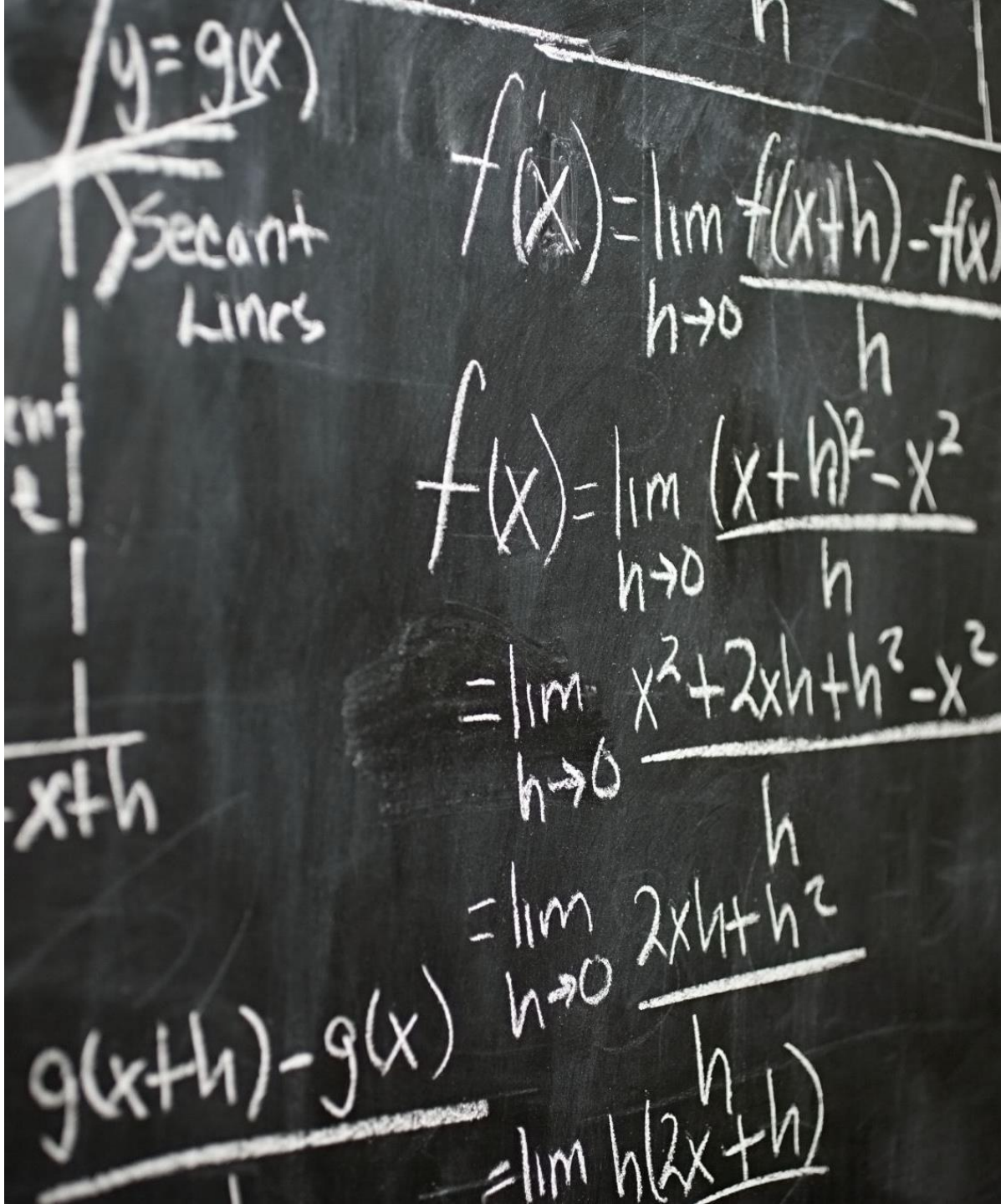
QUANTITATIVE METHODS **INTRODUCTION**

Tomi Heimonen (he/him)

Computing and New Media Technologies
University of Wisconsin-Stevens Point



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INTRODUCTION

- Faculty member at UWSP since 2015
- Currently serving as department chair of Computing and New Media Technologies
- Prior to UWSP, post-doc researcher at Tampere University, Finland
- Industry experience: usability consulting, Google research internship
- Cat dad to six of our feline overlords
- Avid DIY enthusiast

POSITIONALITY STATEMENT

- My academic journey is rooted in the tradition of Human-Computer Interaction – the study and design of how people interact with computers and other digital devices.
- I employ mixed-methods approaches to explore the dynamics of human-technology interaction, focusing on user experience, accessibility, multimodal interaction, and human-centered design.
- I recognize the importance of considering diverse user perspectives and experiences. Integrating quantitative and qualitative data allows for an inclusive understanding of technological impacts and the complexity of user interactions.
- Adopting a holistic perspective is critical in addressing the varied and evolving needs of users in an increasingly digital world.

EMPIRICAL RESEARCH

- **Epistemological Definition:**
  Empirical research is a way of **gaining knowledge** by means of direct and indirect **observation** or **experience**. It relies on **observable** and **measurable evidence**, often gathered through experimentation or systematic observation, to draw conclusions about the world.
- **Practical Definition:**
  Empirical research involves the **collection** and **analysis of data** to **answer specific research questions**. This process typically includes formulating a hypothesis, designing an experiment or survey, collecting data, analyzing the results, and drawing conclusions based on empirical evidence.

CHARACTERISTICS AND BENEFITS OF EMPIRICAL RESEARCH

- **Key Characteristics:**
  Observation-Based: Data is collected through direct or indirect observation, such as experiments, surveys, or field studies.
  Measurable Evidence: Involves quantifiable data that can be analyzed statistically.
  Replicability: Methods and results can be replicated by other researchers.
  Objectivity: Strives to minimize biases and subjectivity in data collection and analysis.
- **Benefits:**
  Provides concrete, observable evidence to support or refute hypotheses.
  Helps build a reliable knowledge base by validating theories through data.
  Essential for evidence-based practice in various fields such as healthcare and education.

GOALS OF EMPIRICAL RESEARCH: EXPLORATION

- **Exploration – discover insights and generate hypotheses**
  Goal: Investigation of a new or understudied area to identify patterns, relationships, or phenomena.
  Example: Conduct a survey to explore the impact of social media usage on mental health among teenagers.
  Method: Use descriptive statistics to summarize the data and identify trends.
  Outcome: Gain initial understanding and generate hypotheses for further research.

GOALS OF EMPIRICAL RESEARCH: VALIDATION

- **Validation – confirm or refute models and theories**

  Goal: Test and confirm the validity of existing theories or models using empirical data.

  Example: Conduct an experiment to validate the theory that high job satisfaction leads to higher productivity.

  Method: Use inferential statistics to test the hypothesis and determine if results are statistically significant.

  Outcome: Provide evidence that supports or refutes the existing theory.

GOALS OF EMPIRICAL RESEARCH: EXPLANATION

- **Explanation – develop deeper understanding of causes and effects**
  Goal: Explain the underlying mechanisms or causal relationships between variables of interest.
  Example: Perform a longitudinal study to explain the relationship between educational interventions and student performance over time.
    Method: Use regression analysis to identify causal links and control for confounding variables.
    Outcome: Develop a comprehensive understanding of how and why specific factors influence outcomes.

QUANTITATIVE VS. QUALITATIVE METHODS

- **Qualitative Methods:**
  Focus: Understanding the **meaning** and **context** of phenomena ("how" and "why").
  Data Collection: Interviews, focus groups, observations, and textual analysis.
  Analysis: Thematic analysis, content analysis, narrative analysis.

- **Quantitative Methods:**
  Focus: Measuring and analyzing numerical data to identify patterns and test hypotheses ("what" and "how much").
  Data Collection: Surveys, experiments, secondary data analysis.
  Analysis: Statistical techniques such as linear regression, ANOVA, and factor analysis.

MIXED METHOD APPROACH

- Combine qualitative and quantitative approaches to capitalize on the strengths of both methods:
  Enhanced validity through data triangulation.
  Comprehensive insights that cover broad quantitative patterns and deep qualitative understanding.
  Flexibility to adapt research methodology to the research questions and context at hand.
- **Examples:**
  Sequential study design: Conduct focus groups to identify key factors influencing customer purchasing decisions → administer a survey to measure the factors across a larger population.
  Concurrent study design: Administer a survey on customer satisfaction with both quantitative and qualitative questions → discover pain points and the reasons for customer perceptions.