dispel those mystiques by:

- Trace back their epistemological roots (ways of knowing), and how the two sets of epistemological roots fit together or not.
- Performance and limitations of both in practical research settings.
- Offering practical advice on how to choose and justify the optimal method.
- Solving common problems faced by students when they are implementing.
- Proposing mixed methods plans as a synergistic counterpart.

Through a detailed analysis with examples, this guide introduces methodological literacy to a new generation of students and researchers, ensuring the soundness of their theses and minimizing the toxic influence of the replication crisis.

Theoretical Underpinnings:

Deductive Research: The Process of Testing Hypotheses

Deduction is based on the foundational principles of Aristotelian logic and represents the linchpin of the scientific method, which involves building knowledge through the testing of falsifiable hypotheses (Popper, 1959). In this model, experimenters have an independent theory that yields specific predictions. These, in turn, are empirically tested through data gathering and statistical analysis, with the goal of either confirming or disconfirming the initial hypotheses (Bryman, 2016).

Key Methodological Features

The following structured inferential components are standard in deductive research:

Sequential Line of Process: The sequence of this method is generally structured, beginning with the formulation of the theory, followed by hypothesis development, data collection, data analysis, and concluding with a final step. This progression is designed to improve clarity and methodological precision (Bryman, 2016; Babbie, 2020).

Quantitative focus: Deductive research often focuses on measurable data that lends itself to statistical analysis. This focus enables us to measure relationships between variables and generalise to wider populations (Creswell & Creswell, 2018; Neuman, 2014).

Controlled Study Environment: Experiments and standardized questionnaires are frequently employed to minimize variation and enhance reliability. In other words, by adjusting for confounders, researchers are given greater confidence in attributing observed effects to the variables of interest (Shadish, Cook, & Campbell, 2002; Kerlinger & Lee, 2000).

Sample sizes: For statistical significance and generalizability, deductive research usually requires large sample populations that are chosen randomly (Saunders, Lewis, & Thornhill, 2019; Cohen, 1992).

Illustrative Example

Assume that you conducted a study that tested the use of social media and academic grades:

Theory-Based Hypotheses: A more appropriate starting point would be to review theory-based hypotheses that posit overexposure to the media results in a decreased attention span, along with reduced learning effectiveness.

Operation: Define variables in measurable terms (e.g., Instagram daily hours of use and GPA (Grade Point Average)).

Standardized Data Collection: 500 university students fill in the same web survey using the same variation of responses from different respondents.

Findings of statistical results: Fit statistical models to establish whether increased social media use is meaningful in predicting bad grades.

Advantages of Deductive Research

One of the most essential advantages of deductive research is its replicability. As deductive studies typically involve the utilization of standardized, clear, and documentable methods, there is the possibility of repeating

the same process and testing the outcome by other researchers. This enhances both the validity and reliability of the findings, thereby contributing to the development of robust scientific knowledge (Bryman, 2016; Creswell & Creswell, 2018). Replication is most useful in social and behavioral sciences, where the replication of studies in various settings makes theory statements more valid.

Deductive studies, especially those conducted through experiments, enable researchers to establish causal relationships with greater certainty. By either keeping variables under control or holding them constant, the ability to determine whether variations in one variable directly influence outcomes in another is enhanced. This causal inference methodological approach not only enhances the research's explanatory power but also enables the testing of hypotheses under controlled conditions (Shadish, Cook, & Campbell, 2002; Babbie, 2020). This methodological approach puts the scientific foundation of causal assertions on firm ground.

The other main strength of deductive research is the fact that it is operationally efficient. Standardized instruments such as structured questionnaires, experiments, and quantitative models make the performance of research cost-effective and feasible on a large scale. These tools facilitate data collection and analysis, allowing researchers to research large populations or multiple environments with relatively fewer resources (Neuman, 2014; Saunders, Lewis, & Thornhill, 2019). The efficiency and scalability of deductive approaches make them particularly well-suited for proposition testing on larger populations, thereby maximizing the generalizability of findings.

Limitations and Criticisms

One of the objections raised against deductive research is its excessive reliance on dominant theories for investigative purposes. Even though such theories provide a framework and direction, they may not apprehend new or context-specific phenomena. Excessive reliance has the effect of narrowing the development of new ideas and inhibiting innovation, as researchers tend to concentrate more on fitting data into established models rather than seeking novel explanations (Bryman, 2016; Blaikie, 2009). In fast-evolving fields, such rigidity can prevent one from noticing new trends that do not conform to the paradigms of dominant theoretical frameworks.

Deductive approaches are also afflicted with the vice of reductionism. By attempting to break down richer human or social experiences into measurable, abstract variables, deductive research risks oversimplification of reality. Such oversimplification, as it facilitates statistical analysis and hypothesis testing, may conceal the richness, diversity, and complexity of lived realities (Neuman, 2014; Guba & Lincoln, 1994). Therefore, essential nuances may be lost, limiting the explanatory depth and ecological validity of the results, especially in human behavioral and cultural research.

However, another disadvantage of deductive methods is that they give little regard to context. Deductive research places greater emphasis on generalizability and standardization, which can minimize the effect of situational, cultural, and social factors on human behavior. By contrast, qualitative and inductive methods emphasize how acts and meanings are constructed within specific contexts (Denzin & Lincoln, 2018; Yin, 2018). By excluding these elements, deductive research can produce statistically robust yet contextually weak results, which could lead to sketchy or misleading findings.

Inductive Research: The Theory Building Approach

Inductive research is primarily characterized as emergent and exploratory in nature. Rather than testing preconceived hypotheses or theories, lines of inquiry are pursued in accordance with data, thus theory emerges from the data. The approach is especially suited for examining poorly known phenomena, intricate social situations, or intangible human experiences that are complex to measure (Glaser & Strauss, 1967).

While the deductive model attempts to measure what is already understood, an inductive research plan would develop what is yet to be understood. It is shaped by complexity, reflexivity, and adaptability, and is particularly suited to qualitative research.

Key Methodological Features

Iterative and Flexible Design: Unlike deductive approaches, qualitative research follows an iterative and flexible design. Research is rarely linear; researchers commonly refine or even alter their original study questions as initial findings emerge. This reciprocal process ensures that the evolving analysis is maintained in proximity to the data and its inherent themes (Charmaz, 2014; Maxwell, 2013). By allowing theory to emerge organically, qualitative research can capture the complexity of human experiences in ways that rigidly preconceived methods cannot.

Collection of Qualitative Data: Qualitative research data are often gathered through instruments such as interviews, focus groups, ethnography, and document analysis. Through these, researchers can access participants' self-reported data and socio-cultural information that may be inaccessible to standardized instruments (Creswell & Poth, 2018; Denzin & Lincoln, 2018). These instruments are particularly helpful in understanding individuals' interpretations of their social realities and in investigating meanings within specific contexts.

Biased, Purposive Samples: In contrast to probability sampling, qualitative research often employs purposive sampling, where participants are selected with an emphasis on their relevance to the research topic rather than their representativeness. It allows researchers to prioritize depth over breadth, focusing on stakeholders who hold consequential opinions or possess valuable knowledge (Patton, 2015; Tracy, 2020). Though at times called "biased," purposive sampling enhances the ability to produce rich contextualized meaning that may be inaccessible through large-scale quantitative inquiry.

Thematic Coding and Analysis: A systematic examination of qualitative data, such as transcripts, field notes, or documents, is used to identify recurring patterns, themes, and categories. Thematic results are synthesized to develop conceptual or theoretical models. Grounded theory (Glaser & Strauss, 1967; Charmaz, 2014) and the Gioia process (Gioia, Corley, & Hamilton, 2013) are procedures that offer systematic structures for coding and theory building without sacrificing the participants' voices and meanings.

Illustrative Example

Think of a study that tries to find out how freelancers think about job security. It would go something like this:

- **Interviewing its subjects:** The reporter interviews 20 people who work as freelancers or on platforms, ranging from delivery to freelance writing to ride-hailing.
- **Transcription and coding of data:** The researcher codes the responses of the participants line by line to capture meaning using Grounded Theory methodologies (Glaser & Strauss, 1967).
- **Discover emergent themes:** You may start to see themes emerge in the data, like “reliance on a platform,” “unpredictable revenue,” or “unsupported institutionally.”
- **Develop a model:** We then bring these themes together in a model that helps us understand how workers may perceive insecurity in platform labour markets.

It is dialogic, reflective, and capable of generating new theoretical insights.

Advantages of Inductive Research

Contextualized Knowledge Claim: Inductive approaches enable a more nuanced understanding of social life, as they allow participants to speak for themselves. This approach is particularly suitable for studying marginalized, diverse, or hard-to-reach populations, as it captures perspectives that are often overlooked in standardized designs (Denzin & Lincoln, 2018; Tracy, 2020).

Theoretical Innovation: Since a priori theory does not constrain inductive research, it provides possibilities for generating new concepts and models derived from empirical data. The theory-generating potential ensures that conclusions remain closely aligned with the daily life experiences of participants (Charmaz, 2014; Glaser & Strauss, 1967).

Methodological Flexibility: Inductive designs are adaptive, and research methods can be altered during the research process in response to emerging phenomena or contextual constraints. This flexibility offers a high degree of realism, and inductive inquiry is particularly well-suited to managing the dynamics of social life (Maxwell, 2013; Creswell & Poth, 2018).

Limitations and Criticisms

Subjectivity: One of the weaknesses of inductive research is its reliance on high levels of researcher interpretation, which can lead to bias and concerns about validity. Reflexive strategies such as memo writing, triangulation, and peer debriefing are key in establishing credibility and trustworthiness (Lincoln & Guba, 1985; Tracy, 2020).

Time-consuming: Qualitative research takes a significant amount of time and effort. Processes such as building rapport in the field, interviewing, transcription, coding, and data analysis can take time and may require several months (Creswell & Poth, 2018; Patton, 2015). This makes inductive approaches less efficient in terms of time compared to standardized quantitative techniques.

Applicability: Findings from inductive research are typically based on small, local samples, which limits their generalizability at a large scale. The research can nevertheless provide a form of transferability wherein findings can be applied or translated in identical contexts (Lincoln & Guba, 1985; Denzin & Lincoln, 2018). This enables qualitative research to provide richness and depth, rather than relying on general statements.

Decision Factor	Deductive Research	Inductive Research
Primary Goal	Test hypotheses derived from existing theory	Generate new theories from empirical data
Typical Disciplines	Psychology, Economics, Medicine	Sociology, Anthropology, Education
Data Collection Methods	Surveys, Experiments, Secondary Data	Interviews, Ethnography, Document Analysis
Sample Strategy	Extensive, Random/Stratified Sampling	Small, Purposive/Theoretical Sampling
Analysis Techniques	Statistical Tests (Regression, ANOVA)	Thematic Coding, Narrative Analysis
Researcher Role	Detached Observer	Engaged Interpreter

Source: Compiled from various sources specified in the literature

When Deductive Methods Should Be Used.

A deductive approach is well-suited for the situation where the research is based on an earlier theory and the purpose is to test, verify, refine, or disprove specific hypotheses derived from this theory (Bryman, 2016; Saunders et al., 2019). These are widely utilized in the quantitative research tradition, which favors objective measurement, statistical analysis, and the resulting generalizability of findings.

Students might choose to deduct instead of induce if the following requirements are fulfilled:

Your research question is theory-driven: A deductive system is appropriate if your study begins with a theory and you want to test how well the theory explains empirical outcomes. For instance, in testing the effect of "transformational leadership" on team productivity, you would depend on established leadership theory, which you seek to confirm in a given setting (Northouse, 2021).

Your discipline prioritises quantitative analysis: In fields such as finance, psychology, economics, and health science, evidence is frequently based on numbers (Creswell & Creswell, 2018). Deductive approaches are well-suited to such traditions and are generally well-resourced (including institutional subscriptions to statistical software and large databases).

You have access to enormous datasets or standard data collection instruments. Deductive research often employs statistically valid samples, which can be generated from questionnaires, experiments, or secondary sources such as government statistics or firm-level financial reports. These types of methods facilitate reproducible, outcome-controlled findings (Hair et al., 2020).

Example Scenarios for Deductive Research:

"Are tech start-up employees more productive if a transformational leader leads them?" This line of research derives from existing theories of leadership (e.g., Bass's model of transformational leadership). It may be empirically tested using productivity measures and leadership behaviour scales (Bass & Avolio, 1994).

"How does sleep correlate to grades?" This can be tested using standardized questionnaires designed to capture quantitative information on a range of sleep characteristics, as well as correlation or regression analysis techniques.

Advantages of Selecting Deductive Approaches in Student Theses:

Structure and clarity: The simple progression theory hypothesis test implies that the thesis is both easy to write and read (Robson & McCartan, 2016).

Replicability and rigour: Allows other researchers to replicate the research, thereby contributing to academic rigour (Popper, 1959).

Generalisability: findings from a statistically acceptable sample can be generalised to other populations (Bryman, 2016).

When Should You Use Inductive Methods?

Inductive approaches are particularly relevant in investigations in which the phenomena are not well understood and no theory has been established. This allows for the possibility of new concepts and ideas to emerge, meanings to be elucidated, and rich, contextual insights to be captured in ways that may be overlooked by standardized instruments (Charmaz, 2014; Tracy, 2013).

Researchers may want to engage in inductive reasoning when:

Your Topic Is Underexplored: Inductive approaches are warranted when there is relatively little literature describing a specific phenomenon, or when the theoretical understanding is piecemeal or archaic. It is a feature present in nascent fields, contentious subjects, or marginalised realities (Silverman, 2020). When this is the case, a theory is not so much tested as constructed from empirically observed regularities.

You Are Interested in Meanings, Experiences, or Cultural Practices: And so, if your research question is about how human beings perceive, feel about, and/or make sense of some phenomena, or some "thing," the inductive approach is the one to use to talk about such human subjective realities. This is particularly true for education, gender studies, health sociology, and HRM research (Creswell & Poth, 2018).

Your Research Is Exploratory: If the purpose of the study is to describe, rather than to explain or predict, more inductive methods offer the freedom to be surprised by your findings. Approaches, such as case study, grounded theory, and ethnography, that seek to develop a deep and nuanced understanding of complex realities are applied (see Glaser & Strauss, 1967).

Example Scenarios for Inductive Research:

"How do LGBTQ+ workers navigate employment discrimination in conservative industries?" This item aims to explore personal experiences and strategies in an environment where social stigma, covert discrimination, or cultural restrictions might have contributed to them. An inductive research project using depth interviews might enable themes such as "code-switching," "informal support networks," or "career redirection" to emerge from participants' stories (Nash & Moore, 2021).

"How do first-generation college students cope?" This line of inquiry raises an invitation to explore aspects of life, including academic, monetary, and social hardships. Because this inductive analysis method can uncover coping mechanisms that are being developed, such as dealing with family expectations, imposter syndrome, or coping via peer mentoring that may not be so well-represented in current theory (see Stephens et al., 2012), focus groups or narrative interviews could be used to continue to develop our understanding of students' coping mechanisms.

Advantages of Selecting Inductive Techniques in Student Theses:

- Development of Theory: Good for creating new models, based on practice (Gioia et al., 2013).
- Cultural and Context Sensitivity: Grasps meaning in the context of social settings.
- Participant-Centred Research: Provides a voice for people who are usually in the margins in quantitative research (Tracy, 2010).

Mixed-Methods: Best of Both Worlds?

Mixed-methods studies combine the deductive approach of quantitative research with the inductive approach of qualitative research within a single investigation to gain a deeper understanding of a research issue. This synthesis is not simply an assembly; instead, it permits researchers to capitalize upon the respective advantages of each method and to counterbalance their respective limitations (Creswell & Plano Clark, 2017).

The blending of numbers and stories in mixed methods increases the validity, richness, and relevance of the findings. They are particularly powerful when responding to complex or multifaceted research questions that cannot be answered by a single method alone (Tashakkori & Teddlie, 2010).

Key Advantages of Mixed-Methods Research

Triangulation of Findings: The use of different data sources or methods reduces bias in results due to corroboration. For example, insights obtained from interviews or focus groups can be applied to test patterns found in the quantitative data (Denzin, 2012).

Enriched Interpretation: With mixed methods, you can add explanatory depth beyond the numbers. Quantitative results reveal what is occurring, and qualitative data sheds light on why it happens (Creswell & Creswell, 2018).

Comprehensive Inquiry: Mixed-methods research can provide a link between theory testing and theory building, making it particularly relevant to program evaluation, organizational research, or social policy research (Greene et al., 1989). Example: Remote Work Satisfaction Study. For instance, if we were to consider a study on the satisfaction with remote work:

Take, for example, a study that investigates employee satisfaction in remote work conditions:

Quantitative Component (Deductive):

To assess employee satisfaction across various dimensions (e.g., autonomy, communication, work-life balance), a survey was conducted among 300 employees within the company. This factor examines existing theories of job satisfaction (for example, Herzberg's two-factor theory).

Qualitative Component (Inductive):

A total of 15 in-depth interviews were conducted with volunteers to explore why specific patterns, such as low satisfaction with communication, emerged. This could generate learnings about employee stories, the specific issues of the context, and the new expectations for hybrid work arrangements.

Both provide measurable statistics and narrative-based reasons, filling in a more complete picture of the ever-changing world of remote work.

Common Mixed-Methods Designs:

Convergent Parallel Design: Collection of both quantitative and qualitative data at the same time, and with independent analysis, followed by merging of the results for comparison and interpretation (Fetters et al., 2013).

Explanatory Sequential Exploratory: Begins with a quantitative phase and, in a second phase, explores the quantitative data.

Exploratory Sequential: Begins with a qualitative phase, followed by the construction of a quantitative phase based on data suggestions.

Conclusion: Choosing Wisely - Methodological Considerations

The choice between inductive, deductive, or a combination of research approaches is not simply a procedural or methodological decision – it is closely linked with the underlying epistemological position of the researcher, the nature of the research problem, and the desired contribution to knowledge (Crotty, 1998; Gray, 2014). The term "methodology" is a handyman's term that can mean all manner of things, but it reflects how a scholar thinks knowledge is obtained and what constitutes valid evidence.

Although this type of deductive research is praised for its precision, predictability, and testability of pre-existing theories, it could also be argued that it tends to oversimplify the social world by neglecting its complexity and emerging phenomena (Bryman, 2016). On the other hand, inductive approaches deliver detailed, contextualized,

and theory-generating insights—but are also frequently criticized for their restricted generalizability and time-consuming data analysis (Charmaz, 2014; Silverman, 2020).

Within this contemporary research context, where phenomena are dynamic, multilayered, and valiative, mixed methods research provides a strong case for amalgamating the statistical rigour of deduction with the narrative richness of induction (Creswell & Plano Clark, 2017). Such triangulation further contributes to interpretation and enhances the validity and relevance (Denzin, 2012; Tashakkori & Teddlie, 2010).

The Optimum Methodological Option is Consistent with:

Your Research Question: If your question is affirmative (do X cause Y?), you probably want to go with a deductive approach. If your question is descriptive or interpretive (e.g., “How do people experience X?”), then the inductive or mixed methods approach is the appropriate choice (Creswell & Poth, 2018).

Disciplinary conventions establish the range of customary methodological procedures that differ among research disciplines. Each discipline establishes its own conventions regarding the form, conduct, and presentation of research. Therefore, while the natural sciences typically depend on controlled experiments and quantitative information, the social sciences are more likely to employ qualitative methods, such as interviews or case studies. These distinctions stem from the special purposes, traditions, and canons of evidence of each discipline.

- Psychology, economics, and epidemiology often favor deductive quantitative methods.
- Inductive, qualitative inquiry that has been noticed and embraced in anthropology, sociology, and education (Guba & Lincoln, 1994; Denzin & Lincoln, 2018).

Practical Constraints: Practical considerations, such as time, participant access, data access, ethical considerations, and researchers' skills and competences, remain and affect method selection. Description inductive studies: may imply extensive fieldwork and/or in-depth analysis, while deductive designs might require statistical skills and large samples (Flick, 2014).

Strategic Takeaway: “There is no method which is best for every use, only a method which is the best for answering a particular research question in a particular context of use.” (Greene et al., 1989; Tracy, 2013).

New researchers should critically analyse their objectives and limitations to support transparent and coherent methodological choices. By doing so, student researchers not only increase the academic integrity of their theses, but they can also ensure that their work is timely, usable, and valuable for academia, policy, or practice.

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