



# Planning for educational research

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# Research questions

- What are the learning outcomes from your idea?
  - Cognitive domain
  - Affective domain
  - Psychomotor domain
- Does it yield more generic outcomes?
- Would you like to measure the attitude/perception towards your innovation/intervention?
- Should the questions be quantitative or qualitative or both?



# Research question example

- Learning outcomes of supply chain game
  - Supply chain activities and loyalty
  - Price competition across supply chains
  - Bullwhip effect
- Research questions
  - What aspects of SCM concepts and relations among different modules of a supply chain do students gain through gameplay?
  - What are the students' perceptions toward the developed game?



# Activity 5: Research questions

- Select an idea from Activity 2 or 4
- What are the outcomes from your idea?
  - Specific outcomes
  - Generic outcomes (if any)
- Form research questions
  - Quantitative
  - Qualitative
  - Affective part



# Research design

- What research design can answer research questions?
  - Impossible to conduct a true experimental educational research
- Who will be the participants?
- Do you need a control group?
  - What intervention will they receive?
  - Is the intervention comparable to the experimental group?
- Should there be a pretest?
  - Do participants have partial knowledge before intervention?



# Research design example

- Research questions
  - What aspects of SCM concepts and relations among different modules of a supply chain do students gain through gameplay?
  - What are the students' perceptions toward the developed game?
- Do the RQs mention a control group?
- Convenience sampling, 1 group
- Third-year students in 2 sessions, each playing 2 rounds
- Do we expect students to have partial knowledge?



# Activity 6: Research design

- Select research questions from Activity 5
- How many groups do the questions imply?
- Who will be the participants?
- When will the data be collected (pre/during/post intervention)?
- Form research design



# Research instruments

- What data are needed to answer research questions?
- What instruments provide the required data?
- Validity
  - Index of Item-Objective Congruence (IIOC)
  - Factor analysis
- Reliability
  - Cronbach's alpha
  - Triangulation





# Triangulation

- More than 1 (can be only 2)
- Data triangulation
  - Different places (schools/universities/countries) / times
  - Different data collection methods / instruments
- Interpretation triangulation
  - Different researchers interpret the same data
- Theoretical triangulation
  - Interpret data under different theories



# Research instruments example

- What aspects of SCM concepts do students gain through gameplay?
- Convenience sampling, 1 group, during and post intervention
- Instruments
  - Spreadsheets containing all strategic decisions
  - Open-ended questions covering
    - Inventory, sales forecast, cost of lost sales, profit and loss, price competition
  - The topics appeared in the post-test, questionnaire, and interview



## Activity 7: Research instruments

- Select a research question from Activity 5
- How many groups do the questions imply?
- Are the data generated during intervention helpful in answering the questions?
- When will you collect data (pre/during/post intervention)?
- What instruments are suitable?
- Compose some items in the main research instrument



# Participants

- Who will be your participants?
  - Students, professionals, etc.
  - Inclusion/exclusion criteria
- Are they representative samples?
- How many do you need / can you get?
- When and where do you implement your intervention?
  - Which semester? What time?

# Special considerations

- Is there any ethical protocol to follow?
- Is it fair for the control group not to receive the intervention?
- Does your research interfere with their regular schedules?
- What unexpected events may happen during your research?
- Can there be any technical/technological difficulties?
- Have you allocated enough time to collect data?
- What can affect the data that you collect?