



RESEARCH METHODOLOGY

Everything You need to Know

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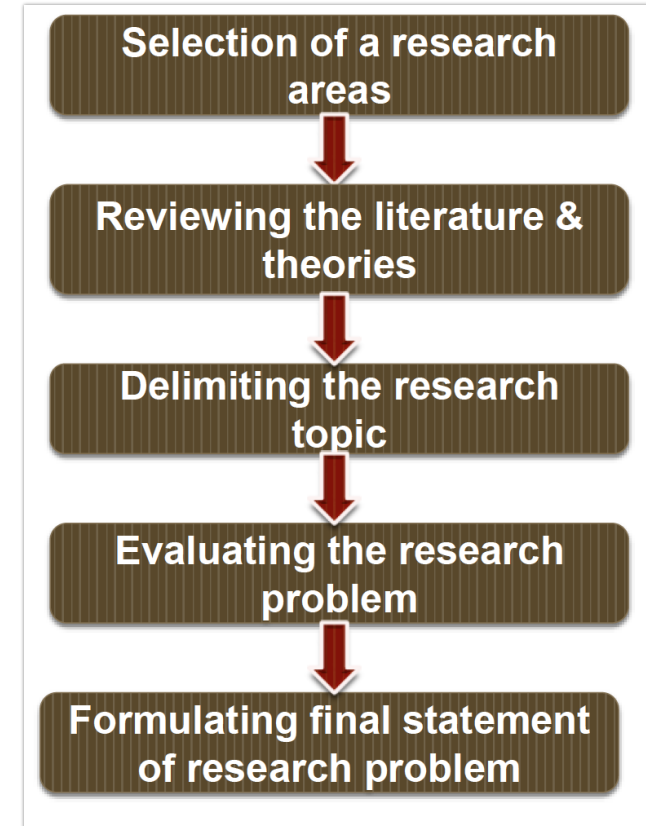
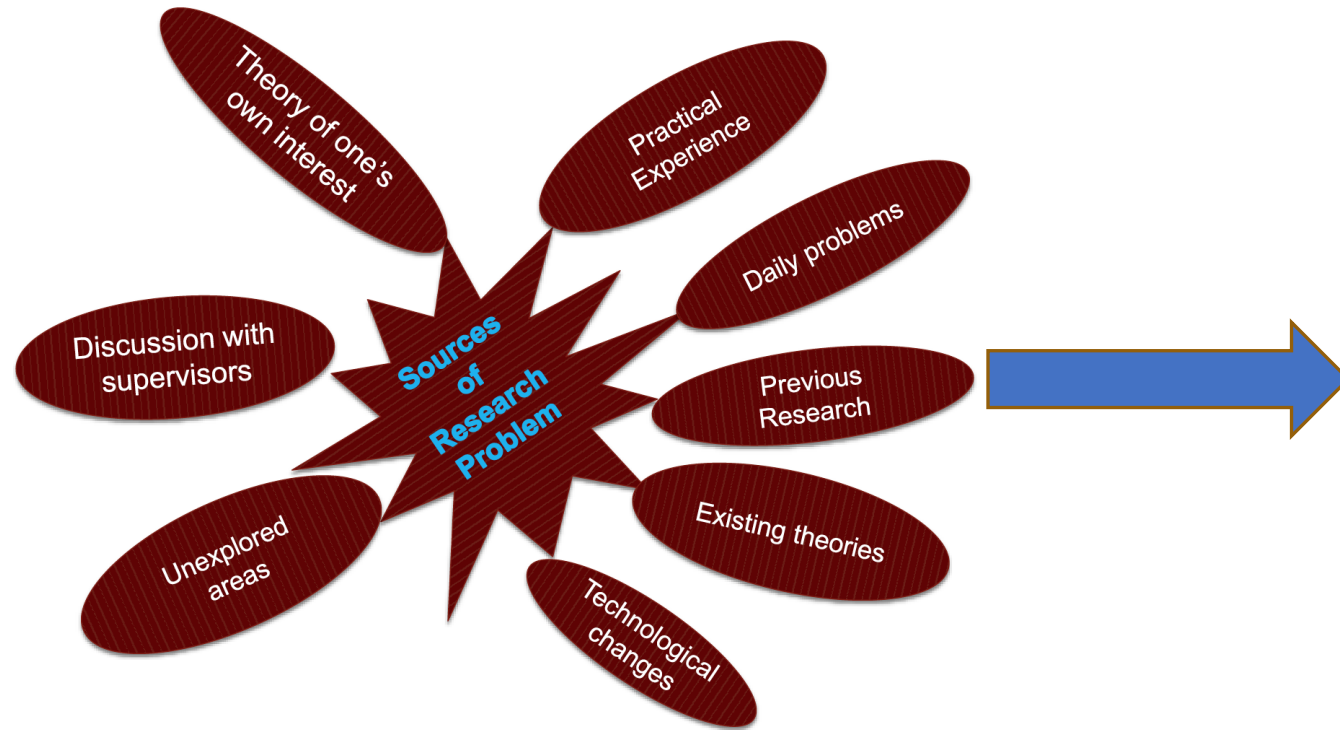
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Formulation of Problem Statement



1.3 Problem statement

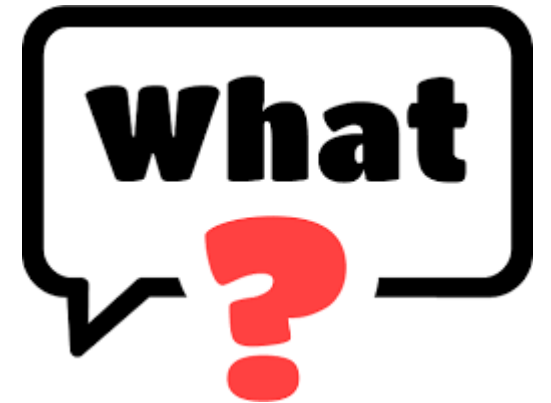
The Internet of Things (IoT) generates a massive volume of traffic from heterogeneous networks such as smart healthcare, smart grid, etc. One of the issues in existing routing schemes based on shortest paths and techniques like MPLS cannot manage the real-time data generated from devices especially for satisfying the multi-constrained Quality of Service (QoS) such as delay, packet loss, and jitter (Han et al., 2018). The literature has focused on utilizing a single QoS metric individually and there can be applications that need to satisfy multiple QoS metrics. Thus, there still exists a research gap on satisfying multi-constrained QoS metrics in the smart healthcare systems using the SDN approach.

SMART Objectives



What is Research Methodology?

- Definition: a procedure researchers choose for carrying out research.
- Studying the methods used in your field, in order to develop an appropriate approach that matches your objectives.
- Methods are the specific tools and procedures you use to collect and analyze data
 - for example: experiments, surveys, and statistical tests



Why RM is important?

- A research methodology gives research legitimacy and provides scientifically sound findings.
- Also provides a detailed plan that helps to keep researchers on track, making the process smooth, effective and manageable



Types of RM Approaches

Quantitative research

- Is about the collection and analysis of **numerical data**.
- Used to test hypotheses or create a set of observations for inductive reasoning
- Researchers analyze that data through various methods of mathematical and statistical analysis.
- Accuracy and repeatability of vital importance
- Popular methods used: **online surveys, online polls, and questionnaires**

Common Quantitative Research Methods



Descriptive



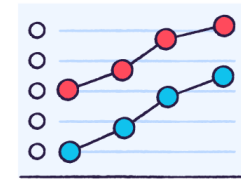
Causal-Comparative



Survey



Experimental



Correlational

Types of RM Approaches

- **Qualitative research**

- Is about the collection and analysis of **non-numerical data**, like written or spoken words.
- typically involves interviews and participant observation in order to examine people's lived experiences.
- Repeatability usually a problem
- Methods such as: **observation, interviews, documents and audio-video materials.**

5W1H for RM

- **Why** have I chosen this method?
- **Where** will I conduct my research?
- **Who** will my participants be and how will I select them?
- **What** instruments will I use to collect data?
- **How** will I use the data?
- **When** will I conduct my research?



Quantitative vs Qualitative

QUALITATIVE VS. QUANTITATIVE



Data Collection

from interview sessions,
discussion with focus
groups, case studies,
and ethnography



Data Collection

from surveys,
experiments,
observations, and
content analysis.

Quantitative Research Guide

- What is the purpose of the survey?
- What are we trying to measure?
- How many questions should we include?
- What type of rating scale should we use?
- How will we know that the survey worked – what will make the data actionable?



Quantitative Research Guide

Instrument Types & Uses

- Surveys are sets of standardized questions (questionnaire) that are administered to selected individuals or groups of individuals.

Question Types

- Closed-Ended Questions are those that list pre-set answers for respondents.
- They include multiple-choice or “yes/no” answers.
- Easy to analyze but do not offer additional, anecdotal but important findings.
- Include all relevant and possible answers and must be mutually exclusive

Quantitative Research Guide

- Write clear instructions for your survey
- Overall instructions at the beginning of your survey should include:
 - The survey's purpose
 - Who will use the information o How the information will be used
 - Whether the responses will be anonymous
 - The approximate time the survey will take to complete
 - Assure respondents of anonymity and confidentiality (if applicable)
- Break up the questions to it's categories and provide instructions for how the respondent should answer the questions at the beginning of each section.
- Provide definitions for any terms or concepts that may not be easily understood by all respondents

Quantitative Data Collection Tools

Which one is the best?



Quantitative Research Guide

Likert Scales

- a type of scale that asks respondents to indicate the level that they agree or disagree (generally, from 'strongly agree' to 'strongly disagree') about a statement.
- Likert scales generally include five-point, seven-point, or nine-point responses. Notice that they always have an odd number of answer options, which is to make sure the respondent is provided with a neutral response.

Developing The Survey Questions

- Survey questions should be created so they are easy for respondents to understand and answer, and also provide the data required for the intended users of the results.
- When writing survey questions you should think about how you will use the information you obtained from the survey.
- Ask yourself:
 - What questions do you need answered and why?
 - Who will use this data and information?

Developing The Survey Questions

- Generate Questions Based On The Purpose Of The Data
- Write Unbiased Questions
- Ask The Most Important Questions At The Beginning Of The Survey
- Make Questions Specific
- Ask Only One Question At A Time
- Using Scaled Questions
- Leave Open-ended Questions For The End

Scales-rating Scales

- **Numeric rating scales**, where respondents are asked to rate a topic based on a set of numbers;
 - Example: On a scale of 0-5, rate your proficiency"": 0- no experience/proficiency 1-fundamental awareness (basic knowledge), 2-novice proficiency, 3-intermediate proficiency, 4-advanced proficiency, 5-expert proficiency
- **Graphic rating scales rate**, which look at behaviors or performance (i.e., leadership, teamwork, performance);
 - Example: Rate your leadership skills. 1- Poor 2- Adequate 3- Fair 4- Good 5- Excellent
- **Descriptive graphic rating scale**, where respondents are asked to place a mark along a line that depicts one extreme to the other.
 - Example: Mark on the line below your effectiveness as a leader:

1
Not effective at all

2

3

4

5
Very effective
- This type of rating scale allows the respondent to establish their own criteria-based on opinion – they are not restricted to values previously set by you.

Scales-likert Scales

- Likert Scales offer a range of answer options — from one opposing perspective to another using either five, seven or nine options.
- For example, two opposing perspectives on a Likert scale might range from, “completely agree” to “completely disagree”, also a natural midpoint, “neither agree nor disagree” .
- Example:
 - 1—Strongly disagree
 - 2—Disagree
 - 3—Neither agree nor disagree (neutral)
 - 4—Agree
 - 5—Strongly agree

Sample Of Questionnaires

Title of the questionnaires

Purpose of the questionnaires &
instructions

Close-ended questions (Structured)

Scales

Market Research Questionnaire

To help us to build more information about the type of people using Limavady's tourism infrastructure and the level of satisfaction within the tourism amenities in existence, we would ask you to take a few minutes of your time to answer the following questions. This will help us in planning future tourism projects for the future to ensure we meet our customer needs. Complete the survey and send it back to tourism@limavady.gov.uk. Enter **survey** as the subject.

Q.1 Do you live in Limavady?

Yes ☐ No ☐

If you have answered no to the above question, please continue to question 2. If you have answered yes, please continue to question 11

Q.2 Have you visited Limavady?

Yes ☐ No ☐

If you have answered no to the above question, please continue to question 14. If you have answered yes, please continue to question 3

Q.3 How long is your visit to Limavady?

Daytrip ☐ Overnight visit ☐ 1-3 days ☐

3-7 days ☐ Over 1 week ☐

If you have answered daytrip to the last question, please continue to question 5. If you have answered any alternative answer to the above question, please continue to question 4.

Sample Of Questionnaires

Purpose of the questionnaires

Demographic Information

Instruction

Close-ended questions (Structured)

Scales

Open-ended questions

University of the East
College of Business Administration
Manila

SURVEY QUESTIONNAIRE

Dear Respondent,

We are marketing students of the College of Business Administration/University of the East. We are working on a research on the "Effect of Infomercial of Politicians to the Student Voters of the University of the East. May we request to kindly answer the questions in this survey questionnaire. The information you provide will enable our group to attain the purpose of the study. Thank you for your cooperation.

The Researchers

Name (*optional*): _____ Age: _____
Year level _____ Gender _____
College & course: _____

Infomercial is similar to a television commercial. It informs the viewing public about a politician who has the intention to run for an elective position in a national election.

I.Direction: Please answer the following questions. Put a check [✓] mark on the box of your answer.

1.) Are you a registered voter?

- ☐ Yes
☐ No

2.) Based on the given definition of infomercial, have you seen an infomercial of a politician on national television?

- ☐ Yes
☐ No

3.) Have you seen an infomercial?

- ☐ Yes
☐ No

3.1.) If yes, kindly check whose infomercial have you seen in national television?

- | | |
|---|--|
| <input type="checkbox"/> Manuel Roxas | <input type="checkbox"/> Allan Cayetano |
| <input type="checkbox"/> Jejomar Binay | <input type="checkbox"/> Panfilo Lacson |
| <input type="checkbox"/> Grace Poe | <input type="checkbox"/> If others (<i>Please</i> |
| <input type="checkbox"/> Mark Villar | <i>specify</i>) _____ |
| <input type="checkbox"/> Sherwyn Gatchalian | |

Qualitative Data Collection Tools

Which one is the best?



Guidelines for Developing Interview Questions

- Questions should be simple.
- Do not ask more than one question at a time.
- The best questions are those which elicit the longest answers from the respondent.
- Do not ask questions that can be answered with one word.
- Don't ask questions that require your respondents to do your analysis for you.

Open-ended vs Close Interview Questions

Open-Ended Interview Questions

- What's your opinion of the current state of business-to-business e commerce in your firm?
- What are the critical objectives of your department?
- Once the data are submitted via the Web site, how are they processed?
- Describe the monitoring process that is available online.
- What are some of the common data entry errors made in this department?
- What are the biggest frustrations you've experienced during the transition to ecommerce?

Closed Interview Questions

- How many times a week is the project repository updated?
- On average, how many calls does the call center receive monthly?
- Which of the following sources of information is most valuable to you?
 - Completed customer complaint forms
 - Email complaints from consumers who visit the Web site
 - Face-to-face interaction with customers
 - Returned merchandise
- List your top two priorities for improving the technology infrastructure.
- Who receives this input?

Probes

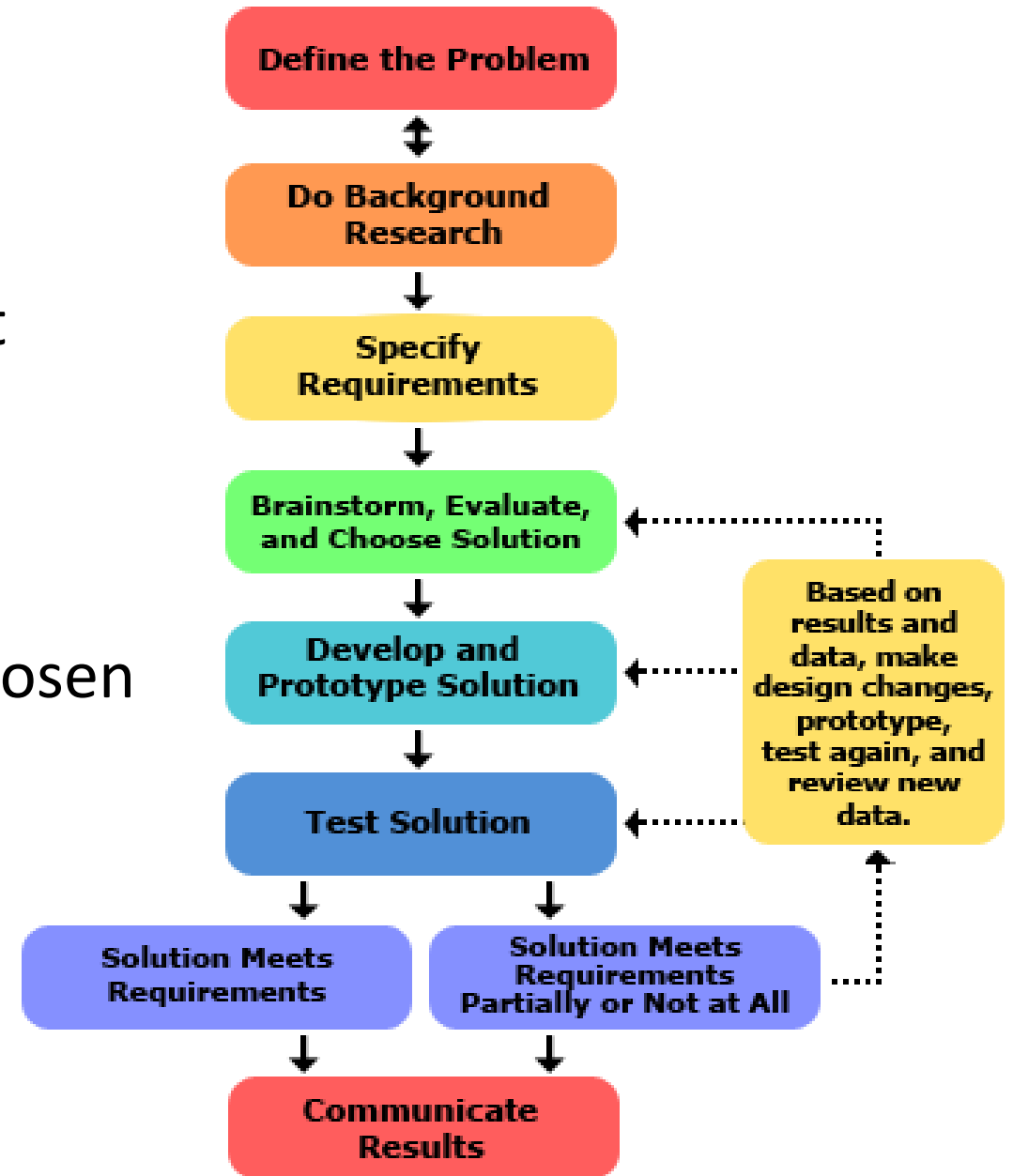
- A third type of question is the probe or follow-up.
- The strongest probe is the simplest: the question,
 - “Why?”
 - “Can you give me an example of a time you did not find the system trustworthy?”
 - Will you elaborate on that for me?”
- The purpose of the probe is to go beyond the initial answer to get more meaning, to clarify, and to draw out and expand on the interviewee’s point.
- Probes may be either open-ended or closed questions.

Probes

- Why?
- Give an example of how ecommerce has been integrated into your business processes.
- Please give an illustration of the security problems you are experiencing with your online bill payment system.
- You mentioned both an intranet and an extranet solution. Please give an example of how you think each differs.
- What makes you feel that way?
- Tell me step by step what happens after a customer clicks the “Submit” button on the Web registration form.

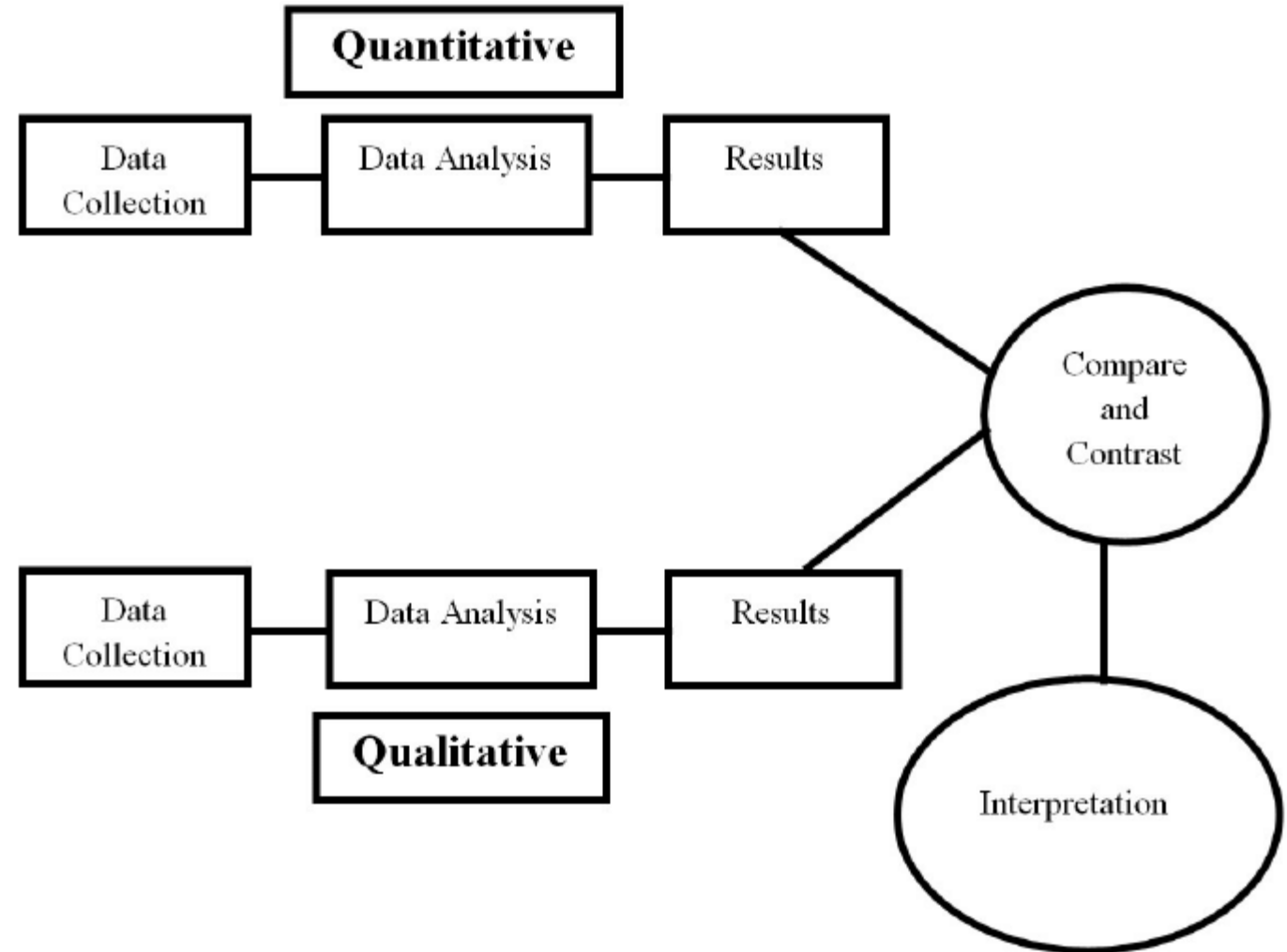
RM for FYP

- Basic phases involved in development model
- Example of the models: ADDIE Model Spiral, Agile etc
- Need to justify why the model was chosen in your project



Mixed-Method

- Is research that involves both qualitative and quantitative methods.



That's all from me...
Thank you

