ΠΑΡΑΔΟΤΕΟ ΕΡΓΟΥ

ΤΙΤΛΟΣ ΥΠΟΕΡΓΟΥ: «Πρόγραμμα Διδακτορικών Σπουδών του Τμήματος Ψυχολογίας, Πράξη Υποστήριξη Διεθνοποίησης του Πανεπιστημίου Δυτικής Μακεδονίας»
ΤΗΣ ΠΡΑΞΗΣ ΜΕ ΤΙΤΛΟ «ΥΠΟΣΤΗΡΙΞΗ ΔΡΑΣΕΩΝ ΔΙΕΘΝΟΠΟΙΗΣΗΣ ΤΟΥ ΠΑΝΕΠΙΣΤΗΜΙΟΥ ΔΥΤΙΚΗΣ ΜΑΚΕΔΟΝΙΑΣ»

ΚΩΔΙΚΟΣ ΕΡΓΟΥ: ΟΠΣ (MIS)5158681

Ενότητα Εργασίας (ΠΕ1): «Ανάπτυξη, Οργάνωση και υλοποίηση ξενόγλωσσου Προγράμματος Διδακτορικών Σπουδών Τμήματος Ψυχολογίας»
Τίτλος Παραδοτέου (Π1.3): Ψηφιακό Εκπαιδευτικό Υλικό (Προτεινόμενες δραστηριότητες ανά εκπαιδευτική ενότητα) (Αγγλική Έκδοση)

Υποβολή: 27/09/2024

ADVANCED RESEARCH METHODS

Suggested Activities per Unit

Florina
2024

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Περιεχόμενα

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1ST LEARNING UNIT

1ST Activity

Title: Exploring Famous Psychological Studies

Description: Make a list of famous psychological studies, including both successful and controversial ones.

- What was the research question or objective of the study?
- What research design was chosen, and why?
- What were the key findings or outcomes?
- Did the research design contribute to the study's success or challenges?

Procedure:
Selection of Studies: Search for famous and controversial psychological studies. These can include well-known studies like the Stanford Prison Experiment, the Milgram Experiment, the Little Albert Experiment, the Hawthorne Studies, or others of your choice.
Research Questions and Objectives: In pairs or small groups, choose one study from the list. Your first task is to identify and articulate the primary research question or objective that the study aimed to address. What were the researchers trying to understand or investigate?
Research Design Analysis: Next, you should investigate the research design used in their selected study. Why did the researchers choose this particular design? What were the advantages and limitations of this design in the context of their research question? How did the design align with the study's objectives?
Key Findings or Outcomes: You should summarize the key findings or outcomes of the selected study. What did the researchers discover, and how did these findings contribute to the field of psychology or our understanding of human behavior?
Role of Research Design: Finally, you should critically evaluate whether the research design contributed to the study's success or posed challenges. Did the design effectively address the research question, or were there limitations that affected the results? How did ethical considerations play a role in the study's design and outcomes?
Group Discussion: After completing your analysis, each group can present their findings to the class. You are encouraged to discuss about the ethical implications of these studies, the validity and reliability of their findings, and the lessons that can be learned from both the successes and controversies.

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2nd Activity

Title: *Research Design Challenge*

Description: This is a hands-on exploration of various research designs. You should apply your knowledge of research methods by designing research studies for specific scenarios.

Procedure:

Scenario Selection: Below you can find a list of research scenarios, each with a unique research question or problem to investigate:

- Investigating the impact of a new teaching method on student test scores.
- Exploring the relationship between social media usage and feelings of loneliness.
- Examining the effectiveness of a new drug in treating a specific medical condition.
- Exploring the relationship between the exposure to educational television programs during early childhood and the impact in cognitive development in later years
- Investigating the factors that influence bystander intervention in emergency situations
- How can social interventions increase the likelihood of helping behavior?"
- Investigation the most effective interventions for reducing symptoms of generalized anxiety disorder
- Exploring how the duration of therapy impact treatment outcomes
- How does the use of mindfulness meditation techniques affect attentional control and cognitive performance in individuals with high levels of stress?

Designing: Each group should choose a scenario. Your task is to choose the most appropriate research design and design a research study for that scenario. You should outline key elements such as the research question, variables, data collection methods, and ethical considerations.
Peer Review: After designing your studies, each group should exchange scenarios with another group. The receiving group should review the design and provide feedback on its appropriateness, clarity, and potential improvements.
Presentation: Groups present their chosen research designs, explaining why they selected that particular design for the given scenario. They should also address any feedback received during the peer review process.
Class Discussion: Compare and contrast the different research designs used for similar or related scenarios. Discuss the strengths and limitations of each design in addressing specific research questions.

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2nd LEARNING UNIT

1st Activity

Title: How to navigate and resolve ethical dilemmas
Description: Ethical dilemmas can arise in various aspects of psychological research. Here are some real-world examples:

- A researcher wants to study the impact of a particular therapy on individuals with severe depression. Some potential participants lack the capacity to provide informed consent due to their condition. Should the researcher include them, and if so, how should consent be obtained?

- A study investigates the bystander effect by staging an emergency situation and observing participants' responses. To maintain the study's integrity, participants are not informed about the deception. Is it ethical to use deception in research, and if so, to what extent?

- During a study on sensitive topics such as substance abuse, participants reveal potentially harmful information about themselves. Researchers must balance the need to protect participants' confidentiality with their responsibility to report any danger to the participants or others.

- Research involving vulnerable populations, such as children, prisoners, or individuals with cognitive impairments, raises ethical questions about their ability to provide informed consent and their potential exploitation in research.

- Researchers may face ethical dilemmas related to publishing only positive results and withholding negative findings. This can distort the scientific literature and hinder evidence-based decision-making.

Navigating ethical dilemmas requires a commitment to upholding ethical principles, respecting the rights and well-being of research participants, and seeking guidance when complex ethical decisions arise. Can you recognize the ethical principles at stake in the above examples? How would you resolve these issues? What would you suggest the researchers to do?

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2nd Activity

Title: Ethics Committee Application Simulation

Instructions:
Visit the ethics committee's website (https://www.uowm.gr/en/research/research-ethics-committee) and thoroughly review their guidelines, procedures, and application requirements. Pay special attention to ethical principles, informed consent, participant protections, and any specific guidelines related to their research area. Then, based on the hypothetical research study that you can find below, you should prepare an ethics committee application following the guidelines provided on the ethics committee's website.
The application should include:

- A detailed research proposal outlining the study's purpose, methods, and potential risks to participants.
- Informed consent documents that explain the study to participants.
- Procedures for ensuring participant confidentiality and data security.
- Plans for obtaining informed consent from participants.
- Any additional materials required by the ethics committee.

Forum discussion: After completing the applications, you can share your experiences, challenges, and insights related to the application process. Discuss the importance of ethical considerations in research as well as the ethical considerations that you addressed in your application.

Hypothetical research study: "Effects of Early Childhood Intervention on Long-term Cognitive Development"
The aim of this longitudinal study is to investigate the impact of an early childhood intervention program on the long-term cognitive development of participants. The study aims at evaluating the effectiveness of an early childhood intervention program for children from disadvantaged backgrounds. The intervention program provides educational support, nutrition, and health services to infants and toddlers to promote their cognitive development.

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3rd LEARNING UNIT

1st Activity

Title: Designing Experiments with Maximum Internal Validity

Topic: *The Impact of Social Media Usage on Self-Esteem*

Design an experiment that investigates how the amount of time individuals spend on social media affects their self-esteem. Consider how you can ensure internal validity in your study.

Topic: *The Effects of Multitasking on Cognitive Performance*

Design an experiment to examine whether multitasking negatively impacts cognitive performance. Discuss how you will control variables and establish causality.

Topic: *The Efficacy of a New Therapeutic Intervention for Anxiety*

Plan an experiment to assess the effectiveness of a novel therapeutic approach for individuals with anxiety disorders. How will you minimize bias and ensure internal validity?

Topic: *The Influence of Parental Involvement on Child Development*

Create an experimental study exploring how different levels of parental involvement impact child development. Explain your strategies for maintaining internal validity.

Discussion Questions:

- What is the primary research question or hypothesis for your study?
- How will you ensure that your study has high internal validity?
- What steps will you take to control potential confounding variables?
- What type of control group (if any) will you use in your experiment?
- Are there any ethical considerations to address in your research design?

2nd Activity

Title: Experimental Design Analysis

Case studies:

Case study 1: Effects of Group Size on Conformity

A researcher wants to investigate the impact of group size on an individual's likelihood to conform to group opinions. Participants are randomly assigned to groups of varying sizes and are asked to respond to a series of opinion-based questions.

Case study 2: Memory Recall and Distraction

A study aims to assess memory recall in the presence of distractions. Participants are asked to memorize a list of words while exposed to varying levels of background noise.

Case study 3: Treatment Effectiveness for Depression

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Researchers are conducting a study to evaluate the effectiveness of two different therapeutic interventions for individuals with depression. Participants are assigned to one of the two treatment groups.

Discussion Questions:

- What is the primary research question or hypothesis for this study?
- Identify potential issues related to experimental design, internal validity, and control of extraneous variables.
- How might the study's internal validity be improved?

Are there any confounding variables that need to be considered?
Propose modifications or improvements to the experimental design to enhance internal validity and reduce bias.

4th LEARNING UNIT

1st Activity

Title: Formulating Research Questions and Hypotheses

Description: In this group discussion, students will be divided into small groups and provided with a research topic. Each group's task is to collaboratively formulate research questions and hypotheses based on the given topic. They should consider the key concepts discussed in the lesson, such as clarity, testability, and specificity.

Topics:

- **getting tattooed**
- **memories for smells**
- **ageism**
- **social media use**

2nd Activity

Case Study: Mindfulness Mediation and Stress

Description: In this case study, students will be presented with a hypothetical research scenario. They will be asked to read the scenario, identify the research questions and hypotheses, and evaluate their clarity and testability.

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Case Study Scenario:
You are interested in studying the effects of mindfulness meditation on reducing stress levels among college students. Your aim is to explore this topic qualitatively before designing a full-scale research study. Your first research questions derives from the description. You hypothesize that practicing mindfulness meditation is associated with lower perceptions of stress levels among college students.

Note:
The research question and hypothesis are intentionally broad and not highly specific or testable. They serve as a starting point for a qualitative exploration of the topic.

3rd Activity

Title: Evaluating Research Questions and Hypotheses

Description: Below you will find five research projects, their research questions and hypotheses formulated by researchers. You are asked to analyze these examples and identify potential issues with each one.
Please choose one, present your arguments on forum and discuss.

Research Projects:

1. **Chocolate and Happiness**
   Research Question: "Does chocolate make people happy?"
   Null Hypothesis (H0): Chocolate does not affect people's happiness.
   Alternative Hypothesis (H1): Chocolate makes people happy.
2. **The magic of music**
   Research Question: "Why do people like music?"
   Null Hypothesis (H0): There is no reason why people like music.
   Alternative Hypothesis (H1): People like music because it sounds good.
3. **Love Measurement**
   Research Question: "Is it possible to measure love?"
   Null Hypothesis (H0): Love cannot be measured.
   Alternative Hypothesis (H1): Love can be measured.
4. **Searching for the meaning of life**
   Research Question: "What is the meaning of life?"
   Null Hypothesis (H0): There is no meaning to life.
   Alternative Hypothesis (H1): Life has a meaningful purpose.
5. **The color of dreams**
   Research Question: "Do people dream in color?"
   Null Hypothesis (H0): People do not dream in color.
   Alternative Hypothesis (H1): People dream in color.

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5th LEARNING UNIT

1st Activity

Title: Scale Selection Exercise

Instructions: Below you will find a list of research scenarios or questions that require measurement:

- *"You are conducting a study to determine the favorite colors of children in a kindergarten class."*
- *"You are researching the level of job satisfaction among employees in a company."*
- *"You want to measure the effectiveness of a new teaching method in improving students' test scores."*
- *"You are conducting a study to assess the academic performance of high school students."*
- *"You are conducting a weather-related research project and need to collect temperature data for various cities over a year."*
- *"You are researching employee tenure at a company and want to measure how long each employee has worked there."*
- *"You work for a marketing research firm, and your client wants to measure customer satisfaction with their product."*

You are asked to classify each scenario or question into one of the four scales of measurement: nominal, ordinal, interval, or ratio. You should justify your choice based on the characteristics of each scale. Then discuss in class your choices.

2nd Activity

Title: Evaluation of Measurement Tools

Instructions: Below you can find a list of published research papers in Psychology Journals. Each paper includes details about the measurement tools used in the study. You are asked to select one research paper and focus on the measurement section. You should identify and evaluate the measurement tools used in the study. You should also assess the reliability and validity of these measurement tools based on the information provided in the paper. You should consider factors such as the research design, sample size, and statistical analyses. Finally, you should consider strengths and weaknesses in the measurement tools and suggest potential improvements.

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List of papers (optional):

Jewell, T., Gardner, T., Susi, K., Watchorn, K., Coopey, E., Simic, M., ... & Eisler, I. (2019). Attachment measures in middle childhood and adolescence: A systematic review of measurement properties. *Clinical psychology review*, *68*, 71-82.

Lord, C., Risi, S., Lambrecht, L., Cook, E. H., Leventhal, B. L., DiLavore, P. C., ... & Rutter, M. (2000). The Autism Diagnostic Observation Schedule—Generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of autism and developmental disorders*, *30*, 205-223.

Matthews, T., Caspi, A., Danese, A., Fisher, H. L., Moffitt, T. E., & Arseneault, L. (2022). A longitudinal twin study of victimization and loneliness from childhood to young adulthood. *Development and psychopathology*, *34*(1), 367-377.

Scott, E. E., Crabtree, K. W., McDonnell, A. S., LoTemplio, S. B., McNay, G. D., & Strayer, D. L. (2023). Measuring affect and complex working memory in natural and urban environments. *Frontiers in Psychology*, *14*, 1039334.

Mirzaee, S., Shahgholian, M., Abdollahi, M. H., & Akhavan-Arjmand, S. (2021). Relationship between Impulsivity and Meta-Cognition with Cognitive Failures. *International Journal of Behavioral Sciences*, *15*(1), 61-65.

Fisher, S., Zapolski, T. B., Wheeler, L., Arora, P. G., & Barnes-Najor, J. (2020). Multigroup Ethnic Identity Measurement invariance across adolescence and diverse ethnic groups. *Journal of Adolescence*, *83*, 42-51.

Gracia, E., Lila, M., & Santirso, F. A. (2020). Attitudes toward intimate partner violence against women in the European Union: A systematic review. *European Psychologist*.

Lehmann, J. K. L. (2020). *View of Self Scale: Psychometric Properties of a Measure of Negative Self-Referential Thoughts in Depression*. Case Western Reserve University.

6th LEARNING UNIT

1st Activity

Title: Sample Size Calculation with G*Power

Instructions: GPower is a widely used tool for calculating statistical power and sample size in research. For the research scenario below, please define the research objectives and the statistical test you plan to use. Discuss the results generated by G*Power. Explain how the calculated sample size aligns with the research objectives.

Research Scenario: The Impact of Mindfulness Meditation on Stress Reduction

In recent years, mindfulness meditation has gained popularity as a potential technique for reducing stress and improving overall well-being. Researchers are interested in examining the effectiveness of mindfulness meditation as an intervention for stress reduction.

Research Objectives:

- To investigate whether regular mindfulness meditation practice reduces perceived stress levels in adults.
- To determine if the duration and frequency of mindfulness meditation practice have varying effects on stress reduction.

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- To explore whether the benefits of mindfulness meditation extend to other aspects of mental well-being, such as improved mood and reduced anxiety.

Study Design:
The study will use a pre-test and post-test design, where participants' stress levels and well-being measures will be assessed both before and after a specific duration of mindfulness meditation practice.
Parameters:
Effect Size: Based on prior research, an estimated medium effect size (Cohen's d = 0.50) is expected.
Alpha Level: The significance level (alpha) is set at 0.05.
Desired Power: You aim for a statistical power of 0.80, indicating an 80% chance of detecting a true effect if it exists.

2nd Activity

Title: Identifying Sources of Sampling Bias
Instructions: Sampling bias is a situation where the sample used in research is not representative of the population, leading to skewed or inaccurate results. Below, you will find three case studies which describe a research study, including the research objectives and the sampling method used. Please read and analyze each scenario. Your task is to identify potential sources of sampling bias within the scenarios. You should consider aspects such as:

- How participants were selected or recruited.
- Any exclusion criteria or restrictions on participation.
- The representativeness of the sample in relation to the research objectives.

After discussing potential bias sources, you are asked to brainstorm ways to address or mitigate these biases in the research design. What changes could be made to improve the sampling method and reduce bias?
Case Study 1: "Online Survey on Sleep Patterns"
A researcher is conducting an online survey to study sleep patterns and their impact on mental health. The survey is advertised on social media platforms and only collects responses from individuals who voluntarily choose to participate.
Case Study 2: "Clinical Trial for an Antidepressant"
A pharmaceutical company conducts a clinical trial to test the effectiveness of a new antidepressant. Participants are recruited through advertisements placed in clinics and hospitals, and only individuals with a recent diagnosis of depression are eligible.
Case Study 3: "Classroom Observations on Student Behavior"
Researchers are observing classroom behavior in elementary schools to study the effects of a new teaching method. They select classrooms from a convenience sample of schools that agree to participate.

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7th LEARNING UNIT

Title: Hypothesis Development and Research Design

Description: In this activity, you will work in small groups to formulate research hypotheses and design a quantitative research study on a specific psychological topic. You are asked to consider variables, data collection methods, and analysis techniques to create a comprehensive research plan.
Steps:

1. Topic Selection: Each group selects a specific psychological topic of interest. This could include areas such as cognitive psychology, social psychology, clinical psychology, or developmental psychology.

2. Research Hypotheses: Within your chosen topic, you should develop one or more research hypotheses. These hypotheses should be clear, specific, and testable.

3. Variables: You should identify and define the independent and dependent variables in their study. Consider how these variables will be measured quantitatively.

4. Data Collection Methods: Outline the methods you will use to collect data. This may involve surveys, experiments, observations, or secondary data analysis.

5. Sampling: Discuss the sampling method you will employ and justify why it is appropriate for your study. Consider issues related to sample size and representativeness.

6. Data Analysis Plan: Specify the statistical techniques you intend to use for data analysis. Explain why these methods are suitable for testing your hypotheses.

7. Ethical Considerations: Address ethical considerations related to your proposed study, such as obtaining informed consent and ensuring the well-being of participants.

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8. Presentation: Present your research hypotheses and study design to the class, explaining the rationale behind your choices and highlighting the potential significance of your study.

8th LEARNING UNIT

1st Activity

Title: "Qualitative Research Design"
Instructions:

- Select a Research Topic in small groups. It could be related to human behavior, experiences, or phenomena that can be explored qualitatively.
- Based on the chosen topic, formulate two research questions that can be explored through qualitative research. These questions should be open-ended and invite exploration of complex phenomena.
- Select a Qualitative Approach: Choose one of the qualitative research approaches discussed in the lesson (e.g., grounded theory) that aligns with your research questions. Justify your choice by explaining why this approach is suitable for your study.
- Data Collection Methods: Identify and describe the data collection methods you would use in your study. This can include interviews, focus groups, participant observation, or document analysis. Explain why these methods are appropriate for your research.
- Sampling Strategy: Determine the sampling strategy you would employ (e.g., purposeful sampling, snowball sampling) and provide a rationale for your choice.
- Data Analysis Plan: Outline the steps you would take to analyze the qualitative data. Describe how you would code and categorize data to identify themes or patterns.
- Ethical Considerations: Discuss ethical considerations related to your study, including obtaining informed consent, ensuring participant confidentiality, and addressing potential biases.
- Reflection: Reflect on the role of the researcher in qualitative research. How might your background, experiences, and biases influence the research process, and how will you address these in your study?
- Presentation: Each group should present their qualitative research design to the class, summarizing the key elements of their proposed study.

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2nd Activity

Title: "Qualitative Data Analysis Workshop with Newspaper Headlines"
Instructions:

- Access online news headlines from reputable sources (at least 50).
- Read through the headlines and start identifying meaningful keywords or "codes" within the headlines.
- After coding individual headlines, group related codes into broader categories.
- Once categories are formed, you are encouraged to identify overarching themes that capture the essence of the news headlines.
- Create a list of themes and provide brief explanations or examples of headlines that support each theme.
- Present your coded headlines, categories, and themes to the class. How qualitative data analysis can reveal patterns, trends, or public sentiments?

9th LEARNING UNIT

1st Activity

Title: "Designing Mixed Methods Research Questions"

Instructions:
Below you can find a list of research topics. These scenarios allow for both qualitative and quantitative data collection. Choose one research topic from the list. Formulate at least two research questions for your chosen topic. These research questions should be designed to require both qualitative and quantitative data for a comprehensive investigation. Once the research questions are formulated, identify the most appropriate data collection methods for each question. Consider whether qualitative methods (e.g., interviews, content analysis) or quantitative methods (e.g., surveys, experiments) are better suited to answer each question.
Mental Health and Academic Performance: Investigate the relationship between mental health issues (e.g., anxiety, depression) and academic performance among college students. Formulate research questions that explore both the qualitative experiences of students dealing with mental health challenges and the quantitative impact on their grades.

Research Topics:

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- **Parenting Styles and Child Development:** Examine the influence of different parenting styles (e.g., authoritative, permissive, authoritarian) on child development.
- **Employee Satisfaction and Organizational Productivity:** Explore the connection between employee satisfaction and productivity in a workplace setting.
- **Technology Use and Social Interaction:** Investigate how the use of technology (e.g., smartphones, social media) affects face-to-face social interaction among adolescents.
- **Healthcare Access and Patient Satisfaction:** Examine the accessibility of healthcare services and its impact on patient satisfaction.

2nd Activity

Title: "Advantages and Challenges of Mixed Methods Research"

Instructions:
Each group should focus on **one aspect of the advantages of mixed methods research**, such as triangulation, complementarity, and completeness and **a challenge associated with mixed methods research**, such as time constraints, complexity, or integration difficulties. Discuss and prepare a short presentation (2-3 minutes for the advantage and 2-3 minutes for the challenge) on your chosen advantage and challenge. Provide examples of how this advantage can enhance research and when this challenge might arise - how researchers can address it.

3rd Activity

Title: "Advantages and Challenges of Mixed Methods Research"
Case Studies:
Below you can find case studies that involve mixed methods research. These case studies present real-world research dilemmas where mixed methods might be beneficial or challenging.
Individually, analyze one case study and decide whether a mixed methods approach would be suitable. You should also identify any potential advantages or challenges in each case. Present on the forum your answer and discuss.

Case Study 1: Improving Student Achievement

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A school district is interested in improving student achievement in mathematics. They want to know if implementing a new teaching approach will be effective. They also want to understand the factors that influence student motivation and engagement in math classes.
Research Dilemma: Should they use a mixed methods approach to gather quantitative data on test scores and qualitative data through student interviews to gain a holistic understanding of the situation? What challenges might they encounter when integrating these data?

Case Study 2: Healthcare Access in Rural Areas
A healthcare organization wants to assess healthcare access in rural areas. They aim to measure the distance patients must travel to access healthcare facilities and understand the barriers and experiences of rural patients.
Research Dilemma: Is a mixed methods approach appropriate for this study, given the need for both quantitative distance measurements and qualitative patient narratives? How can they ensure data integration for a comprehensive assessment?

Case Study 3: Employee Satisfaction in a Company
A company wants to evaluate employee satisfaction and identify areas for improvement. They plan to administer a standardized satisfaction survey and conduct focus group discussions to gather in-depth employee insights.
Research Dilemma: Should the company use a mixed methods design to merge the quantitative survey data with qualitative insights? How can they ensure that the results from both methods provide a coherent picture of employee satisfaction?

Case Study 4: Community Health Intervention
A public health department is implementing an intervention program to reduce the incidence of a specific disease in a community. They want to measure the program's effectiveness by tracking disease rates and gather community feedback through interviews and open-ended surveys.
Research Dilemma: Should the public health department employ mixed methods to assess the intervention's impact from both quantitative data and qualitative community perspectives? How can they align these data sources to inform program adjustments?

Case Study 5: Consumer Behavior in E-commerce
An e-commerce company is interested in understanding consumer behavior. They plan to collect data on purchase history, website traffic, and demographics. Additionally, they aim to conduct user interviews and analyze social media sentiment.
Research Dilemma: Is it appropriate to use a mixed methods approach to gain insights into consumer behavior through both quantitative data analysis and qualitative

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exploration? How can they integrate these diverse data types to enhance decision-making?

10th LEARNING UNIT

1st Activity

Title: Conducting analyses and interpreting the results

Inferential Statistics (T-Test)

Suppose you are conducting a study to investigate whether there is a significant difference in the exam scores of two groups of students who received different types of test preparation.
Group A (Traditional Study Methods): Exam Scores - 85, 78, 92, 75, 88, 81, 95, 79
Group B (New Study Method): Exam Scores - 92, 98, 88, 105, 94, 97, 86, 99
Instructions:

- Calculate the mean and standard deviation of the exam scores for both Group A and Group B.
- Conduct an independent samples t-test to determine if there is a significant difference between the two groups.
- Report the following:
    - A description of the analysis conducted.
    - The key statistics (e.g., means, standard deviations, *t*-value, *p*-value).
    - An interpretation of the results. Is there a significant difference between groups? If so, what does it imply?

Analysis of Variance (ANOVA)

Imagine you are a researcher studying the impact of three different teaching methods (A, B, and C) on students' math test scores. You collected data from students who were randomly assigned to these three teaching methods.
Teaching Method A: Test Scores - 78, 85, 92, 76, 88, 81, 95, 79
Teaching Method B: Test Scores - 92, 98, 88, 105, 94, 97, 86, 99
Teaching Method C: Test Scores - 68, 72, 75, 69, 81, 77, 73, 70
Activity: Interpreting ANOVA Results

Instructions:

- Calculate the mean and standard deviation of the test scores for each teaching method (A, B, C).

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- Perform an ANOVA analysis to assess if there are significant differences in test scores among the three teaching methods.
- Report the following:
    - A description of the analysis conducted.
    - The key statistics (e.g., means, standard deviations, *F*-value, *p*-value).
    - An interpretation of the results. Are there significant differences among teaching methods? If so, what does it imply?

2nd Activity

Title: Conducting analyses and interpreting the results

Mann-Whitney U Test
Suppose you have two groups, Group A and Group B, and you want to compare their test scores (out of 50) to see if there's a significant difference.
Group A: [38, 42, 36, 30, 45, 41, 34, 39, 40, 37]
Group B: [25, 28, 32, 27, 29, 26, 30, 31, 24, 22]
Instructions:

- You are provided with two groups of test scores, Group A and Group B.
- Conduct a Mann-Whitney U Test to determine if there is a significant difference between the two groups. You can use statistical software like SPSS, JASP or an online Mann-Whitney U Test calculator for this.
- After conducting the test, you will obtain a U statistic and a p-value.
- Interpret the results based on the p-value

Kruskal-Wallis Test:
Suppose you have three different teaching methods (Method X, Method Y, and Method Z) and you want to compare the test scores (out of 100) of students who used these methods.
Method X: [78, 84, 72, 88, 75, 82, 80, 77, 89, 81]
Method Y: [62, 68, 73, 66, 70, 65, 69, 64, 75, 72]
Method Z: [92, 95, 90, 86, 88, 94, 91, 87, 93, 89]
Instructions:

- You are provided with three groups of test scores, Group X, Group Y, and Group Z.
- Conduct a Kruskal-Wallis Test to determine if there is a significant difference between the three groups. You can use statistical software like SPSS, JASP or an online Kruskal-Wallis Test calculator for this.

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- After conducting the test, you will obtain a H statistic (Kruskal-Wallis test statistic) and a p-value.
- Interpret the results based on the p-value

11th LEARNING UNIT

Multiple Regression Analysis

Dependent Variable: Academic Achievement
Independent Variables: Study Hours, Prior Knowledge, Test Anxiety

Model Summary:

R	R Square	Adjusted R Square
.609	.371	.348

ANOVA Table:

	Sum of Squares	df	Mean Square	F
Regression	58.334	3	19.445	8.763*
Residual	99.666	96	1.041	
Total	158.000	99		

Coefficients Table:

	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	20.012	4.132	
Study Hours	0.482	0.176	.367*
Prior Knowledge	0.732	0.275	.412*
Test Anxiety	-1.210	0.392	-.322*

* $p < 0.05$

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Structural Equation Model (SEM) Output (SPSS Amos)

Model Fit Indices:
- Chi-Square (χ^2) = 58.234
- Degrees of Freedom (df) = 30
- p-Value = 0.002
- CFI = 0.932
- RMSEA = 0.057

Path Coefficients:
- Study Hours → Academic Achievement: 0.578
- Prior Knowledge → Academic Achievement: 0.672
- Test Anxiety → Academic Achievement: -0.312

Latent Variables:
- Latent Variable 1: Motivation
- Latent Variable 2: Self-Efficacy

Measurement Model:
- Motivation (Factor 1):
  - Item 1 → Motivation: 0.841
  - Item 2 → Motivation: 0.742
  - Item 3 → Motivation: 0.912
- Self-Efficacy (Factor 2):
  - Item 4 → Self-Efficacy: 0.934
  - Item 5 → Self-Efficacy: 0.821
  - Item 6 → Self-Efficacy: 0.901

Covariances:
- Motivation ↔ Self-Efficacy: 0.312

Residual Variances:
- Academic Achievement: 0.243
- Motivation: 0.117
- Self-Efficacy: 0.198

12th LEARNING UNIT

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FINAL PROJECT

Final Project: Research Proposal Development

Description: In this activity, you will work individually to develop the research proposal for your study. You will select a research topic of interest and outline the key components of a research proposal, including the research question, hypothesis, data collection methods, and statistical analysis plan.
Steps:

1. Research Topic Selection: Select a research topic and formulate a research question.

2. Hypothesis Development: Based on the research question, develop a clear and testable hypothesis.
3. Research Design: Outline the research design, including the type of data to be collected (e.g., surveys, experiments), the sampling method, and any independent and dependent variables.
4. Data Collection: Describe how you plan to collect data, including the development of data collection instruments if necessary.
5. Statistical Analysis Plan: Specify the statistical techniques/ qualitative analysis you intend to use to analyze the data and explain why these methods are appropriate.
6. Ethical Considerations: Address ethical considerations related to their proposed study, including informed consent and protection of participants.

Proposal Presentation: You will present your research proposals to the class, highlighting the significance of their research and the practical implications of their

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