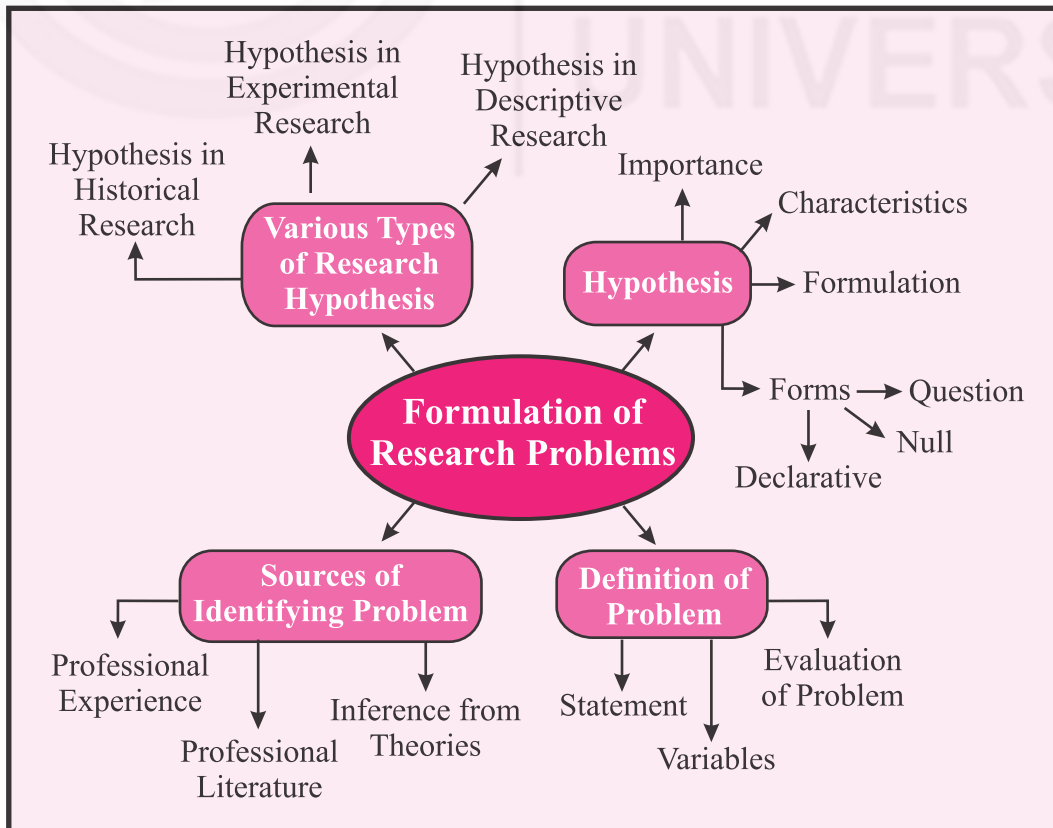


UNIT 4 FORMULATION OF RESEARCH PROBLEMS

Structure

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4.0 INTRODUCTION

The first step in the research process is the selection of a suitable problem from the field chosen by the researcher. In each field or area of education, several problems exist which may have reference to pure, applied, or action research. The choice and formulation of a suitable problem is one of the most difficult tasks for a researcher, especially if he/she is a beginner. There are many sources to which a researcher may go for a suitable research problem, or from which he/she may develop a sense of problem awareness.

The features of a good research problem are its:

- i) significance,
- ii) originality, and
- iii) feasibility.

You, as a researcher, should evaluate a proposed problem in the light of your competence and professional experience, possible difficulties in the availability of data, the financial and field constraints, and limitations of time. After evaluating a broad research problem you have to narrow it down to a highly specific research problem. You formulate the problem by stating specific questions for which you would seek answers through the application of scientific method. After the selection and formulation of a research problem, the derivation of Hypothesis(es) is the next and most important step in the research process. This step establishes the problem and the logic underlying the research study. Questions which the researcher has designed to answer are usually framed as hypothesis to be tested on the basis of evidence. The formulation of the research problem and hypothesis(es) is typically determined with the help of the implications of the related literature and the deductive logic of the problem under investigation. For this, a researcher should familiarise himself/herself with the steps involved in the selection, definition and evaluation of a research problem, and also with the concept of hypothesis alongwith its various types, the features of usable hypothesis and its importance.

4.1 OBJECTIVES

In this Unit, you will concentrate on the selection, definition, statement, and evaluation of the research problem. It also deals with the nature, importance and formulation of a hypothesis, the features of a usable hypothesis, its various types and utility in the research process. On completion of this Unit, you should be able to:

- Describe the important sources for the selection or identification of research problems,
- Explain what is meant by the 'definition' of the problem,
- Describe the criteria which are helpful in the evaluation of a research problem, and
- Explain the meaning of hypothesis, what its importance is, and types of hypotheses.

4.2 SOURCES OF IDENTIFYING A PROBLEM

A thorough understanding of known facts and ideas in the field of your interest as a researcher constitute the first and the most important step in selecting a problem for your study.

A thorough knowledge of the research studies conducted in the field provides you with details about the problems which have remained unresolved. A survey of suggestions for further research given at the end of research reports and reviews of research would help you to get an idea about the gaps which exist in the knowledge pertaining to your field of educational research. Periodicals and bibliographies of educational research are helpful in keeping you informed about the research going on in the field in which you are interested and show competence.

The choice and identification of a suitable problem is usually difficult. For a beginner to identify a research problem is always a very difficult task. This may be due to his/her limited knowledge of research processes or his/her unpreparedness for identifying the problem. He/she may not be familiar with the problems in the field which need solution through research. Even an experienced researcher finds it difficult to list all the problems that need to be researched. Each researcher selects a problem because of his/her own needs and purposes. The following, are, however, some important sources which would help you identify a suitable and significant problem.

4.2.1 Professional Experience

Professional experience of a researcher is one of the most fruitful resources which could suggest research problems. For example, if you are a classroom teacher, or academic counselor or working in any distance learning institute, you must be confronted with a number of problems in your day-to-day academic activities. In the classroom, there is a dynamic interaction between you as the teacher and your learners, between learners themselves, and between learners and learning materials. Such interaction provides you with a variety of problems to be solved through research. You may also be confronted with a number of behavioural problems in and outside the classroom. You have to make decisions about the probable effects of classroom instruction on your learners behaviour so as to establish a relationship between instructional objectives, learning experiences and learning outcomes in terms of behavioural changes in the learners. The learner behaviour may be analysed in terms of their academic achievement, interests, attitudes, motivation, values and some personality characteristics. You have to take decisions about the effectiveness of certain innovative teaching methods and techniques so as to base future classroom instructions upon empirical evidence rather than upon your subjective opinion. The teacher may wish to get answers to certain important and significant questions pertaining to certain components of the teaching- learning process. What are the organisational or management techniques that are employed? How are learning materials presented? How do students, teachers and parents feel about the use of certain innovations in the classroom? What out-of-school activities affect students and the teaching- learning process? How does the isolation of a distance student affect his/her progress in a course?

Introduction to Research in Distance Education

The educational administrators and planners may find subjects of research in the areas concerning decision-making, scheduling, teacher recruitment and placement, instructional supervision, and several other matters with which they are concerned.

Contacts and discussions with research oriented people are also helpful to researchers in identifying crucial problems and issues concerning education. Participation in conferences, seminars and workshops and listening to the learned speakers are very helpful in locating research problems. The Distance Education Council in India has identified some areas of research. They also provide financial aid for doing research in those areas.

4.2.2 Professional Literature

The study of professional literature will not only expose you to pressing research problems but will also suggest the way in which research is conducted. Research reports, bibliographies of books and articles, periodicals, research abstracts, yearbooks, dictionaries, research guides etc. would suggest areas in which research is needed.

Some specialised sources are:

- Encyclopedia of Educational Research,
- Dissertation Abstracts International,
- Psychological Abstracts, and similar publications are rich sources of research problems.

Some journals are:

- Open Learning
- The Journal of Distance Education
- The American Journal of Distance Education
- Indian Journal of Open Learning

The above publications are exclusively devoted to identifying and bringing into sharp focus the varied research needs in the different areas and aspects of Education and Distance Education in particular. Besides these printed materials, the other important sources for educational research are computerized databases. Most prominent amongst them is the Educational Resources Information Centre (ERIC) database, EBSLO, PsycINFO etc. International Council for Distance Learning (ICDL) database provides information about research literature on Open and Distance Education.

All published research reports generally conclude by making suggestions about further research. These suggestions are helpful to researchers for making decisions about methods and procedures employed by other researchers in similar studies with different samples.

Many research studies are criticised for weaknesses in design, treatment and analysis of data, contradictions and inconsistencies in the results, and so on. Thus, researchers can make significant contributions not by repeating these studies, but by making necessary

modifications in the design and procedures so as to correct the inconsistencies found in earlier works.

4.2.3 Inference from Theories and Other Sources

Another important source of identifying the research problems lies in the generalisations that are drawn from various theories pertaining to education, psychology, sociology, etc., known to the researcher. For example, the application of general principles involved in various theories to specific problems of Distance Education makes an excellent starting point for research in this area. Various theories of personality, intelligence, motivation, etc. are helpful in identifying problems pertaining to classroom situations and practices. It is only through research that you can profitably test the validity, scope, and practicability of various theories in educational situations.

Technological and social changes, and curricular developments constantly give rise to new problems and issues for research. Such innovations as teaching by television, programmed instructions, computers, and other hardware and software techniques need to be carefully evaluated through the research process.

Check Your Progress 1

List at least four sources for identifying research problems in the area of education. Which one may be a better source in the case of distance education and Why?

Notes: (a) Space is given below for your answer.

(b) Compare your answer with the one given at the end of this Unit.

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4.3 DEFINITION OF THE PROBLEM

After a problem has been selected, the next task for you is to define it in a form amenable to research. The definition of a problem amounts to specifying it in detail and narrowing it down to workable size. Each question and subordinate questions to be answered are specified at this stage and the scope and limits of investigation are determined. Usually, it is necessary to review previous studies in order to determine just what is to be done. Sometimes, while defining the problem, it is necessary to formulate the point of view or educational theory on which the research study is to be based. In case certain assumptions are made, they must be explicitly stated. Formulation of the problem includes:

- i) stating the problem in the form of statements or questions which make the problem clear and understandable,
- ii) identification and operationalisation of the variables concisely, and
- iii) evaluating the problem in terms of its significance, novelty and feasibility.

Let us now touch upon each of the above points one by one.

4.3.1 Statement of the Problem

A good statement of a problem must clarify exactly what is to be determined or solved or what is the research question. It must restrict the scope of the study to specific and workable research questions. So, you are required to describe the background of the study, its theoretical basis and underlying assumptions, and specify the issues in concrete, specific, and workable questions. All questions raised must be related to the problem. Each major issue or element should be separated into its subsidiary or secondary elements, and these should be arranged in a logical order under the major divisions.

4.3.2 Operationalisation of Variables

In stating a problem, the researcher should make sure that it is neither stated in terms so general as to make it vague nor specified so narrowly as to make it insignificant and trivial. The most important step in this direction is to specify the variables involved in the problem and define them in operational terms. To illustrate, suppose you state that you want to study the “Effectiveness of television on the performance of students in Course One of Master of Arts (Distance Education) offered by the Indira Gandhi National Open University”. This statement is broad and it communicates in a general way what you want to do. But it is necessary to specify the problem with much greater precision. For this the first step is to specify the variables involved in the problem and define them in operational terms.

The variables involved in the problem are, “effectiveness” and “performance”. Please note that these expressions are to be understood beyond their dictionary meanings. For example, the dictionary meaning of “effectiveness” is “producing the desired effect”. This meaning is not sufficient for research purposes. It is important for you to specify exactly

what indicator of effectiveness you will use or what you will do to measure the presence or absence of the phenomenon denoted by the term “effectiveness”. Similarly, you have to define the other variable “performance” also in terms of the operations or processes that will be used to measure them. In this study, you might choose to define “effectiveness” as the improvement made by the Diploma students in scores on a standardized achievement test in Course One. The term ‘performance’ might refer to the scores on the achievement test in Course One.

It is worth noting that the problem should be stated in a way that it indicates a relationship between two or more variables. It should involve neither philosophical issues, values nor questions of judgement that cannot be answered by scientific investigations. For example, should television be more effective in increasing performance level of students?

Such value questions cannot be answered through research. Similarly, the question “what is there in television teaching that enhance performances” is a philosophical question which cannot be probed easily.

4.3.3 Evaluation of the Problem

It is worthwhile for you to ask yourself a series of questions before you undertake the research. The questions should be helpful in the evaluation of the problem on various criteria. All such questions must be answered affirmatively before the study is undertaken. What are the questions that we should ask?

i) Is the problem researchable?

There are certain problems that cannot be effectively solved through the process of research. A researchable problem is always concerned with the relationship existing between two or more variables that can be defined and measured. The problem should be capable of being stated in the form of workable research questions that can be answered empirically.

ii) Is the problem new?

There is no use in studying a problem which has already been adequately investigated by other researchers. To avoid such duplication, it is essential to examine very carefully the literature available in the field concerned. The problem should be selected only when you are convinced that it is really a new problem which has never before been investigated successfully. However, it must be noted that a researcher may repeat a study when he/she wants to verify its conclusions or to extend the validity of its findings in a situation entirely different from the previous one.

iii) Is the problem significant?

The problem should be such that it is likely to fill in the gaps in the existing knowledge, to help to solve some of the inconsistencies in the previous research, or to help in the interpretation of the known facts. The results or findings of a study should either become

a basis for a theory, generalisations or principles. Besides, they should lead to new problems for further research or have some useful practical applications.

iv) Is the problem feasible for the particular researcher?

A research problem may be researchable, new or significant, and yet not feasible because of the following considerations:

- a. *Research competencies:* The problem should be in an area in which the researcher is qualified and competent. He/she must possess the necessary skills and competencies that may be needed to develop and administer the data gathering tools, and interpret the data available for analysis. The researcher should also have the necessary knowledge of research design, qualitative and quantitative techniques of data analysis etc. that may be required to carry out the research to its completion.
- b. *Interest and enthusiasm:* The researcher should be genuinely interested in and enthusiastic about the problem he/she wants to undertake for research.
- c. *Financial considerations and feasibility:* The problem should be financially feasible. The researcher should ascertain whether he/she has the necessary financial and temporal resources to carry on the study. Each project has a cost, particularly in the case of DE projects where students are dispersed. The cost is an important element in feasibility. It is important to estimate the cost of the project and assess the availability of funds. This will determine whether the project can be actually executed.
- d. *Administrative considerations:* In addition to personal limitations, financial and time constraints, the researcher should also consider the nature of data, equipment, specialised personnel, and administrative facilities that are needed to complete the study successfully. He/she should check whether he/she is able to get the co-operation from various administrative authorities for collecting various types of data.
- e. *Time:* Projects are a time bound exercise. Most of you, if not all, are already engaged in more than one activity in office, at home and at social organizations. It is important to assess the time required to complete a study. Besides the assessment of total period, it is necessary to identify the period of the year in relation to the nature of the study. For instance, if you wish to study instructional transactions in personal contact programmes your project must be timed so that you can actually observe a series of sessions in personal contact programmes.

At this stage, we should like you not to proceed further until you complete the exercise given below.

Check Your Progress 2

In the light of our discussion till now think of a research problem either in Distance Education or in your own area of specialisation. State the variables of the problem you have identified and state briefly how it is new, significant and feasible for research.

- Notes:** (a) Space is given below for your answer.
(b) Compare your answer with the one given at the end of the Unit.

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4.4 HYPOTHESIS

After you have identified a problem, you may formulate certain answers in the form of hypotheses. These guesses are based on the past experiences or informal observation or information gained from others. A hypothesis is defined as “A tentative proposition suggested as a solution to a problem or as an explanation of some phenomenon (Ary et.al. 1985).

4.4.1 Importance of Hypothesis

It is an agreed fact that, whenever possible, research should proceed from a hypothesis. Hypotheses are particularly necessary in studies where the cause-and-effect relationships are to be discovered. These, however, may not be so important in research studies in which the issue is of determining the status of a given historical, social or educational phenomenon.

It may be mentioned here that hypotheses are not essential to all researches, particularly, in the early stages of exploration of a problem. And it should not be assumed that failure to develop a hypothesis is necessarily a sign of lack of scientific orientation. However, a hypothesis may be conceived as an assumption which merits consideration and needs to be tested against the available empirical evidence. That is why it is suggested that a hypothesis is to be used as a pivot around which the investigation resolves, limiting thereby the field of investigation to a definite target and also determining the observations to be made and the ones to ignore.

A good hypothesis has several basic characteristics. We discuss some of them as follows:

- i) *Providing direction:* Hypotheses provide direction to research and prevent review of irrelevant literature and collection of useless or excessive data. They enable you to classify the information from the stand point of both 'relevance' and 'organisation'. This is necessary because, a given fact may be relevant with respect to one hypothesis and irrelevant with respect to another, or it may belong to one classification with regard to first hypothesis or to an entirely different classification with regard to the second. Thus, hypotheses ensure the collection of relevant data necessary to answer questions arising from the statement of the problem. For example, in a research problem, 'Study habits and achievement of Distance Education Learners', the researcher may frame the hypothesis – learners putting in more study hours achieve more in the examination. The researcher will collect data about the number of hours being put in by learners for study and their achievement in the examination.
- ii) *Hypothesis should be testable:* Hypotheses should be stated in such a way as to indicate an expected difference or an expected relationship between the measures used in the research. The researcher should not state any hypothesis that she/he does not have reason to believe that it can be tested or evaluated by some objective means. Hypotheses are the propositions about the relationships between variables. These can be tested empirically. There is no relationship between attendance to personal contact programmes in a distance education course and achievement in examination. Such propositions can be tested by means of empirical data.
- iii) *Hypothesis should be brief and clear:* Hypothesis should be stated clearly and briefly. It makes problems easier for the reader to understand and also for the researcher to test. The statement should be a concise statement of the relationship expected.

4.4.2 Characteristics of a Good Hypothesis

There are some important aspects to be looked into to judge the worth of a hypothesis in research. A good hypothesis must be:

- i) consistent with known facts and theories, and might be even expected to predict or anticipate previously unknown data,
- ii) able to explain the data in simpler terms,
- iii) stated in the simplest possible terms, depending upon the complexity of the concepts involved in the research problem, and

- iv) stated in a way that it can be tested for its being probably true or probably false, in order to arrive at conclusions in the form of empirical or operational statements.

4.4.3 Formulation of Hypothesis

Hypotheses are formulated to explain observed facts, conditions, or behaviour and to serve as a guide in the research process. The statements or tentative generalisations which constitute hypotheses are partly based on facts and explanations, and partly conceptual. Hence, there are certain necessary conditions that are conducive to the formulation of hypothesis. These are:

- i) *Deducing a hypothesis inductively:* You may deduce a hypothesis inductively after making observations of behavior, noticing trends or probable relationships. For example, as a teacher you observe your learners behaviour in the classroom. On the basis of your experience in the educational institution, you may attempt to relate your behaviour with that of the learners, to various teaching-learning methods as well as to the change in the institution itself and so on. On the basis of these observations, you may be able to formulate a hypothesis that attempts to explain these behavioural relationships in an educational setting.
- ii) *Limiting the problem:* Here you need to state that the basic understanding of the literature pertaining to the problem under investigation also becomes essential in view of the fact that the already existing corpus of knowledge on the particular problem is too detailed to be incorporated in the process of hypothesis formulation. Hence, the researcher must have the ability to comprehend the available evidence in support or against the expected relationships so as to remain within the limits of the problem while formulating the hypothesis.
- iii) *Deriving a hypothesis deductively:* Hypotheses are also derived deductively from the theory. Such types of hypothesis, called “deductive hypotheses” are formulated by studying a particular theory in the area of one’s interest and deducting a hypothesis from this theory through logic. This is possible when a researcher has a versatile intellect and can make use of it for restructuring his/her experiences in research. Creative approach to problem solving so badly needed by a researcher, is the product of intellectual adventure, sound attitude and agile intellect. This view is more relevant to descriptive and historical research in which the abundance of literature with a number of contradictory/supplementary theories may divert the researcher from the right path. Therefore, you have to exercise great restraint and display considerable patience to keep yourself on the right path. You have to develop certain habits and attitudes, besides saturating yourself with all the possible information about the problem and also think open-mindedly about it before proceeding further in the conduct of the study.
- iv) *Hypothesis from analogies, conversations, etc.:* Analogies also lead a researcher to clues that may prove to be useful in the formulation of hypotheses and for finding solutions to problems. For example, a new social situation resembles an old one with respect to a particular set of factors. If the researcher knows that the factors correlate in a particular fashion in the old situation, he/she may hypothesize in terms of trends in the relationship to be expected in the new social situation. However, it is

to be mentioned here that use of analogies must be made cautiously as they are not fool-proof tools for finding solutions to problems.

Sometimes, especially the inter-disciplinary research conversations and consultations with experts are also found to be useful in the formulation of hypotheses. To study the relationship of increasing literacy rate in the rural population with the changing pattern of agricultural development requires consultation with experts in agriculture, education, planning etc. while formulating hypotheses. However, formulating hypothesis on the basis of analogies, anecdotes and conversations should be done rarely, only as exceptions.

4.4.4 Three Forms of Hypothesis

To arrive at some conclusions pertaining to a particular research problem, a hypothesis is generally stated in testable form for its proper testing. It may be stated either in declarative form, the null form or the question form. What do these three forms mean?

Declarative hypothesis

When a researcher makes a positive statement about the outcome of the study, we get a declarative hypothesis. For example, the hypothesis 'The performance of the creatives on problem solving tasks is significantly higher than the non-creatives' is stated in the declarative form. Here, the researcher makes an attempt to predict the future outcome. This prediction is based on the theoretical formulation of what should happen in a particular situation if the explanations of the behaviour (performance on problem solving tasks) which the researcher has given in his/her theory are correct.

Null hypothesis

A null hypothesis is a non-directional hypothesis that proposes no difference or no relationship. The usual form of such hypothesis is: "There is no significant difference between the performance of two groups of students, one following the conventional system of education and the second following distance-mode of education. Since a null hypothesis can be statistically tested, it is also known as "statistical hypothesis" or "testing hypothesis". The proponents of null hypothesis emphasize that the researcher must remain unbiased throughout his/her research efforts. This view is defended on the basis of the fact that in this case the researcher neither predicts a result nor indicates a preconceived attitude that may influence his/her behaviour during the conduct of the study. On the other hand, those who criticize the use of null hypothesis argue that the researcher should indicate the direction of the outcomes of the study, wherever possible. It is further argued that predicting the results of a study is less awkward in phrasing a relationship, than in using the 'no difference' phrase that is usual in the null form.

A null hypothesis challenges the assertion of a declarative hypothesis and also denies it altogether. It says even where it seems to hold good, it is so due to mere coincidence. It is for the researcher to reject the null hypothesis by showing that the outcome mentioned in the declarative hypothesis does occur and the quantum there of is so significant that it cannot easily be said to have occurred by chance. The reasons for rejecting the null hypothesis may differ. Sometimes the null hypothesis is rejected only when the probability

of its having occurred by a mere chance is 1 out of 100 or .01 out of 1. In such instances, we consider the probability of its having occurred by chance to be too little to be considered, and we reject the chance component of the null hypothesis and take the occurrence to be due to a genuine tendency.

Hypothesis in question form

In the question-form-hypothesis, instead of stating what outcome is expected, a question is asked as to what the outcome will be. e.g. if you are interested to find out whether instructions through video programmes have any positive effect on the learning of the students of Master of Arts (Distance Education). The declarative form of the hypothesis will be: ‘Will Instruction through video programmes affect the learning of student of Distance Education?’ This statement shows that instructions through video programmes is not related to learning.

It is easier to state a hypothesis in question form because it appears to be quite useful to write down all the questions that one wants to answer in a particular research study. On the other hand, a researcher faces difficulties in predicting the outcome of the study and stating the hypothesis in declarative form. But it is worth noting that the question form is less powerful than the declarative or null form as a tool for obtaining valid information, and it is generally advisable to state a hypothesis in directional i.e., declarative form to arrive at valid conclusions and generalizations. However, this last statement should not be taken as if it were a law in the practice and theory of research.

Let us examine and compare the three forms of hypothesis on “Effect of video programmes on learning of students in distance education”.

Declarative	Instruction through Video Programmes will increase the learning of the students enrolled in the Masters in Distance Education in comparison with those who do not have such provision.
Null	There will be no difference in learning outcomes of the two group of students, one following instructions through video programmes and the other having no such facility.
Question	Will instructions through video programmes affect the learning of student of Distance Education?

Check Your Progress 3

Give your own examples for each of the three forms of hypothesis.

Notes: (a) Space is given below for your answer.

(b) Look at the samples given at the end of this Unit

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4.5 HYPOTHESISING IN VARIOUS TYPES OF RESEARCH

There is no rigid rule about the choice of the form of hypothesis. You can choose any form which your research problems warrant. However, there are various conventions followed in selecting the form of hypothesis in relation to various types of research such as Historical, Experimental and Descriptive research etc. In this section we shall discuss how hypotheses are usually formulated in Historical research, Experimental research and Descriptive research.

4.5.1 Hypothesis in Historical Research

The hypotheses in historical research are useful in explaining events, conditions or phenomena of the historical period in question. For example, it may be hypothesized that ‘The educational innovations highlighted in the National Policy on Education 1986 are based upon practices that have been previously tried in Indian Education since 1947’, or

'The observations of European school systems by Indian Educators during the nineteenth and the first half of the twentieth century exercise significant influence on Indian educational practices'. The hypotheses for historical research may not be formal hypotheses to be tested. Rather they are written as 'explicit' statements that tentatively explain the occurrence of events and conditions. It has been argued that an explicit statement or a systematic awareness of the hypothesis used in determining what facts were significant, clarifies the relationship between the investigator's, ideas and the facts he/she reports, and it minimizes the possibility of employing trivial, biased, conflicting, faulty, or archaic hypotheses.

While formulating hypotheses in historical research, the investigator may formulate questions that may be most appropriate for the past events which he/she is investigating and then directs his/her research efforts seeking answers to these questions with the help of gathered evidence. For example the researcher may frame question – what educational practices have been tried in Indian Education since 1947? What educational innovations have been highlighted in National Educational Policy of 1986? If the evidence is compatible with the consequences of the hypothesis, it is confirmed. If the evidence is not compatible, or is negative, the hypothesis is not confirmed. It is through such synthesis that historical facts are established.

4.5.2 Hypothesis in Experimental Research

In experimental research a hypothesis states that the antecedent condition or phenomenon (independent variable) is related in cause and effect relationship to the occurrence of another condition, phenomenon, event or effect (dependent variable) in a particular setting. To test a hypothesis, the researcher attempts to control all the conditions except the independent variable which he/she manipulates. Then he/she observes the effect on the dependent variable presumably because of the exposure to the independent variable.

In view of the intricacy of casual effect of the independent variable, it is advisable for the researcher to give sufficient attention to the formulation of hypothesis alongwith the experimental plans and statistical procedures. The experimental plans and statistical procedures merely help the researcher in testing the hypothesis and contribute little to the development of theories for the advancement of knowledge. For example, a researcher wishes to study the effect of some type of supplementary materials used in a particular class taught by closed-circuit television. The experiment is supposed to compare the use of supplementary learning material alongwith some other methods. Hence, it may be hypothesized either in declarative form : 'The achievement of learners who use programmed supplementary materials will be superior to the achievement of learners who follow non-programmed supplementary materials' or in null form: 'The achievement of learners who use programmed supplementary materials will not differ from the achievement of learners who use non-programmed supplementary materials'. Knowledge cannot be advanced by working on either of these hypotheses.

It may be mentioned here that the hypotheses derived or developed from existing theories contribute to the development of new theories and knowledge only through the method of experimentation.

4.5.3 Hypothesis in Descriptive Research

Different types of hypotheses have been in use in descriptive research in education and distance education. For example, to study the effectiveness of distance education in a country it may be hypothesized that 'The regional disparities in higher education have decreased over the period 1970-1986 with the increase in centres of distance/ correspondence education in Indian Universities'. Also public opinion surveys require hypotheses to study the opinion of people with regard to various educational issues. For example, to study the popularity of educational television in the country, it may be hypothesized that 'The educational television programmes are preferred more by the urban students than the rural learners'. Some studies in education require not only testing but also tracing relationship between serious facts to have a deeper insight into the phenomenon. For example, a researcher wants to study the relationship of socio-economic status and achievement-motivation with the enrolment of rural learners in higher education through correspondence. This requires the hypothesis: 'There is a significant relationship between Socio-economic status and rural learners in higher education through correspondence as compared to that of their urban counterparts'.

Similarly some researchers are concerned with developmental studies, especially in the identification of trends and predicting what is likely to happen in the near future. To illustrate, the researcher may be interested in the study of opening of non-formal education centres in a changing social order. He/she may hypothesize, 'The new colonies in the industrial townships require more non-formal education centres than the rural areas in Maharashtra'.

4.6 LET US SUM UP

In this Unit, we have discussed the issues related to selection, definition, statement and evaluation of research problems along with hypothesis formulation in various types of research.

To select a research problem we may depend on various sources: our personal experiences, the existing theories in the field concerned, etc. A research problem should contribute to the existing body of knowledge and lead to further research. It should be testable and feasible.

A hypothesis, can be derived either inductively or deductively or through analogies, consultations, etc. A good hypothesis must be simple and clear; it must state the expected relationship between variables, and thus make a prediction.

A hypothesis can be stated in a declarative form, null form or question form. Hypotheses are formulated and stated differently depending upon the requirements of various types of research such as historical research, experimental research and descriptive research.

4.7 CHECK YOUR PROGRESS: THE KEY

- 1) The four sources of identifying research problems in the area of education are:
(a) the researcher's own understanding and knowledge of the area of research and research studies already conducted in that particular area, (b) professional experience of the researcher, (c) professional literature and (d) generalisation made by various disciplines such as education, psychology, sociology, etc.

In distance education, the researcher's own professional experience may be a better source of identifying a research problem because it would provide him/her with the necessary information regarding the relevance and the feasibility of the research contemplated.

- 2) Here you may have any research problem. But we give you a model. "The educational value of audio-video programmes on Distance Education" could be a research problem. It is significant because, the idea of multi-media approach to distance teaching has to be tested empirically in a given situation. The impact of audios and videos on distance learners will decide whether to continue with multimedia approach or not. It is also feasible since it could be taken up by researchers in Distance Education/Educational media, and the financial and other requirements could be met in certain cases.
- 3) Declarative Hypothesis: "An urban distance learner performs better than his/her rural counterpart."

Null Hypothesis: "There is no difference between the performance of an urban and a rural distance learners."

Hypothesis in Question Form: "Is there any significant difference between the performance of urban and rural distance learners?"

Reference

Ary, D., Lucy, C. Jacobs and Razavich, A. (1972) *Introduction to Research in Education*, Third Edition, New York: Holt, Rinehart and Winston Inc.



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Indira Gandhi National Open University

STAFF TRAINING AND RESEARCH INSTITUTE OF DISTANCE EDUCATION

Dear Student,

While studying the units of this block, you may have found certain portions of the text difficult to comprehend. We wish to know your difficulties and suggestions, in order to improve the course. Therefore, we request you to fill out and send us the following questionnaire, which pertains to this block. If you find the space provided insufficient, kindly use a separate sheet.

Questionnaire

Enrolment No.

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1. How many hours did you need for studying the units?

Unit No.	1	2	3	4	5
No. of hours					

2. Please give your reactions to the following items based on your reading of the block:

Items	Excellent	Very Good	Good	Poor	Give specific examples, if poor
Presentation Quality					
Language and Style					
Illustrations Used (diagrams, tables, etc.)					
Conceptual Clarity					
Check your Progress Questions					
Feedback to CYP Questions					

3. Any other comments:

Mail to:
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New Delhi - 110068, India

NOTES

