

Lecture 7

Research Question/Problem

Formulating a research problem is a crucial step in the research process. It involves defining a clear, focused, and researchable issue or question that your study will address. This structured process helps to ensure that the research problem is both relevant and manageable.

Lets examine the structured approach to formulating a Research Question/Problem:

1. Identify a Broad Area of Interest

Topic Selection: Choose a general area that interests you or is relevant to your field. This could be based on gaps in current research, personal interest, or societal issues.

2. Conduct a Literature Review

Use academic databases, journal articles, and credible sources to gather information.

Background Research: Review existing literature to understand what has already been studied, the current state of knowledge, and what gaps or issues remain. This helps in refining your focus.

Identify Gaps: Look for areas where existing research is lacking or where there is conflicting evidence.

Resources: Google Scholar, PubMed, academic journals, and library databases.

3. Narrow Down the Focus

Specific Aspect: Refine the broad topic into a more specific aspect that can be researched in detail.

Contextualization: Consider the context in which the problem exists, such as geographical, temporal, or demographic aspects.

4. Formulate the Research Problem

Problem Statement: Clearly define the problem or question you want to address. It should be specific, focused, and researchable.

Research Questions: Develop specific questions that your research will aim to answer. These should be clear and concise.

5. Assess Feasibility

Scope: Ensure the problem is researchable within the constraints of time, resources, and access to data.

Significance: Consider the importance of the problem. Will solving it contribute significantly to your field or have practical implications?

6. Refine and Specify

Operational Definitions: Define key terms and concepts to ensure clarity and consistency in your research.

Hypotheses: If applicable, formulate hypotheses or propositions that your research will test.

7. Seek Feedback

Consultation: Discuss your research problem with peers, mentors, or experts to refine and validate it.

Example

Concerns Regarding the Impact of Social Media on Mental Health

Social media has become a central part of daily life, with platforms like Instagram, Twitter, and Facebook influencing how individuals communicate, connect, and present themselves.

The rapid increase in social media usage, especially among younger demographics, has prompted significant interest in understanding its effects on mental health.

Studies suggest that while social media can offer benefits such as enhanced social connectivity and support, it also poses risks including increased anxiety, depression, and low self-esteem.

The varying impacts of different types of social media platforms—imagebased versus textbased—add another layer of complexity to this issue.

Concerns Raised

Individual Level:

Mental Health Issues: Increased social media use has been linked to heightened anxiety, depression, and decreased self-esteem. These effects may be exacerbated by factors such as social comparison and exposure to idealized images.

SelfPresentation: The pressure to curate a perfect online persona can contribute to stress and mental health challenges, particularly on imagebased platforms like Instagram.

Social Level:

Social Comparison and Cyberbullying: Social media platforms can amplify social comparison and expose users to cyberbullying, impacting overall mental wellbeing. The public nature of social media can also lead to more intense and widespread psychological effects.

Group Dynamics: Social media can influence group behaviors and perceptions, potentially exacerbating collective issues such as stigmatization and social isolation.

Reflection in Traditional Media and Group Discussions

Group Discussions: Conversations around social media and mental health in community groups and forums frequently address personal experiences and societal impacts. These discussions reflect growing concerns about the need for balance and responsible use of social media, as well as the importance of addressing mental health proactively.

Traditional Media: Discussions in traditional media often highlight both the positive and negative aspects of social media. Reports and articles may emphasize the risks of mental health issues associated with heavy use, alongside the potential benefits of connectivity and support.

Motivation

Relevance and Timeliness: The pervasive nature of social media and its continual evolution make it crucial to understand its current effects on mental health. This research is timely given the increasing integration of social media into everyday life and the rapid development of new platforms and features.

Impact on Vulnerable Populations: Young adults, who are among the highest users of social media, are particularly vulnerable to its effects. Understanding how different social media platforms impact this group is essential for developing targeted mental health interventions.

Policy and Practice Implications: Insights from this research can inform public health guidelines and social media policies, aiming to mitigate negative mental health outcomes and promote healthier usage patterns.

Knowledge Gaps: There is a need for comparative studies that specifically examine how different types of social media platforms affect mental health differently, addressing gaps in current research.

Potential for Positive Change: Findings could lead to educational campaigns and intervention strategies designed to enhance mental wellbeing and guide healthier social media practices.

Eg. Break down the process of formulating a research problem including the development of hypotheses.

1. Identify a Broad Area of Interest

Topic Selection: The impact of social media on mental health.

2. Conduct a Literature Review

Background Research:

Existing studies indicate that social media can have both positive and negative effects on mental health. Some research shows that social media can provide social support and enhance social connections, while other studies suggest it may contribute to issues such as anxiety, depression, and low self-esteem.

Common themes in the literature include the influence of social media on body image, cyberbullying, and social comparison.

Identify Gaps:

While there is extensive research on general mental health effects, there may be less focus on how different types of social media platforms (e.g., imagebased vs. textbased) impact mental health differently.

There may also be a gap in understanding how specific demographic factors (e.g., age, gender) moderate the relationship between social media use and mental health outcomes.

3. Narrow Down the Focus

Specific Aspect:

Investigate how the type of social media platform (image based platforms like Instagram vs. text based platforms like Twitter) affects mental health outcomes, such as anxiety and self-esteem.

Contextualization:

Focus on young adults aged 18-24 years, a demographic known to be highly active on social media, and examine how their mental health is influenced by their use of different types of platforms.

4. Formulate the Research Problem

Problem Statement:

"How does the use of imagebased social media platforms (e.g., Instagram) compare to textbased social media platforms (e.g., Twitter) in affecting anxiety and selfesteem among young adults?"

Research Questions:

1. "What is the relationship between the use of imagebased social media platforms and levels of anxiety among young adults?"
2. "How does the use of textbased social media platforms affect selfesteem in young adults?"
3. "Are there differences in the impact on mental health between imagebased and textbased social media platforms?"

5. Assess Feasibility

Scope:

Conduct surveys or experiments with young adults to assess their usage of social media platforms and measure their anxiety and self-esteem levels.

Use validated psychological scales to measure mental health outcomes and ensure a representative sample of young adults.

Significance:

Understanding these dynamics can help in developing targeted mental health interventions and guidelines for social media use, which is particularly relevant for mental health professionals and social media companies.

6. Refine and Specify

Operational Definitions:

Anxiety: Measured using standardized tools such as the Generalized Anxiety Disorder 7 (GAD7) scale.

Selfesteem: Assessed using tools like the Rosenberg SelfEsteem Scale (RSES).

Type of Platform: Categorized as imagebased (e.g., Instagram) versus textbased (e.g., Twitter).

Hypotheses:

1. H1: Higher usage of image based social media platforms (e.g., Instagram) is associated with increased levels of anxiety among young adults compared to the use of text based platforms (e.g., Twitter).
2. H2: Higher usage of text based social media platforms (e.g., Twitter) is associated with higher selfesteem in young adults compared to the use of image based platforms (e.g., Instagram).
3. H3: The negative impact on mental health (anxiety and selfesteem) will be more pronounced for users of image based social media platforms compared to users of text based platforms.

7. Seek Feedback

Consultation:

Discuss the research problem and hypotheses with psychologists, social media researchers, and experts in mental health to refine the research questions and ensure the methodology is robust.

Obtain feedback on survey design, data collection methods, and analysis plans to ensure that the study will yield valid and reliable results.

Background

The integration of Artificial Intelligence (AI) into epidemiology represents a transformative shift in how public health data is analyzed and interpreted. AI technologies, such as machine learning and predictive modeling, have the potential to revolutionize the field by enhancing disease prediction, identifying risk factors, and optimizing response strategies. Historically, epidemiology has relied on traditional statistical methods and epidemiological models, but the increasing complexity and volume of health data necessitate more advanced analytical tools. AI applications in epidemiology have shown promise in several areas, including outbreak prediction, disease surveillance, and personalized medicine. For example, machine learning algorithms can analyze large datasets to predict disease spread and identify high-risk populations more accurately than traditional models. Despite these advancements, there is still limited understanding of how various AI approaches compare to conventional methods in terms of accuracy, efficiency, and overall impact on public health outcomes.

Motivation

Need for Improved Tools: There is a pressing need to enhance disease prediction and management due to the increasing frequency of global health crises and the complexity of health data. AI has the potential to address these challenges by providing more accurate and timely predictions.

Potential Benefits: AI models could offer significant improvements over traditional methods in terms of accuracy, efficiency, and scalability. Understanding these benefits is crucial for integrating AI into public health practices and optimizing disease management strategies.

Knowledge Gaps: While AI is being applied in epidemiology, there is limited research comparing its performance directly with traditional epidemiological models. This gap needs to be addressed to understand the practical implications and benefits of AI in disease forecasting.

Research Question

"How does the performance of Artificial Intelligence-based prediction models compare to traditional epidemiological models in forecasting the incidence and spread of infectious diseases?"

Hypotheses

To address the research question, the following hypotheses can be relevant:

Hypothesis 1: AI-Based Models Show Greater Accuracy

AI-based prediction models will demonstrate higher accuracy in forecasting the incidence and spread of infectious diseases compared to traditional epidemiological models.

Rationale: AI models often leverage large datasets and complex algorithms that can identify patterns and correlations more effectively than traditional methods, potentially leading to more accurate predictions.

Hypothesis 2: AI Models are More Efficient

AI-based prediction models will process and analyze data more efficiently than traditional epidemiological models, resulting in faster predictions and reduced computational time.

Rationale: AI technologies, such as machine learning algorithms, are designed to handle large volumes of data and perform complex calculations rapidly, which may enhance the efficiency of disease forecasting.

Hypothesis 3: AI Models Provide Additional Insights

AI-based prediction models will uncover additional insights and patterns in disease incidence and spread that are not readily identified by traditional epidemiological models.

Rationale: The advanced analytical capabilities of AI may reveal novel trends and relationships in data, providing a more comprehensive understanding of disease dynamics.

Expected Outcome

The expected outcome of this research is to provide a comparative analysis of AI-based prediction models and traditional epidemiological methods. Specifically, the study aims to:

Assess Accuracy: Determine how accurately AI models predict disease incidence and spread compared to traditional models.

Evaluate Efficiency: Analyze the efficiency of AI models in processing and interpreting large datasets relative to conventional methods.

Identify Strengths and Limitations: Highlight the strengths and limitations of AI approaches in epidemiology, providing insights into their practical applications and potential improvements.

Inform Public Health Practices: Offer recommendations for integrating AI technologies into public health practice based on comparative findings, potentially leading to more effective disease management and response strategies.

Expected Outcome:

Explore Potential for Positive Change:

Educational Outreach: Research findings can be used to develop educational materials and campaigns aimed at promoting healthier social media usage patterns and raising awareness about mental health impacts.

Intervention Strategies: The research could lead to the development of interventions designed to mitigate negative effects, such as digital detox strategies or enhancements to social media platform features to promote positive mental health.

Assignment: Developing a Research Question

Objective of the Assignment:

To help develop a clear and focused research question on a topic of ones own choice.

This process involves identifying an area of interest, describing the background and motivation for your research, and outlining the expected outcomes.

Instructions

1. Choose a Research Topic

Select a topic that interests you and is relevant to your field of study. This can be a broad area or a more specific aspect within your chosen field. Consider current issues, gaps in existing research, or emerging trends that you find intriguing.

2. Describe the Background

Provide a brief overview of the background related to your chosen topic. This should include:

- A description of the general area of interest.

- Key issues, trends, or challenges related to the topic.

- Relevant context or current state of knowledge in the field.

3. Explain the Motivation

Clearly articulate why this topic is important and worth investigating. Address:
The significance of the research question.
How your research could contribute to the field or address a particular gap.
Potential implications or applications of the research findings.

4. Formulate Your Research Question

Develop a clear, focused, and researchable question based on the background and motivation provided. Ensure that your question:
Is specific and well-defined.
Addresses a relevant issue or gap in current knowledge.
Can be answered through research with available resources.

5. Outline the Expected Outcome

Describe what you hope to achieve with your research. This should include:
The anticipated results or insights you expect to gain.
The potential impact or contributions of your research to the field.
Any practical or theoretical implications of your findings.

6. Submit Your Report

Show the breakdown of the process from Choosing a wide area of research upto the development of hypothesis. Prepare a written report (2-4 page report) that includes:

Background: A summary of the general area of interest and relevant context.

Motivation: An explanation of why the research is important and how it could contribute to the field.

Research Question: Your formulated research question.

Expected Outcome: An outline of the anticipated results and their potential impact.

Format: Submit your report as a Word document. Use appropriate formatting and citation style if referencing any sources.

Assessment Criteria

Your report will be evaluated based on the following criteria:

Clarity: The research question is clear, specific, and well-defined.

Relevance: The background and motivation are relevant and address a significant issue or gap.

Feasibility: The research question is researchable with available resources.

Expected Outcome: The expected outcome is well articulated and demonstrates the potential impact of the research.

6. Submit Your Report

Show the breakdown of the process from Choosing a wide area of research up to the development of hypothesis. Prepare a written report (2-4 page report) that includes:

Background: A summary of the general area of interest and relevant context.

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Feasibility: The research question is researchable with available resources.

Expected Outcome: The expected outcome is well articulated and demonstrates the potential impact of the research.

Advisory

This assignment will help you develop essential skills in formulating research questions and understanding the importance of context, motivation, and expected outcomes in the research process.

Team Work:

Maximum Two students may join together to formulate a research question and submit a single assignment.

No two assignments should be same.

Submission Deadline:

Please submit your report by 25 August 2024.

Late submissions will carry negative marks.

Non Submission will lead to Course Incomplete grade