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Research Methodology

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Chapter 1

What Is Research?

(Cont.)

OUTLINE

- The Process of Research
- Intellectual Discovery
- **Classifying Research**
- **Research Methods**
- **Effective Research**

CLASSIFYING RESEARCH

- Research can be divided into three categories based on three separate perspectives, the *field*, the *approach*, and the *nature* of the research.
  - **Field:** The area of research is little more than a nomenclature that allows groups of academics with similar interests to be identified and grouped together in one place.

    Ex: Researching the topic of computers may results in finding research topics in areas such as information systems, artificial intelligence, etc. where these subjects may be further subdivided into more particular topics that assist in distinguishing features of different fields of study.
  - **Approach:** approaches indicate the different types of research methodologies that were used as part of the research process for example, case studies, experiments, and surveys.
  - **Nature:** The type of contribution of the research to knowledge is determined by the nature of the investigation.

    The nature of research, in context of science and engineering, can be categorized into three categories:

    1. Pure theoretical development.
    2. Research that examines and evaluates pure theory, and the potential for applying it in real-world situations.
    3. Applied research that has some practical application or outcome.

RESEARCH METHODS

- According to general classification, there are **two major types of research methods**: quantitative and qualitative.
  - **Quantitative approaches:** - Numeric scales are related to this research methodologies because they allow for the measurement of items.

    - According to the literature, the natural sciences are the origin of these methodologies.
      - Where they focused with knowing "how something is produced, built, or functions", and
      - They concerned with testing hypotheses, and the repeatability of experiments as well as the testing of hypotheses are critical to the reliability of the outcomes.
  - **Qualitative approaches:** - Have their roots in the social sciences.

    - They include approaches such as case studies and surveys.

RESEARCH METHODS (CONT.)

- According to the aforementioned types, there are **four of the most common research methods that you might use (either individually or combined).**
- These methods are **action research, experiment, case study, and survey**.
  - **Action research:** - Includes the very thoroughly documented examination of what you are working on.

    - It also entails working on a specific topic or project with a subject or, more commonly, an organization, and then analyzing the results.

    - Here, it is important to avoid becoming overly fixated with the action itself and losing sight of the underlying reason for performing it. BECAUSE analyzing the results is part of the project.

RESEARCH METHODS (CONT.)

- According to the aforementioned types, there are **four of the most common research methods that you might use (either individually or combined).**
- These methods are **action research, experiment, case study, and survey**.
  - **Experiment:** - It entails the exploration of causal linkages using tests that you design and control.
    - It is quite common for researches with a lack of access to samples, ethical concerns, and other factors, (quasi-experimental research).
    - Experiments are usually performed in development, evaluation, and problem-solving projects.
    - Typical experiments include the following steps:
      1. Defining a theoretical hypothesis;
      2. Selecting samples from known populations;
      3. Allocating samples to different experimental conditions;
      4. Introducing planned changes to one or more variables;
      5. Measuring a small number of variables;
      6. Controlling all other variables.

RESEARCH METHODS (CONT.)

- According to the aforementioned types, there are **four of the most common research methods that you might use (either individually or combined).**
- These methods are **action research, experiment, case study, and survey**.
  - **Case study:** - A case study is a comprehensive examination of a specific scenario (e.g., a specific issue, problem, firm, or set of companies).
    - Can be carried out directly through for example interviews, observation, etc., or indirectly, for example, through the analysis of corporate reports or company paperwork.
    - Note: Case studies create a considerable amount of subjective data, which needs to be sifted and analyzed before being interpreted in order to produce conclusive, accurate, and fair conclusions.

RESEARCH METHODS (CONT.)

- According to the aforementioned types, there are **four of the most common research methods that you might use (either individually or combined).**
- These methods are **action research, experiment, case study, and survey**.
  - **Survey:** - In order to gain an understanding of the situation you are working with and to gain some preliminary perspective based on other people's contributions, this research method is essential as a first step.

EFFECTIVE RESEARCH

- There are three criteria that can be used to highlight the good research:
  - **Open minds:** - Utilize the "open system of thought" when working.

    - Be receptive to the questions that are being offered.
  - **Critical analysis:** - Examine the information with **a critical eye**.

    - Ex: are these numbers correct? Is it possible to interpret these data in a different way? etc.
  - **Generalizations:** - Generalization enables for the interpretation and application of research findings to a wide range of scenarios.

    - However, researchers must know the limitations of these generalizations and therefore

    - Specify restrictions on the scope of the generalizations they identify.
- As a conclusion, you will not contribute to knowledge if you do not keep an open mind to new ideas, do not examine them critically, and do not have the ability to generalize your learning to diverse situations.

REFERENCES

- Meikang Qiu, Han Qiu, Yi Zeng. Research and Technical Writing for Science and Engineering. CRC Press, 2022.

Thank you ☺