What is Research, Really?

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Understanding Research Across Contexts: From Google Searches to the Scientific Method in the Brown Virtual Lab

I. Introduction

The word research means different things to different people. A high school student might hear the term and think of typing a question into Google. A college student might associate it with writing a term paper. A medical fellow might spend months or years leading a clinical investigation or laboratory-based study under Institutional Review Board (IRB) oversight. These varied interpretations of "research" can lead to confusion—not just in conversations across educational levels, but also in practice, when individuals unknowingly apply incorrect assumptions to ethically sensitive or scientifically rigorous contexts.
In your Brown Virtual Lab, you've cultivated a space that brings together learners at multiple stages—high schoolers, undergraduates, graduate students, medical trainees, and fellows. Each of these groups comes with its own background, expectations, and vocabulary. Creating shared understanding is essential—not only to ensure ethical conduct and clarity of roles, but also to empower every participant to meaningfully contribute to the scientific and humanistic advancement of health. This essay offers an expansive framework to help all members of the Brown Virtual Lab, and those beyond it, understand the nuances of research terminology, goals, and responsibilities across educational and professional levels. It also explains how early-stage projects—like stakeholder interviews, market research, and learning inquiries—can lay the foundation for robust, IRB-approved studies.

II. Levels of Understanding: From Google to the Bench

1. General Public Research (e.g., "Googling It")

When a member of the general public says they're "doing research," they typically mean looking something up—usually on Google, YouTube, Reddit, or social media. Their goal is often to answer a practical question quickly: Is this symptom normal?, What's the best phone under $500?, or How do I boil an egg without cracking it?

Characteristics:

- Purpose: Quick answers or opinions
- Sources: Search engines, social media, crowd-sourced answers
- Evidence Level: Varies widely; often includes blogs, non-peer-reviewed articles, or even misinformation
- Skills Needed: Information literacy, media evaluation

While this is not "research" in the academic or scientific sense, it reflects an early form of inquiry and curiosity. It's an important opportunity to introduce the concept of source credibility and critical thinking—skills that can evolve into academic or scientific research.

2. College Student Research (Academic Essay Writing)

In undergraduate and early graduate settings, students are taught to conduct "research" for assignments, such as literature reviews or argumentative essays. They learn how to search for reliable sources, summarize ideas, and cite appropriately.

Characteristics:

- Purpose: Synthesize existing knowledge to support a thesis
- Sources: Books, journal articles, websites (often peer-reviewed or academic)
- Evidence Level: Secondary research; summary and analysis
- Skills Needed: Citation management, synthesis, critical analysis

This kind of research builds foundational academic thinking but typically does not involve original data collection or ethical approval processes. It prepares students for deeper inquiry.

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3. Scientific and Medical Research (Clinical, Translational, or Bench Research)

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This is the kind of research conducted by physician-scientists, PhD investigators, and their teams—inclu[illegible] s, students, and lab staff. It involves asking original questions, collecting and analyzing data, and often generating new knowledge.

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Learner Level	Focus	What They Learn in the Lab
High School	Exploration	Curiosity, source credibility, intro to ethics
College	Academic writing	Literature reviews, early-stage inquiry

- Regulation: Requires IRB approval if involving human subjects or data
- Dissemination: Peer-reviewed manuscripts, posters, oral presentations, datasets

This form of research must be reproducible, rigorous, and ethically sound. It involves responsibilities that go beyond individual interest and affects patients, communities, and the scientific field.

III. Distinguishing Scientific Research from Educational Inquiry

In the Brown Virtual Lab, many learners begin by engaging in exploratory projects: stakeholder interviews, market research, landscape scans, and informal literature reviews. These efforts serve two crucial functions:

1. Educational Growth – allowing students to learn how research is structured, without yet contributing to generalizable knowledge.
2. Foundation for Future IRB-Approved Research – these preliminary inquiries shape the hypotheses, populations, and outcomes that will be formally investigated later.

Projects not intended to yield generalizable knowledge (as defined by federal guidelines) may not require IRB approval if done strictly for educational purposes. However, once these inquiries are used to inform or publish results that apply beyond the group being studied, IRB approval becomes essential.

Key Terms for Early-Stage Activities:

- Needs assessment
- Environmental scan
- Stakeholder engagement
- Formative inquiry
- Educational project
- Design thinking interviews
- Patient advocate insights
- Preliminary qualitative exploration

Clear labeling of these activities helps prevent confusion and avoids ethical missteps.

IV. Teaching the Differences to Learners at Every Level

High School Students:

Teach them that looking up facts is a first step, but scientific research means testing hypotheses and working in teams under structured protocols. Use analogies (e.g., Google is like reading the answers; research is writing the test). Introduce IRB basics as a way of protecting people in studies.

College Students:

Clarify the difference between secondary and primary research. Teach how to move from a literature review to a study question. Emphasize ethics, informed consent, and data integrity. Help them understand the timeline of research: idea → question → IRB → data collection → analysis → publication.

Graduate Students and Medical Students:

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Introduce distinctions between retrospective, prospective, and cross-sectional research. Explain the need for IRB even for chart reviews or anonymous surveys. Discuss how stakeholder interviews can inform study design but are not equivalent to research unless designed as such.

Medical Residents and Fellows:

Teach them the regulatory, methodological, and translational layers of research. They should understand Good Clinical Practice (GCP), data safety monitoring, statistical power, reproducibility, and how early stakeholder interviews can inform aims, inclusion criteria, and outcomes in IRB applications.

In All Groups:

Use visual tools (research timelines, data flow diagrams, IRB checklists), case-based learning (e.g., "Should this be IRB-approved?"), and interactive workshops. Reinforce that clarity in communication avoids misunderstandings and ensures ethical rigor.

V. Avoiding Terminology Confusion

Use these strategies to ensure clarity:

- Always define what research means in your context: informal inquiry vs. generalizable knowledge.
- Label your efforts: "learning project," "stakeholder exploration," "pre-IRB formative work."
- When unsure, consult IRB officers or use pre-review tools to determine whether an activity qualifies as "human subjects research."
- Establish shared vocabulary within your lab. For example, you could use a "Project Status Tracker" with columns for: Formative Inquiry, Educational Activity, IRB Submission in Progress, IRB-Approved Research, Publication Drafting.

VI. The Value of Stakeholder and Learning Projects Before IRB Submission

These early activities are not just placeholders—they are vital:

1. They Improve Research Questions.
   Stakeholders highlight real-world problems researchers may overlook. Their voices shape meaningful, respectful, and applicable studies.
2. They Enhance IRB Applications.
   Well-informed applications that demonstrate community input and feasibility are more likely to be approved. Reviewers appreciate when research stems from lived experience and patient perspectives.
3. They Build Trust and Buy-In.
   Engaging patients, clinicians, or community partners early fosters collaboration and ethical sensitivity.
4. They Clarify Methodology.
   Talking to stakeholders may reveal logistical constraints or opportunities that shape the study design—like recruitment timing, survey burden, or acceptable language.

VII. Summary: A Unified Framework in the Brown Virtual Lab

Your Brown Virtual Lab, a powerhouse of virtual mentorship, inquiry, and innovation, can lead by example in clarifying research across stages. Here's how your framework supports understanding:

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Brown Virtual Lab: Research Understanding and Framework Guide

I. Introduction

The concept of "research" varies significantly depending on context. While a general web search may count as research to a member of the public, academic institutions and scientific communities require rigorous processes involving original inquiry, ethical oversight, and dissemination of findings. In the Brown Virtual Lab, we support learners across all levels—from high school students to Cardiology fellows—helping them distinguish between types of research and guiding them in ethical, informed learning journeys.

II. Levels of Research Understanding

1. General Public (Googling It)
    - *Purpose*: Immediate answers
    - *Sources*: Search engines, social media
    - *Nature*: Informal inquiry
    - *Key Skill*: Information literacy
2. College Student (Academic Essay Writing)
    - *Purpose*: Argument construction or thematic analysis
    - *Sources*: Academic journals, books
    - *Nature*: Secondary research
    - *Key Skill*: Critical synthesis
3. Scientific/Medical Research (Lab or Clinical)
    - *Purpose*: New knowledge creation
    - *Methods*: Data collection, analysis, IRB protocols
    - *Nature*: Primary **research** with ethical implications
    - Key Skill: Experimental design and ethical compliance

III. Types of Early Learning Projects

In the Brown Virtual Lab, early projects like *market analysis*, *literature review*, and *stakeholder interviews* are valuable steps that do not yet qualify as IRB-regulated research. These efforts are best described as:

- Needs Assessments
- Stakeholder Engagements
- Educational or Formative Inquiries
- Design Thinking Conversations
- Pre-IRB Learning Projects

IV. Explaining the Differences to Learners

- *High School*: Introduce the spectrum from curiosity to evidence-based research
- *College*: Teach academic writing and evidence evaluation
- *Graduate/Medical Students*: Focus on ethics, IRB, study types (retrospective, cross-sectional, prospective)
- *Residents*: Emphasize clinical application, GCP, and data handling
- *Fellows*: Train for research independence and leadership

V. Terminology Clarity

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To reduce confusion:

Learner Level	Focus	What They Learn in the Lab
High School	Exploration	Curiosity, source credibility, intro to ethics
College	Academic writing	Literature reviews, early-stage inquiry
Grad/Med Students	Research foundations	IRB basics, project design, data ethics
Residents	Applied science	Study execution, patient safety, data security
Fellows	Innovation & Leadership	Independent research, grant writing, dissemination

- Build trust with communities
- Clarify logistical and ethical concerns

VII. Summary Table

VIII. Application in the Brown Virtual Lab

This framework ensures that all learners in the Brown Virtual Lab understand where they are in the research continuum and how to move forward ethically and effectively. Whether preparing for future IRB proposals or exploring stakeholder needs, each stage contributes meaningfully to the pursuit of equitable, impactful science.

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