



RESEARCH METHODOLOGY

Defining the Research Problem

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Department of Computer Science and Engineering

Chapter 2:

Defining the Research Problem



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What is a Research Problem



A research problem is a specific issue, difficulty, contradiction, or gap in knowledge that you will aim to address in your research.

A research problem is a statement about an area of concern, a condition to be improved, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and systematic investigation.

Difficulty which a researcher experiences in a context of either theoretical or practical situation and wants to obtain the solution to overcome the same.

What is a Research Problem



Textbook Definition:

“Research Problem, in general, refers to some difficulty which a researcher experiences in the context of either a theoretical or practical situation and wants to obtain a solution for the same.”

A RP does exist if the following conditions are met:

I = Individual

N = eNvironment

C_1, C_2 = two Courses of action

O_1, O_2 = two Outcomes

(def by uncontrolled variables, Y_j)

What is a Research Problem



The courses of action available must provides some chance of obtaining the objective, but they cannot provide the same chance, otherwise the choice would not matter.

Thus, if $P(O_j | I, C_j, N)$ represents the probability that an outcome O_j will occur, if I select C_j in N ,

$$P(O_j | I, C_j, N) = \text{Probability}$$

$$P(O_1 | I, C_1, N) \neq P(O_1 | I, C_2, N)$$

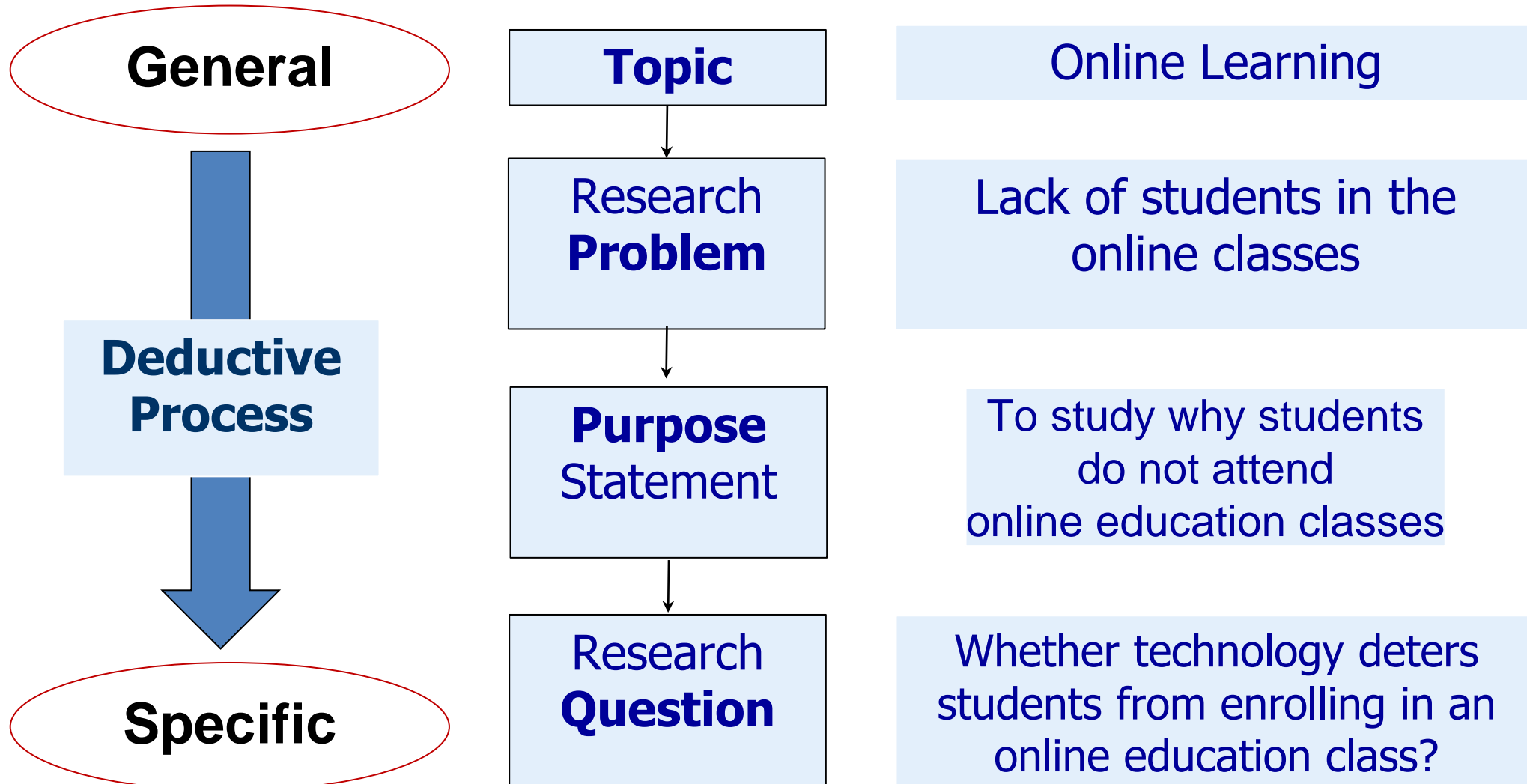
The choices must have unequal efficiencies for the desired outcomes.

What is a Research Problem

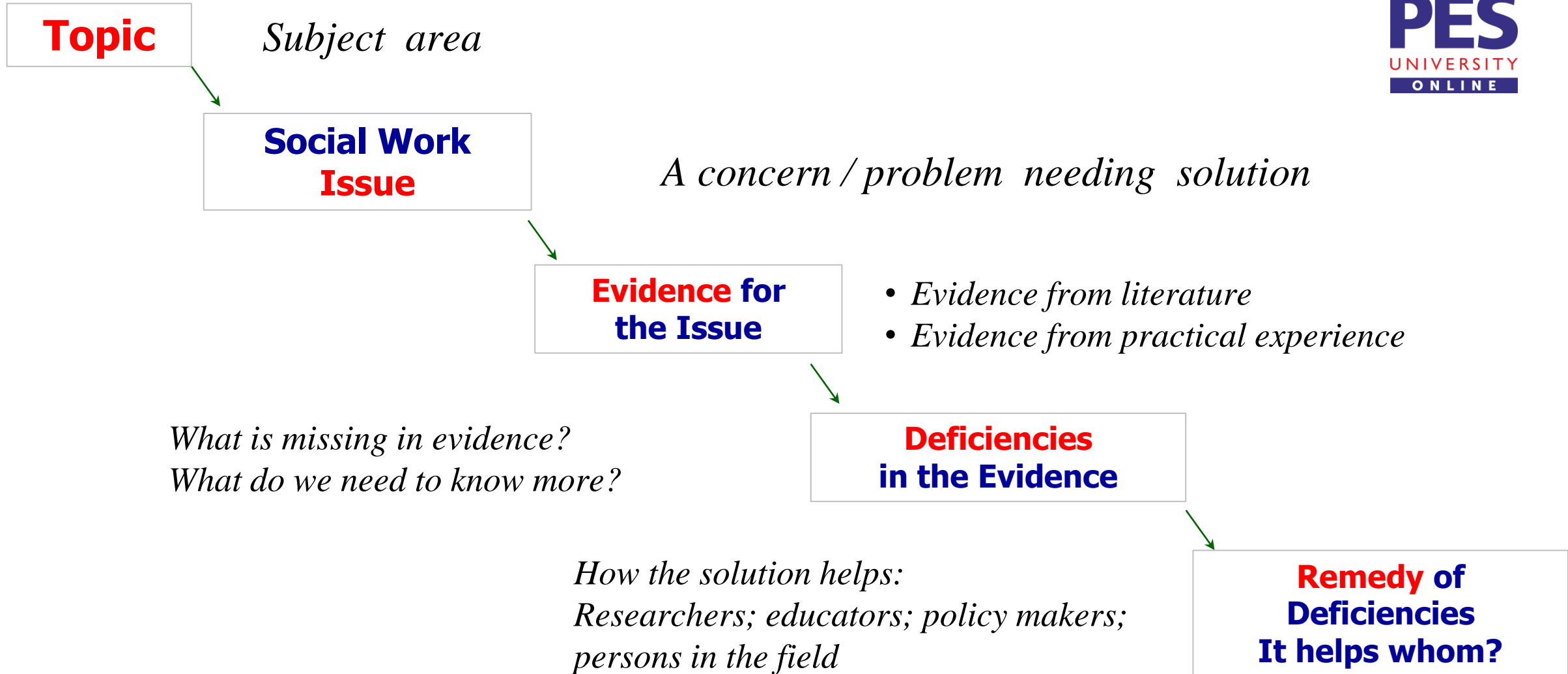
We can, thus, state the components of a research problem as under:

- (i) There must be an individual or a group which has some difficulty or the problem.
- (ii) There must be some objective(s) to be attained at. If one wants nothing, one cannot have a problem.
- (iii) There must be alternative means (or the courses of action) for obtaining the objective(s) one wishes to attain. This means that there must be at least two means available to a researcher for if he has no choice of means, he cannot have a problem.
- (iv) There must remain some doubt in the mind of a researcher with regard to the selection of alternatives. This means that research must answer the question concerning the relative efficiency of the possible alternatives.
- (v) There must be some environment(s) to which the difficulty pertains.

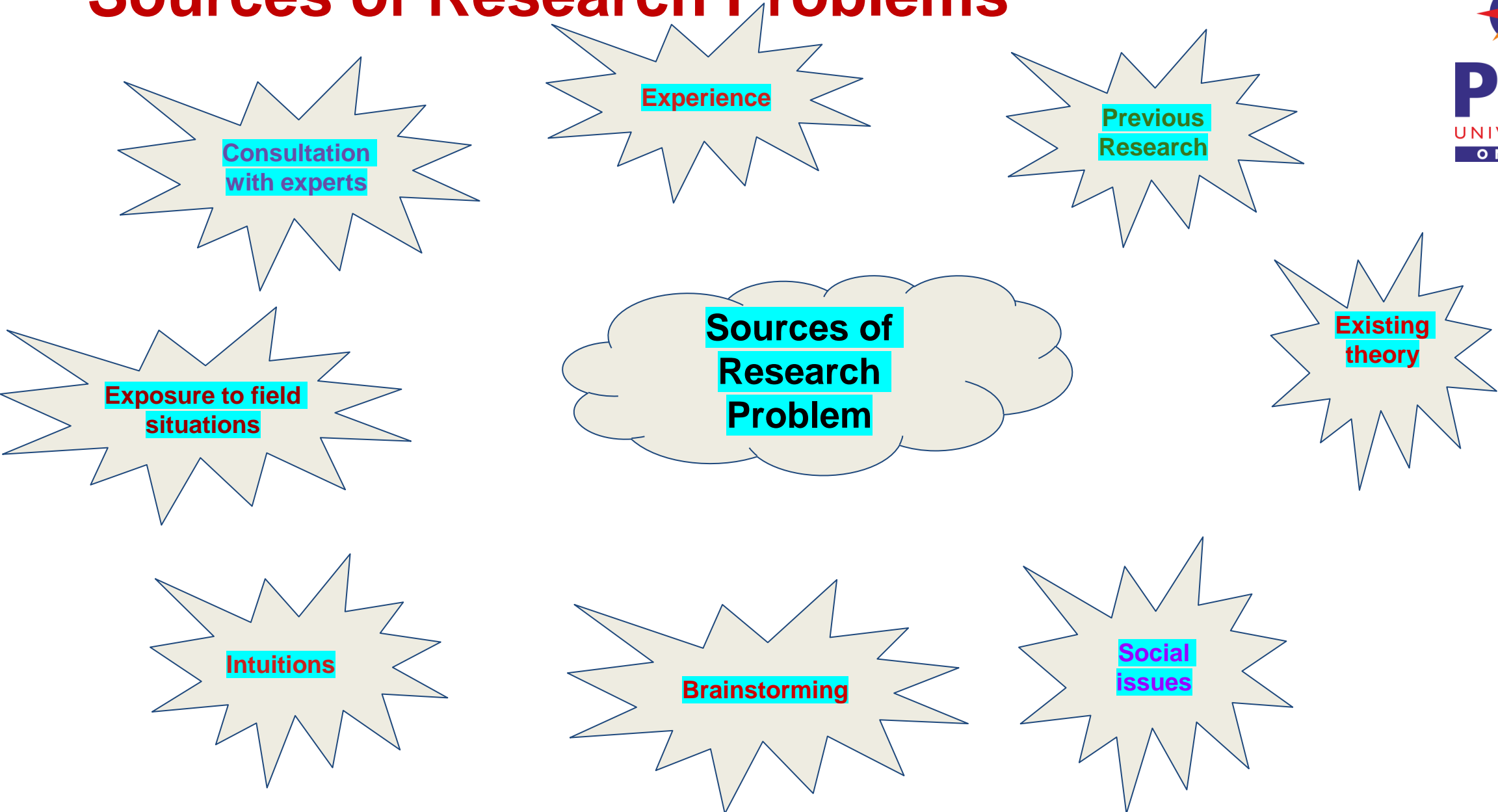
Topic, Problem, Purpose & Questions



The 5 Elements of Problem Statement



Sources of Research Problems



Selecting of a Research Problem

1. Subject which is not overdone is chosen
2. Controversial subject should be avoided
3. Avoid vague problem
4. Subject should be familiar and feasible
5. Before the final selection of a problem is done, a researcher must ask himself the following questions:
 - (a) Whether he is well equipped in terms of his background to carry out the research?
 - (b) Whether the study falls within the budget he can afford?
 - (c) Whether the necessary cooperation can be obtained from those who must participate in research as subjects?
6. Selection of problem must be preceded by preliminary study

Necessity of Defining the Problem



Clearly stated research problem is half solved:

1. What data are to be collected?
2. What characteristics of data are relevant?
3. What relations are to be explored?
4. What techniques are to be used for this purpose?

Technique Involved in Defining a Problem



1. State the problem in a general way
2. Understand the nature of the problem
3. Survey the available literature
4. Develop ideas through discussions
5. Rephrase the research problem

Technique Involved in Defining a Problem

- a) Technical terms and words or phrases, with special meanings used in the statement of the problem, should be clearly defined.
- b) Basic assumptions or postulates (if any) relating to the research problem should be clearly stated.
- c) The criteria for the selection of the problem should be provided.
- d) The suitability of the time-period and the sources of data available must also be considered.
- e) The scope of the investigation (or the limits within which the problem is to be studied) must be mentioned explicitly.

In Conclusion



- The task of defining a research problem follows a sequential pattern —
 - the problem is stated in a general way, the ambiguities are resolved,
 - thinking and rethinking process results in a more specific formulation of the problem so that it
 - may be a realistic one in terms of the available data and resources and
 - is analytically meaningful.
- All this results in a *well defined research problem* that is
 - meaningful from an operational point of view,
 - paves the way for the development of working hypotheses and
 - means of solving the problem.



THANK YOU

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