

Unit II: Sample FRQ

Research Methods: Often, methodology questions take one of two forms: the “design your own experiment” form and the “identify the flaws” form. I am providing one example of each.

Research Methods: Question 1: Design an Experiment

Design an experiment that tests the hypothesis, “Cooperative learning is more effective in raising test scores than direct teacher instruction.” Use the following terms in your response:

Independent and dependent variables

Random sampling and assignment

Experimental and control grouping

Ethical considerations

An interpretation of what statistically significant results would mean for this experiment

Rubric:

Students must address the hypothesis given in the question. They cannot develop an experiment that does not address this hypothesis.

Points 1 & 2: Independent & Dependent Variables

Students must identify the variables correctly:

IV: type of teaching (cooperative learning vs. direct teacher instruction)

DV: increase in test scores

Points 3 & 4: Random sampling and assignment

Students must discuss ways in which they would conduct both random sampling (choosing participants from the population) and random assignment (assigning participants to groups). Any of the following ways can be used:

Random number generators

Choosing every _____ person from a list of all possible participants

Drawing names from a hat

Flipping a coin

Etc.

NOTE: Students cannot mix up sampling and assignment. These are distinct procedures. **They must talk about sampling and assignment separately to earn the points.**

Points 5 & 6: Experimental and Control Groups

Students must describe the two groups in their experiment. The experimental group contains participants who experience the independent variable (cooperative learning). The control group

contains participants who do not experience the independent variable (direct instruction). Students must correctly identify the distinct groups in order to receive both points (one group cannot be inferred through discussion of the other group).

NOTE: Students can discuss that there would be 3 groups – two experimental (one with cooperative learning, the other with direct instruction) and one control group (those who have a teacher who has not received training in either method).

Points 7 & 8: Ethical considerations

Students must identify at least two distinct ethical considerations they took into account when planning the experiment. Some options include (but are not limited to):

Informed consent (which includes knowledge that one is in the study and ability to leave study without penalty)

Informed consent/assent for minors

Debriefing

Institutional review (IRB)

Limiting/not using deceptive practices

Point 9: Interpretation of statistical significance

Students must explain what the phrase “statistical significance” means. Students must at least discuss that results that are significant are not due to chance (and therefore due to the independent variable).

NOTE: Students may not just discuss p-values at the .05 level without discussing what the $p=.05$ means.

Research Methods: Question 2: Identify the Flaws

Dr. Myers wants to explore how cooperative learning is more effective in raising test scores than direct teacher instruction. He approaches the principal of a local school and asks if he can conduct his research on the teachers and students. The principal agrees and gives Dr. Myers the names of several teachers who would be most willing to work with him. Dr. Myers interviews the teachers and chooses 2 that he feels would best represent different types of teachers and diverse students in the United States. One teacher is new to the school and teaches freshman English. The other has been teaching for 23 years and teaches senior AP Psychology.

Dr. Myers gives the new teacher the cooperative learning group, and the veteran teacher the direct instruction group. Each teacher is videotaped during their research lessons, and Dr. Myers's students watch the videos to determine if the teachers conducted the lessons according to Dr. Myers' instructions. At the end of the semester, Dr. Myers gathers the students' test scores for each class. He looks over the test scores and decides to study only those students who sat in the first two rows of each class, since after he watched the videotaped observations they seemed to paying the most attention to the lessons in each class. He **has parent approval allowing him to** ~~gets their parents to agree to let him~~ analyze the data.

Identify at least **two** problems with Dr. Myers' study from **each** of the following areas:

Random sampling procedures
Random assignment procedures
Experimenter (researcher) bias
Ethical issues

Rubric:

General considerations:

- Students must identify the problems in this study. They cannot identify issues that are not related to the study described in the question prompt.
- Students can earn one point per problem identified.
- They must identify which category the problem is enumerating to ensure the student is successfully applying the information.

Points 1 & 2: Random sampling procedures

Students can identify any of the following:

- He chooses the school and does not select the sample school at random.
- The principal chooses the teachers from whom Dr. Myers will choose his sample.
- Dr. Myers chooses the teachers he wants to study in a non-random way.
- Dr. Myers chooses the student data he wants to analyze in a non-random way.

Points 3 & 4: Random assignment procedures

Students may identify any of the following:

- Dr. Myers chooses which teachers he will study based on non-random procedures.
- Dr. Myers chooses the student data he wants to analyze in a non-random way.

Points 5 & 6: Experimenter (researcher) bias

Students may identify any of the following:

- Dr. Myers chooses which teachers he will study based on his own preconceived notions about the representativeness of teachers.
- Dr. Myers chooses the student data he wants to analyze due to his own assessment of the video observations.

Points 7 & 8: Ethical issues

Students may identify any of the following:

- Dr. Myers does not get informed consent from the teachers to participate in the research.
- Dr. Myers does not get informed consent or assent from the students' parents or the students.
- There is no indication from the description that Dr. Myers went through the IRB process.
- There is no indication from the description that Dr. Myers debriefed his participants.