

CORRELATIONAL RESEARCH DESIGN

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Informasi	Abstract
Volume : 2	<i>Correlational research is a methodological approach that aims to identify and analyze the relationship between two or more variables without manipulation. This article aims to comprehensively explain the basic concepts of correlational research, its objectives, characteristics, design types, and limitations. The method used in this study is library research with an analytical-critical approach to various relevant academic literature. The results show that correlational research not only identifies the existence of relationships between variables but can also be used for predictive purposes through regression analysis and multiple regression. The types of correlational designs discussed include bivariate correlation, path analysis, cross-lagged panel, and factor analysis. On the other hand, the main limitation of this approach lies in its inability to explain causal relationships and the tendency for biased data interpretation if not analyzed carefully. By understanding the characteristics and weaknesses of this method, researchers are expected to be able to use it appropriately in various social and educational research contexts.</i>
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Abstrak

Penelitian korelasional merupakan pendekatan metodologis yang bertujuan mengidentifikasi dan menganalisis hubungan antara dua atau lebih variabel tanpa melakukan manipulasi. Artikel ini bertujuan untuk menjelaskan secara komprehensif mengenai konsep dasar penelitian korelasional, tujuan, ciri-ciri, jenis rancangan, serta keterbatasannya. Metode yang digunakan dalam kajian ini adalah penelitian kepustakaan (library research) dengan pendekatan analitis-kritis terhadap berbagai literatur akademik yang relevan. Hasil kajian menunjukkan bahwa penelitian korelasional tidak hanya mengidentifikasi keberadaan hubungan antar variabel, tetapi juga dapat digunakan untuk keperluan prediktif melalui analisis regresi dan regresi jamak. Jenis rancangan korelasional yang dibahas meliputi korelasi bivariat, analisis jalur, cross-lagged panel, serta analisis faktor. Di sisi lain, keterbatasan utama dari pendekatan ini terletak pada ketidakmampuannya menjelaskan hubungan kausal dan kecenderungan interpretasi data yang bias bila tidak dianalisis secara hati-hati. Dengan memahami karakteristik dan kelemahan metode ini, peneliti diharapkan mampu menggunakannya secara tepat dalam berbagai konteks penelitian sosial dan pendidikan..

Kata Kunci : Desain Penelitian, Penelitian Korelasional, Analisis Korelasi, Regresi, Hubungan Antarvariabel

A. INTRODUCTION

Research is a systematic and logical process of collecting and analyzing data to achieve specific goals. This process uses scientific methods, both quantitative and qualitative, experimental or non-experimental, and interactive or non-interactive. These methods have been developed intensively through various trials so that they have standardized procedures.

In understanding research methodology, caution is needed because finding new information or knowledge is not easy. Etymologically, “method” means the right way to do something, while “logos” means science or knowledge. Therefore, methodology can be interpreted as a way of doing something with careful thought to achieve certain goals. The research itself is an activity that includes searching, recording, formulating, analyzing, and preparing reports based on facts collected and interpreted systematically.

One type of research that is often used is correlational research. This research is sometimes categorized as descriptive research because it describes the relationship between existing variables without manipulating them. However, correlational research differs significantly from purely descriptive research, such as self-reports or observational studies. In correlational research, data is collected to determine if a relationship exists between two or more variables that can be measured quantitatively. This relationship is then expressed in the form of a correlation coefficient.

For example, there is a relationship between intelligence and academic achievement. Individuals who score high on intelligence tests tend to have high average academic achievement, while individuals who score low on intelligence tests tend to have lower academic achievement. The main purpose of a correlational study is to determine the level of relationship between certain variables or to use the relationship to make predictions (Imam Santoso, 2021).

Based on the explanation above, understanding correlational research is not enough to know its definition. A more in-depth study of its characteristics, limitations, and application in scientific research is required. Therefore, this article will discuss what correlational research is, its purpose, the characteristics of correlational research, the limitations of correlational research, and examples of correlational research titles for further reference.

B. RESEARCH METHODS

The study in this paper uses the library research method, namely by reviewing various literature sources that are relevant to the topic of discussion. This process involves collecting, analyzing and synthesizing information from existing literature in order to gain a more comprehensive understanding. Providing new material supported by appropriate data collection techniques is part of the literature review, which serves as the basis for formulating arguments and findings in this study (Fatha Pringgar & Sujatmiko, 2020).

C. RESULT & DISCUSSION

Definition of Correlational Research

Etymologically, the term "research" is composed of two component words, namely "re" which indicates the meaning of "return" or repetition, and "to search" which means "to search". Therefore, the literal meaning of "research" refers to a re-searching activity. In the Indonesian equivalent, the term is commonly translated as research. Donald Ary defines research as an application of scientific methodology in the process of investigating a problem, which aims to acquire useful information that can be accounted for its validity. (Sahir, 2021)

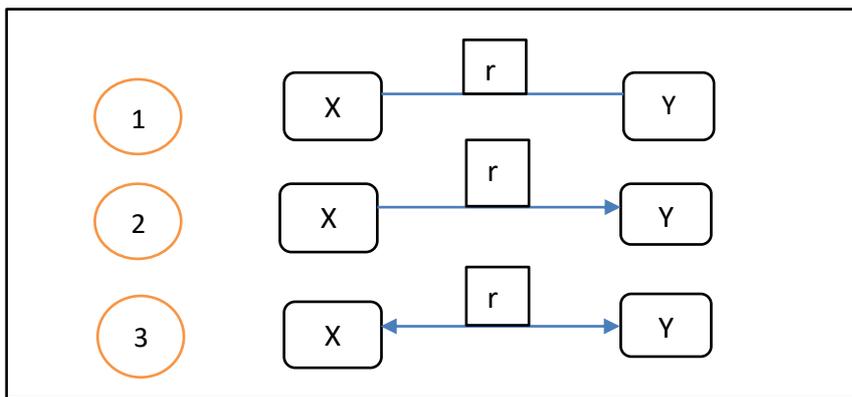
Correlation can generally be defined as the relationship between two things. However, in a broader context, this term has a more complex meaning. Correlation is one of the methods in statistical analysis used to determine the relationship between two or more quantitative variables. Two variables are said to have a correlational relationship if changes that occur in one variable are followed by consistent changes in the other variable, either in the same direction (positive correlation) or in the opposite direction (negative correlation). (Fraenkel & N.E, 2008)

Correlational research is a type of research that aims to identify the relationship and the level of relationship between two or more variables. Mc Millan and Schumacher, as cited by Syamsuddin, emphasize that understanding the level of relationship between variables is very important because it allows researchers to develop findings in accordance with research objectives. This type of research usually uses a statistical measure known as the correlation coefficient to measure the level of relationship. (Syamsuddin, 2009)

According to Gay in the opinion expressed by Sukardi, correlation research is included in the category of ex-post facto research, because in its implementation the researcher does not manipulate the variables under study, but directly analyzes whether there is a relationship between variables and the level of the relationship occurs. (Sukardi, 2018)

Correlational research does not aim to reveal cause-and-effect relationships, but only describes how much the level of relationship between the variables studied. In other words, this study only shows how strong the relationship is between one variable and another, such as between variable X and variable Y. (Diplan & Setiawan M.A, 2018).

Figure 1. Schematic of Variables in Correlational Research



Description:

- X: independent variable
- Y: dependent variable
- r: relationship between X and Y variables
- design 1: there is no relationship between X and Y
- design 2: there is a relationship between X and Y
- design 3: interconnected between X and Y

Purpose of Correlational Research

Correlational research aims to identify associations between various characteristics of individuals or other phenomena. Furthermore, it seeks to determine how much variation in one factor is related to variation in one or more other factors, as measured by a correlation coefficient. (M. Johnson, 1992)

Correlational research has a main focus on revealing the degree of association between changes in one factor and changes in other factors, which is based on the calculation of the correlation coefficient (Suryabrata, 2018). In a similar view, Gay, as cited by Emzir, emphasized that the essence of correlational research is to identify and establish the existence of relationships among the variables being observed. (Emzir, 2019).

Specifically, the objectives of correlational research are:

1. Seeking evidence of whether there is a relationship (correlation) between variables,
2. Seeing the level of relationship between variables
3. To obtain clarity and certainty whether the relationship is meaningful (convincing/significant) or insignificant.

If this is illustrated in the form of a question, a person who will conduct correlation research, in order to be able to answer three research questions about two or more variables, namely 1) Is there a relationship between two variables? 2) what is the direction of the relationship? and 3) how much / how far can the relationship be explained? (Yusuf, 2017).

Characteristics of Correlational Research

According to Yusuf (2017), there are several characteristics of correlational research that distinguish it from other research designs, namely:

1. This research design is very suitable for investigating complex variables that cannot be studied through experimental methods or manipulated by researchers.
2. Correlational research allows for the simultaneous measurement of multiple variables, the analysis of relationships between these variables, and the conduct of such analyses within a natural setting.
3. The primary outcome of this research is the magnitude or degree of a relationship between variables, not conclusions about the presence or absence of an effect (influence) of one variable on another, unless the researcher applies more advanced analytical techniques that allow for the exploration of such effects.

Some key characteristics of correlational research that prospective researchers should be aware of include:

1. The variables being studied are relatively complex; they cannot be experimented with or manipulated.
2. Measuring related variables simultaneously in realistic situations,
3. The correlation coefficient being sought is positive or negative; significant or insignificant.
4. One or more variables are called independent variables, and one or more variables are called dependent variables. (Sudarwan, 2002)

Considering the main characteristics of correlational research as described above, it can be emphasized that by using various instruments, a researcher can conduct research on broad and complex topics. Additionally, they can be administered to respondents in different

locations, provided they fall within the same sample category. Furthermore, since the primary instrument in correlational research is a questionnaire, various types of instruments can be prepared to study multiple variables simultaneously. The same instrument can also be distributed across a wide area within a limited timeframe.

Limitations of Correlational Research

Although correlational research is widely used by researchers, this does not mean that this method has no limitations. Isaac and Michael (1980) pointed out several limitations of correlational research, including:

1. Does Not Show Causality – Correlational research only identifies relationships between variables, but cannot determine the cause-and-effect relationship between them.
2. Less Rigorous than Experiments – Compared to experimental research, correlational research is less rigorous in determining influence because it does not allow for control or manipulation of the variables being studied.
3. Limitations in Identifying Relationship Patterns – Correlational research tends to only identify direct relationship patterns, and the elements used are often unreliable or not sophisticated enough in their analysis.
4. Potential for Misinterpretation – The relationship patterns identified in correlational research are sometimes fabricated, questionable, or unclear, leading to misinterpretation.
5. Tendency to Use a “Shotgun Research” Approach – In some cases, correlational research is conducted using a shotgun research approach, which involves including various variables at once without in-depth selection and without meaningful interpretation based on the data collected.

Key Steps in Correlational Research

Like other types of research, correlational research follows a series of systematic steps as follows:

1. Formulating the Problem – Clearly defining and formulating the research problem as the main basis for the research process.
2. Conducting Literature Review – Reviewing theories and previous research to strengthen the conceptual foundation and understand existing research findings.
3. Identifying Research Variables – Based on the formulated problem, identifying the variables to be studied and determining the relationships to be tested.

4. Determining the Sample and Instruments – Determining the research population and sample, compiling and selecting appropriate research instruments, and establishing the data analysis techniques to be used.
5. Collecting Data – Carrying out the data collection process using the instruments that have been determined, such as questionnaires or tests.
6. Analyzing and Interpreting Data – Analyzing data using appropriate statistical methods and interpreting the results to answer the research questions.
7. Preparing a Research Report – Preparing a systematic research report that includes findings, discussion, conclusions, and recommendations based on the analysis results.

Correlational Research Design

Correlational research has various types of designs used to analyze the relationship between variables. The following are some of the main designs in correlational research.

1. Bivariate Correlation

Bivariate correlation is a research design that aims to describe the relationship between two variables. This relationship has a level and direction, which is expressed in the form of a correlation coefficient with a value range between -1 and +1.

- A correlation coefficient of 0 indicates no relationship between variables.
- A coefficient close to -1 or +1 indicates a stronger correlation.
- A negative correlation (-) means that when one variable increases, the other decreases. For example, the relationship between stress and health—the higher the stress, the worse the health condition.
- A positive (+) correlation indicates that an increase in one variable is followed by an increase in the other variable. For example, the relationship between motivation and academic achievement—the higher the motivation, the higher the academic achievement.

2. Regression and Prediction

If there is a correlation between two variables, the value of one variable can be used to predict the value of the other variable. Regression measures how well such predictions can be made.

- The higher the correlation (approaching -1 or +1), the more accurate the prediction can be made.

- For example, if there is a relationship between stress and health, then by knowing a person's stress level, we can estimate their future health condition.

3. Multiple Regression

Multiple regression is an extension of simple regression that adds multiple predictor variables to improve the accuracy of predictions.

- Predictor variables are variables used to make predictions.
- Criterion variables are variables that are predicted.

For example, if we want to predict someone's health, we don't just look at their stress level, but also their health behaviors (such as diet and exercise) and previous health history. With this combination of variables, predictions of health conditions become more accurate.

4. Factor Analysis

Factor analysis was developed by Karl Pearson (1857–1936) and further developed by Charles Edward Spearman (1863–1945) in his study of intelligence factors. Spearman distinguished intelligence into quantitative ability and verbal ability.

For example, in research on student academic performance, it can be found that performance is influenced by intelligence level (IQ) and other factors. A student who excels in mathematics is likely to achieve high grades in related courses, while another student with a talent for sociology will excel in that field.

Factor analysis uses linear regression equations, for example:

- Mathematics (M) = $a_M \text{ IQ} + B_M$
- Operations Research (R) = $a_R \text{ IQ} + B_R$
- English (B) = $a_B \text{ IQ} + B_B$
- Sociology (S) = $a_S \text{ IQ} + B_S$

In these equations:

- IQ is the independent variable.
- Talent is the disturbance variable (error term).
- The coefficient of the intelligence variable is called the pattern loading, which indicates the extent to which that factor influences academic outcomes.

5. Correlational Design for Drawing Causal Conclusions

Although correlational research cannot directly conclude a cause-and-effect relationship, there are two designs that can be used to approach causal analysis:

a. Path Analysis

- Used to determine relationships between variables through more complex pathways.

- For example, the relationship between stress and health can be explained through psychological pathways, such as anxiety or lifestyle, which mediate the relationship (Santoso, 2021).

b. Cross-Lagged Panel Design

- Used to analyze cause-and-effect relationships by examining changes in variables over time.
- This technique compares data collected at several points in time to see which relationships are more likely to be causal.

Correlation Analysis

Correlation analysis is a statistical analysis technique used to determine the relationship between two quantitative variables. In its application, the data analyzed must be quantitative. If the data observed is still qualitative, it must first be quantified, for example using a Likert scale.

A variable is said to have a correlation if a change in one variable is followed by a change in the other variable. This relationship can occur in two directions:

- Positive correlation, which is when an increase in one variable is followed by an increase in the other variable. For example, the relationship between rice field area and rice production: the larger the rice field area, the higher the rice production (milled dry rice).
- Negative correlation, which is when an increase in one variable causes a decrease in another variable. An example is the relationship between rice production and rice prices: when rice production increases significantly (during the harvest season), the price of rice per kilogram tends to decrease, and conversely, when rice production is limited (before the harvest), the price per kilogram tends to increase.

Types of Correlation in Survey Research

In survey research, correlation analysis can be divided into three main types.

1. Simple Correlation

Simple correlation is the most basic form of correlation analysis, in which the relationship is measured between only two variables. Through simple correlation, the following can be determined:

- The strength of the relationship between two variables (strong, moderate, or weak).

- The direction of the relationship, whether it is positive or negative (Priyono, 2021).
- Simple correlation is often used in survey research, and common techniques include:
- Pearson Product Moment Correlation, used for interval or ratio scale data in parametric statistics.
- Spearman's Rank Correlation, used for ordinal scale data in non-parametric statistics.
- Chi-Square, used for nominal scale data.

By selecting the appropriate correlation technique, the analysis results can be more valid and closer to the truth.

2. Multiple Correlation

Unlike simple correlation, which only involves two variables, multiple correlation is used to measure the relationship between two or more independent variables and one dependent variable. Multiple correlation helps assess the contribution of several independent variables to one dependent variable in a single problem area.

For example, if you want to measure the factors that influence student academic achievement, then the variables of learning motivation, discipline, and learning facilities can be analyzed together to see how they affect student academic grades.

However, if the variables being analyzed come from different problem areas, it is more advisable to use simple correlation.

3. Partial Correlation

Partial correlation is used to determine the relationship between two variables by controlling the influence of other variables. In this analysis, one variable that is considered influential is used as a control variable that can be made constant or excluded from the calculation.

For example, if you want to study the relationship between study hours and academic achievement, but there is a variable of intelligence (IQ) that may play a role, then the IQ variable can be controlled so that it does not influence the analysis results.

Interpretation of Correlation Coefficients

In correlation analysis, whether simple, multiple, or partial, the correlation coefficient value ranges from -1 to +1:

- The closer to ± 1 , the stronger the relationship between variables.
- The closer to 0, the weaker the relationship between variables.
- In addition, the correlation coefficient also indicates the direction of the relationship:
- Positive coefficient (+) \rightarrow direct relationship (X increases, Y also increases).

- Negative coefficient (-) → inverse relationship (X increases, Y decreases).

According to Sugiyono, the interpretation scale for the correlation coefficient is as follows:

- 0.00 – 0.19 = Very low correlation
- 0.20 – 0.39 = Low correlation
- 0.40 – 0.59 = Moderate correlation
- 0.60 – 0.79 = Strong correlation
- 0.80 – 1.00 = Very strong correlation

D. CONCLUSION

Correlational research is an effective method for analyzing the relationship between variables in various fields of study. By using appropriate correlation analysis techniques, researchers can understand the pattern of relationships between variables without manipulating, although they cannot draw causal conclusions. Therefore, choosing the appropriate analysis method is very important so that the research results can be interpreted validly and accurately.

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