Australian Aid

DepED
DEPARTMENT OF EDUCATION

ACTION RESEARCH
SESSION 3.3
DESIGNING CAUSAL-COMPARATIVE STUDY FOR ASSESSING THE SITUATION
(STAGE 1 OF THE ACTION RESEARCH FRAMEWORK)

BEST Basic Education Sector Transformation

Objectives

At the end of the session, teachers should be able to:

1 name the essential characteristics of causal-comparative research and its application in "Assessing the situation" (stage 1 of the Action Research framework);

2 discern situations in which causal-comparative research is appropriate to be used in preliminary investigations prior to Action Research;

3 formulate research questions that are suited for causal-comparative research; and

4 determine appropriate data collection methods and data analysis tools for causal-comparative research.

Key Understandings

1 Causal-comparative research attempts to find possible relationship between an independent variable and dependent variable by comparing two groups that already differ on a "presumed cause."

2 Causal-comparative research is conducted after an event has already occurred. It is also known as ex-post facto research.

Materials

- laptop
- LCD projector
- whiteboard or blackboard
- whiteboard markers
- marking pens (4–6 pieces)
- blackboard or whiteboard erasers
- metacards for Activity
- masking tape
- manila paper (for group outputs under Application)
- about twenty-four (24) small, rolled sheets

of paper with equal counts of numbers "1" to "4" on them (e.g., 6 with "1," 6 with "2," 6 with "3," and 6 with "4"); adjust the number of rolled sheets depending on the number of participants present)
* copies of "Worksheet on Causal-Comparative Research"

TIME ALLOTMENT
120 minutes or 2 hours

References

Best John W. and James V. Kahn. (1959) 1993. *Research in Education.* Needman Heights, MA: Allyn & Bacon.

Maheshwari, V. K. 2018. "Causal-Comparative Research." Dr. V.K. Maheshwari, Ph.D. (website). Accessed May 12, 2018. http://www.vkmaheshwari.com/WP/?p=2491.

Introduction (10 minutes)

Begin the learning session by saying: "Good morning, everyone. How are you today? I hope you are excited to know more about Action Research. My name is _____. I am your LAC facilitator for today's session, which will last for about two hours.

We will be continuing our discussion on Action Research designs with particular focus on a third type called the causal-comparative research design. Because this type of research design investigates variables after they have already occurred, it is also known as ex-post facto research. Such being the case, causal-comparative research is not applied for Action Research. Rather, it is used in 'Assessing the situation' (stage 1 of the Action Research framework), prior to implementing an intervention or treatment for an Action Research."

Causal-comparative research is conducted to explore causal relationship between a presumed cause (independent variable) and a presumed effect (dependent variable). The hypothesized independent variable either has occurred, like enrollment in Preschool, or cannot be directly manipulated, such as gender.

For example, it might be hypothesized that pupils who enroll in Preschool prior to Kindergarten are more prepared to be in school than those who did not. Technically, the teacher-investigator does not 'randomly select' children to enroll (or not enroll) in Preschool. Moreover, by the time of enrollment for Kindergarten, the enrollment for Preschool has already happened. If we want to prove our hypothesis that Preschool enrollment does improve school readiness, we may want to compare Kindergarten pupils who had Preschool education and those who had none. The appropriate research design for this is causal-comparative research.

Another example might be to hypothesize that reading is intrinsically gender-related (e.g., girls like to read more than boys). The presumed cause, gender, is something that cannot be directly manipulated by the teacher-researcher. We do not 'randomly assign' a child to be a girl or to be a boy. They come to us already with their gender classifications. In this case, we may compare a group of boys with a group of girls (of the same age and grade level) through a Reading Proficiency Test. If the results show that one group (say, the girls) performed significantly better than the other (the boys), the teacher may proceed to implement an intervention or treatment to enable the other to catch up another using either an experimental or a qualitative design for Action Research.

At the end of this session, you are expected to be able to name the essential characteristics of causal-comparative research and its application in 'Assessing the situation' (stage 1 of the Action Research framework); discern situations in which causal-comparative research is appropriate to be used for preliminary investigations of Action Research; formulate research questions that are suited for causal-comparative research; and determine appropriate data collection methods and data analysis tools for causal-comparative research.

Activity (15 minutes)

Lead the conduct of the pre-discussion activity by observing the following instructions.
  1 Divide the participants into four groups.

2   Pass around small, rolled sheets of paper with numbers "1" to "4" on them. Allow each participant to pick one. Wait until everyone has picked a number. The number that each participant ends up picking will be their group number. Let the participants sit around in groups.

3   Ask the groups to brainstorm and identify at least five (5) characteristic variables (naturally occurring grouping variables that cannot be manipulated) that can be used as "possible" independent variables for dependent variables such as pupils' skills levels, achievement ratings, or aptitude scores.

4   Distribute metacards and marking pens. Let the groups write their ideas on the metacards given.

5   Once the groups are done, have them post their ideas on the board.

Analysis (10 minutes)

Process the outcome of the activity by asking the participants the following guide questions.

1   What variables did your group identify?

2   How did you come up with those variables?

3   What made it easy or difficult for you to name those variables?

Abstraction (50 minutes)

Proceed to the discussion part of the session by saying: "Now that you have an idea of what types of variables serve as 'possible' cause or independent variable for causal-comparative research, we will now proceed to the discussion proper."

UNDERSTANDING CAUSAL-COMPARATIVE RESEARCH

Causal-comparative research is a type of systematic and scientific investigation that attempts to find possible relationship between a supposed independent variable (cause) and its supposed dependent variable (effect) after the former has already occurred. This type of research design examines the "effect" of a variable that cannot be directly manipulated, like what is done in experimental research.

Because the supposed cause and effect have already occurred, causal-comparative research is also known as ex-post facto research (Best and Khan, 1993).

INDEPENDENT AND DEPENDENT VARIABLES IN CAUSAL-COMPARATIVE RESEARCH

Possible independent variables include any factor, trait, or condition that already exists. These variables cannot be manipulated because they have already occurred. In some cases, the independent variable cannot be manipulated for ethical reasons.

For example, we might hypothesize that the reason some pupils have short attention span is because they do not have good nutrition. In this case, we cannot "randomly select" pupils to groups, give one group a diet with good nutrition, and the other group, a diet with poor nutritional content. Exposing pupils to a condition that may potentially lead to some long-term and irrevocable harm is unethical. For this reason, we may just classify pupils into two groups, those that we observe to be "well-nourished" and those that may be described as "malnourished" or "under-nourished". Then, we may observe them in the classroom and record their attention span in minutes. We then can use statistical techniques to complete the comparison. Prior to instituting a breakfast program for malnourished and undernourished children, it may be necessary to show that diet does affect attention span and therefore, pupils' learning too. A causal-comparative research may serve as a preliminary investigation to "Assess the situation" (stage 1 of the Action Research framework). If the causal-comparative study does prove that malnourished or undernourished children are less attentive than well-nourished ones, then the teacher may continue with the implementation of an intervention or treatment in the form of a breakfast program, and pursue the investigation as Action Research.

Some of the variables that have been used as "possible" independent variables in causal-comparative research are the following:
   a   Sex (male and female)
   b   Grade level (Grade 6 and Grade 10)
   c   Achievement level (Superior, Upper Average, Lower Average, Poor)
   d   Educational level (Elementary Level, Elementary Graduate, High School level, High School graduate, College Level, College graduate)
   e   Municipality income type (1st class, 2nd class, 3rd class, 4th class, and 5th class)
   f   School type (Primary, Central ES, Non-Central ES)
   g   Size of school (small, medium, large)
   h   City/municipality category (urban, partially urban, rural)
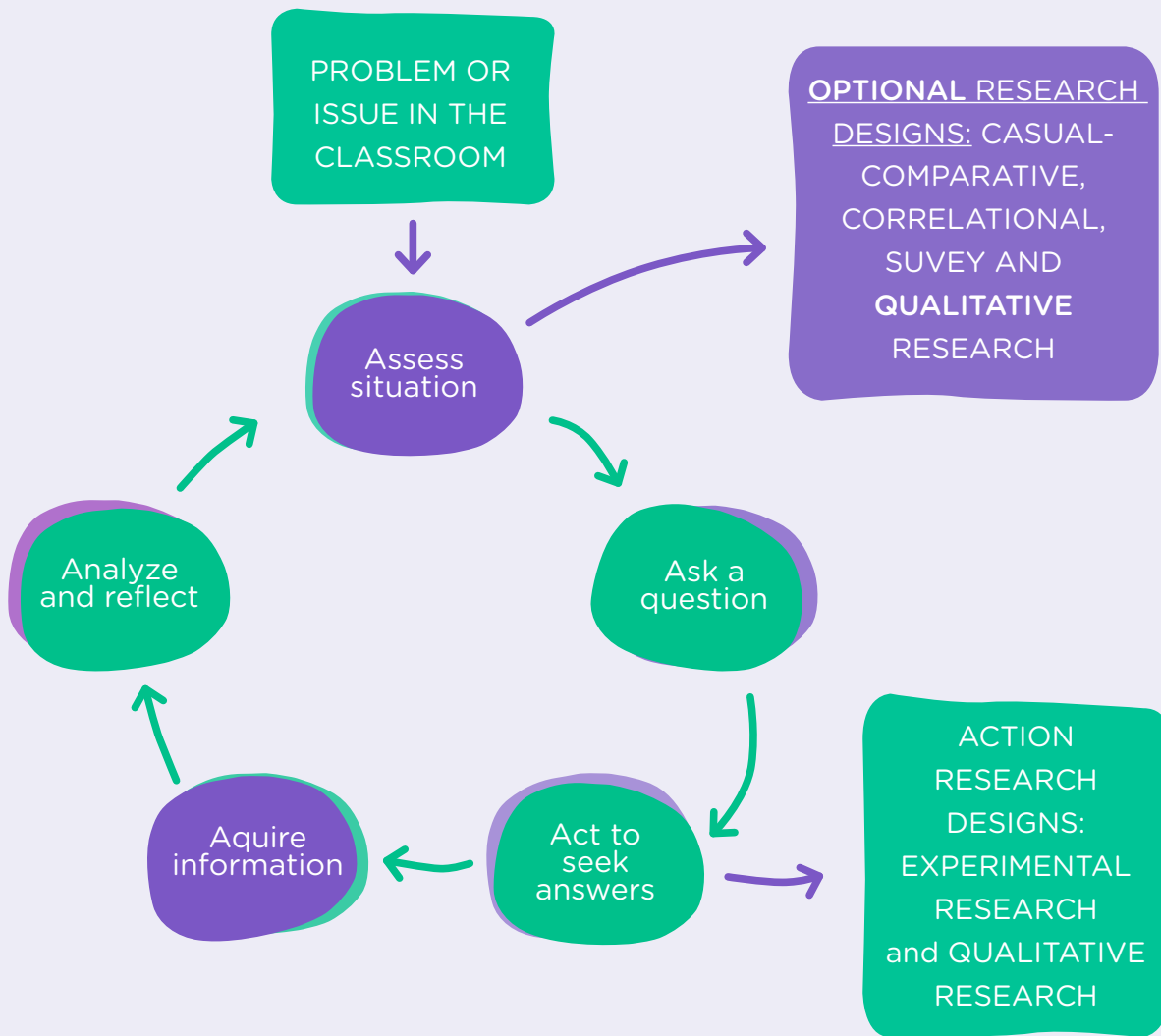
CONDUCTING CAUSAL-COMPARATIVE RESEARCH

Causal-comparative research may be undertaken as a preliminary study to explore possible causes of a problem or issue in the classroom. It may be used for "Assessing the situation," (stage 1 of the Action Research framework) prior to instituting an intervention or treatment in an Action Research.

The results may give explanations for observed problems or issues and may give the teacher-investigator some ideas on what type of intervention or treatment might remedy the situation. Thus, Causal-comparative Research may be a prelude to an experimental research or a qualitative research wherein the goal is to examine an intervention or treatment.

If the results of analysis in causal-comparative research point to causes of problems or issues in the classroom, the teacher-investigator may proceed to the development and implementation of an intervention or treatment to address the problem or issue by conducting an Action Research. This may either be an experimental (quantitative) research or a qualitative research.

Figure 1 shows the order of research designs from stage 1 of the Action Research framework, "Assess the situation," to stage 3, "Act to seek answers." Prior to implementing an intervention, the Action Researcher may conduct a preliminary investigation as part of "Assessing the situation." In this stage, four general research designs may be applied, namely, causal-comparative, correlational, survey, and qualitative. However, for the Action Research itself, there are only two designs that will allow the implementation of an intervention—one that collects quantitative data, experimental research, and another one that gathers narrative data, qualitative research. In both research designs, the Action Researcher can carry out an intervention. In experimental research, the investigator decides to collect numerical data through tests and other similar instruments to determine if the intervention applied was effective or not. In qualitative research, the investigator chooses to work with verbal accounts as proofs of the effectiveness of the intervention. The other types of Research Designs used for preliminary investigation (Correlational Research and Survey) will be tackled in the next learning sessions.

FIGURE 1. THE ACTION RESEARCH FRAMEWORK

PROBLEM OR ISSUE IN THE CLASSROOM

Assess situation

OPTIONAL RESEARCH DESIGNS: CASUAL-COMPARATIVE, CORRELATIONAL, SUVEY AND QUALITATIVE RESEARCH

Ask a question

Analyze and reflect

Aquire information

Act to seek answers

ACTION RESEARCH DESIGNS: EXPERIMENTAL RESEARCH and QUALITATIVE RESEARCH

SAMPLING METHOD

If the pool of students from which the sample is to be taken is large, random sampling may be utilized. This will enable the teacher-investigator to confidently generalize the findings to the population.

When randomization is not possible, purposive or accessible sampling may be applied

instead. However, be aware that these methods bring in sampling error. One approach to minimize error due to sampling is to increase the sample size. About 30 to 50 students are deemed sufficient for each group to be compared in causal-comparative research.

DATA COLLECTION METHODS

Causal-comparative research is classified as a quantitative type of research that employs inferential statistical treatment. Any data collection method that yields quantitative data is suitable for measuring the supposed dependent or outcome variable. These include:

- paper-and-pencil tests (standardized or teacher-made)
- rating scales
- checklists
- personality inventories

Documents, such as teachers' class records, and data obtained from the Department of Education's database (E-BEIS) may also serve as sources of information for causal-comparative research.

DATA ANALYSIS TECHNIQUES

Below are the different data analysis techniques:

1 Independent t-test—used to determine if there is a significant difference between the means of two groups (e.g., as in a study comparing boys (group 1) and girls (group 2) in terms of their Language Proficiency.

2 F test or ANOVA—used when comparing three or more groups. An example of a study in which F test or ANOVA is suitable is one comparing students in low, average, and high income brackets.

Statistical significance obtained from these techniques will tell the teacher-investigator whether observed differences between or among groups are true not only for the samples but also for the populations from which the samples were taken.

Statistical terms or technical concepts mentioned in this session will be discussed in detail in the succeeding learning sessions.

Application (35 minutes)

Lead the participants in applying what they have learned so far by saying: "Since this is our third LAC session on research designs, perhaps by this time, you are already familiar with some variables in your class records that might be relevant to your Action Research. Building on this, we will now have an individual and a group exercise to enable you to apply your understanding of causal-comparative research." Observe the following instructions.

1 Have the participants sit together in groups of 4 or 5 and form a circle.
2 Distribute copies of the worksheet provided at the end of this session guide. Ask the participants to answer completely the two items in the worksheet. Give them 10 minutes to do this.
3 After 10 minutes, ask the participants to share with the members of their group their responses in the worksheet. After hearing from each other, have the groups choose one research question and ask them to discuss the procedure in answering it using the causal-comparative research method.
4 Distribute manila paper and marking pens. Have the groups write their answers on the manila paper. Give them another 10 minutes to finish the group output.
5 Once the groups are done, ask them to present their output. Limit the presentation to 3 minutes per group. Moderate the sharing. Ask follow-up questions when necessary to help the participants elucidate their presentations. Welcome questions from other participants. Take note of things that seemed confusing to participants and take time to explain these before ending the session. You may also note them and inform the participants that they will be discussed in the next LAC session.

Closing (5 minutes)

End the learning session by saying: "Congratulations for finishing another LAC session on Action Research. Thank you for actively participating in our discussions and activities today. It is alright if you still have questions about

causal-comparative research. If you do, please take time to do some more readings on your own. But do let me know if I can be of help. I hope that at this point, you already have a better understanding of causal-comparative research as a research design.

In the next two sessions, we will learn about two more research designs that, like causal-comparative research, can be used in 'Assessing the situation' prior to the implementation of an intervention or treatment to address a classroom problem or issue. Per schedule, our next meeting will be on (state the specific date). To prepare for our session, do review the three research designs that we have discussed so far. Compare and contrast them in terms of the types of research questions they address and the sampling, data collection, and data analysis procedures followed in each.

Although we will not yet be using them in the next LAC session, I would also like everyone to prepare any readily available data such as, but not limited to, test scores, grades, results of checklists, rating scales, and similar quantitative instruments and the demographic profile of students. We will be using these for our learning sessions on data analysis.

Again, thank you and see you all soon!"

Worksheet: Causal-Comparative Research

1 In the box below are some of the variables about students. Encircle the variables that you can use in a causal-comparative research as a preliminary investigation (for "Assessing the Situation," stage 1 of the Action Research Framework).

	Dialect	
Age	Ethnic Affiliation	Section
Attendance	Mode of Transportation	Religion
Body Mass Index	NAT MPS	1st Quarter Final Grade

2 Based on the input and the problems you encountered in your class, formulate a research question that can be answered using the causal-comparative research. Write the research question below.

_____
_____
_____

Describe the activities you will do to find the answer to this research question following the procedure for causal-comparative research.

_____
_____
_____
_____
_____
_____
_____

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