

**ASSIGNMENT No. 1**

**Q.1 Explain expert opinion, rationality and magic as sources of knowledge. To what extent they are useful now-a-days?**

Human body needs nutritious food for its healthy existence. Human mind also need nutritious food for their healthy and brilliant functioning. Hence Knowledge is considered as the food of mind. The definition of knowledge is ongoing debate among the philosophers in the field of epistemology. According to Plato Knowledge is justified true belief. Knowledge can be defined as a familiarity awareness or understanding of someone or something such as facts, information, descriptions or skills, which is acquired through experiences or education by perceiving, discovering or learning. Any new information acquired by an organism through formal, informal or non formal way of inquiry can be termed as knowledge. Knowledge make individuals more strength and confident in their activity. The activity of research builds new knowledge, theory or formulates generalization.

**Ways/Source of Acquiring Knowledge**

Curious to know about new things is the main motivating factor for searching new knowledge. When a person feel disequilibrium regarding any matter of content, s/he start search for reaching valid conclusion regarding the matter of doubt. The process of clarification leads them to equilibration in their cognition. For the purpose of getting new information the human beings are using following ways to accumulate new knowledge.

**Sensory Perception**

Senses are the gate ways of knowledge. Five senses help an individual to get primary information regarding any object, individual or events and so forth. For example, students can see an experiment conducted by the teacher, hear the explanation, touch the object or product, smell the output, taste the product etc. Through this five activity (five sense organs) or any one activity (single sense organ) students are able to construct and verify information regarding the experiment conducted. Hence sensory perceptions are the one important source or means of acquiring knowledge. In the case of a researcher, the sensory perceptions are important to them to collect information and verify the authenticity and originality of acquired knowledge.

**Logical Reasoning**

Logical reasoning is another way of acquiring Knowledge. It is related to brainy functioning. Ignorance and blind believes made man as a sleeping brains, later, curiosity and search for cause and effect relationship paved the way of unfolding natural truths and facts. People become modern and developed by the way they approached the matters through logical reasoning. Deductive as well as inductive reasoning are emerged by the time as methods of logical reasoning. Individuals may infer things through deductive reasoning, abstract thinking, finding relationship between events and variables and so forth. For example a competent person can make valid conclusion regarding the nature and consequences of certain events by observing behavior of individuals or analyzing chain of events, statement and attitude of national leaders and so forth. Through the logical reasoning a researcher can deduct and infer information regarding the research problem.

## **Deductive Reasoning**

It is the earlier philosophical method of Logical Reasoning. Categorical syllogism is considered as the old systematic method of logical reasoning. The famous philosopher Aristotle developed it as Deductive method of problem solving. Moving from General assumptions to specific application, that means the general to particular principle (DGP). It can be understood by the explanation of categorical syllogism given below.

### **Categorical Syllogism**

Syllogistic reasoning is a kind of logical argument that applies deductive reasoning for drawing a valid conclusion based on two or more propositions. Categorical syllogism consists of three components; such as Major premise, Minor Premise, Conclusion. It establishes a logical relationship between them.

**Major Premise:** it is a self evident assumption, previously established by metaphysical truth or dogmas. For example all men are mortal

**Minor Premise:** it is a particular case related to the major premise. For example, Socrates is a man

**Conclusion:** based on both premises conclusion and inference could be surely possible. For example Socrates is mortal

Form the above example we can observe the general assumption in major premise; that is all men are mortal. Then leads to particular observation in minor premise that Socrates is a man and concludes that that's why he is a mortal.

### **Inductive Reasoning**

Later much creative criticism had been raised regarding the process drawing conclusion from general phenomenon. Because of the reason that there might be some dogmas and myths, baseless beliefs which had not been empirically proved but believed that, they are true and as well as had impacted the conclusion. So it leads to creating unreliable and error information to the people. Hence many centuries later Francis Bacon advocated the inductive method of reasoning or problem solving which had kicked back the limitation of the deductive method. It is the process of specific observations of phenomenon which leads to generalization. Here individuals arrive to conclusions after the empirical verification of many individual observations of a common phenomenon. Hence there is no possibility to adopt any dogmas or myth as a foundation of knowledge. Here the problem solver ensures the mortality of the human beings or any organism in particular case. For example a person analyzing the life history of great personalities, such as Mahatma Gandhi, Nehru, Maulana Abul Kalam Azad, Abraham Lincoln and so forth. S/he could reach a conclusion that even though these personalities had a strong back up of the political power they could not overcome the death. And there is no organism can be found on earth alive after a reasonable length of period. Hence it is concluded that every organism with soul or life should breathe its last after a while.

### **Authority**

There are several occasions where a researcher needs authoritative knowledge. All official information can be termed as authoritative knowledge. One can get information from concern authority regarding their concerned.

Right to information act is a good example for the same. If any individual need authentic information regarding any authority s/he can file a query regarding his information concerned through RTI to concerned authority. This process ensures an information seeker to get authentic knowledge from authority. For example if a researcher needs information regarding the enrollment, dropout rate, literacy rate, budget allocation to different educational sector, s/he can be collect information from the concern authority regarding the above. The information provided by the concerned authority would be the knowledge from authority or authoritative knowledge.

### **Traditions**

Traditions are another important source of knowledge. Much social related knowledge are preserved and transmitted through traditions. For example social skills, values, social functions are entirely routed in traditions of the society. Traditions have local as well as national impact. A researcher can get information regarding the indigenous treatment system, folklore arts, skilled based traditional social class are available from social traditions. There much information which is largely depends on traditions.

### **Experience**

Personal as well as professional experience of an individual contributes much in his knowledge. Personal experience in family, society, and neighborhood taught humans many lessons regarding the behavior, adjustment, social dealings, patience and so forth. Professional experiences make an individual perfectly professional. Knowledge of matters regarding to be performed or not to be do in personal as well as professional situation create through experiences. Learning by doing is also come under this category.

### **Naturalistic Inquiry**

Thirst for knowledge is the uniqueness of human being. When s/he wants to solve a certain problem or confront a curious situation. S/he starts searching for the solution of the problem in naturalistic way. The final solution will be found out by getting new information regarding the problem through the inquiry. For example a researcher felt a problem of why the students of backward areas are less enrolled in higher education. The researcher may formulate possible reasons and possibilities of the problem. Empirically collect information from the original sources, s/he may go to the community location and approach the concerned subject of the study and their social situation. Through this inquiry process the researcher get much valuable information and thereby infer the solution of the problem. The knowledge construction through this process can be termed as naturalistic Inquiry.

### **Trial and Error**

Trial and error is one of the ways of acquiring new knowledge. The term trial and error is contributed by famous psychologist E.L. Thorndike. Individuals learn more things through trial and error process. Knowledge related to practical, professional, skilled and semi skilled professions are largely depends on this source of knowledge. For example knowledge of use of computer, smart phone, driving, playing cricket, football, teaching etc can be acquired through trial and error.

### **Scientific approach**

Knowledge can be created or accumulated through various means. Scientific approach is very important means of knowledge acquisition. Scientific approach ensures the reliability and rationality of the information or knowledge acquired. The knowledge constructed through scientific approach has following features.

1. Body of Knowledge
2. Universal application
3. Empirically proved
4. Experimental
5. Measurable
6. Observable
7. Trustworthiness
8. Objectivity
9. Validity
10. Reliability
11. Predictability

#### **Scientific Method in Developing Knowledge**

Scientific method ensures the reliability and validity of the knowledge constructed through its process. The adoption of the scientific method eliminates the biasness as well as the fake information regarding the matter of concern. John Dewey (1938) identified the following steps for scientific method which constitute the elements of deductive and inductive reasoning.

1. Identification and definition of problems
2. Formulation of hypotheses
3. Collection, organization and Analysis of data
4. Formulation of conclusion
5. Verification, Rejection, or Modification of hypotheses

#### **Intuition**

Knowledge revealed from insight is another means of knowledge acquisition. Archimedes' Principles, Lord Buddha are the living examples of acquired knowledge through intuitions. Many of the life situations we also had experienced intuitive knowledge to solve our life problems. Intuitive knowledge can be acquired through following process.

1. Preparation

In this step all available information regarding the problem to be solved must be assembled and analyzed in depth. Continuous attempts are made to found out solutions and the process is set aside.

2. Incubation

No intentional attempt made to solve the problem. It come to mind while playing, cooking or at bathroom and so forth.

### 3. Illumination

Illumination is the process of intuiting many ideas in the mind of the problem solver unexpectedly. It may be the result of preparation as well as the relaxed mood of incubation period. The script writers, poets, writers, scientist are getting ideas or knowledge in this manner.

### 4. Verification

After receiving the idea the problem solver should verify or test the validity and reliability of the information empirically. The level of attaining knowledge through intuition must be depends on the motivation as well as the intelligence level of problem solver.

### Learning

Learning from the original sources is another method of acquiring knowledge. In modern era Lot of information are available at finger tips. Learning can be done through online as well as off line mode. One can depend the formal classroom as well as non-formal way of learning for acquiring knowledge. Stream wise systematic knowledge are disseminating in formal classrooms. For example, the subjects like engineering, medicine, education, psychology, statistics and so forth are studying in formal classrooms. If an individual is not able to attend the regular classroom for his educational purpose he can avail knowledge through distance learning. However there are many doors are opens for accessing knowledge throughout the world. Learner can search primary sources or secondary sources of information for accumulating knowledge. Learning can be done selectively as per the requirements of the knowledge seeker.

### Q.2 Write key points of different aspects of research in your own words.

A careful consideration of study regarding a particular concern or problem using scientific methods. According to the American sociologist Earl Robert Babbie, “Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon. Research involves inductive and deductive methods.”

Inductive research methods are used to analyze an observed event. Deductive methods are used to verify the observed event. Inductive approaches are associated with qualitative research and deductive methods are more commonly associated with quantitative research.

Research is conducted with a purpose to understand:

- What do organizations or businesses really want to find out?
- What are the processes that need to be followed to chase the idea?
- What are the arguments that need to be built around a concept?
- What is the evidence that will be required for people to believe in the idea or concept?

### Characteristics of research

1. A systematic approach must be followed for accurate data. Rules and procedures are an integral part of the process that set the objective. Researchers need to practice ethics and a code of conduct while making observations or drawing conclusions.
2. Research is based on logical reasoning and involves both inductive and deductive methods.

3. The data or knowledge that is derived is in real time from actual observations in natural settings.
4. There is an in-depth analysis of all data collected so that there are no anomalies associated with it.
5. Research creates a path for generating new questions. Existing data helps create more opportunities for research.
6. Research is analytical in nature. It makes use of all the available data so that there is no ambiguity in inference.
7. Accuracy is one of the most important aspects of research. The information that is obtained should be accurate and true to its nature. For example, laboratories provide a controlled environment to collect data. Accuracy is measured in the instruments used, the calibrations of instruments or tools, and the final result of the experiment.

**Following are the types of research methods:**

**Basic research:** A basic research definition is data collected to enhance knowledge. The main motivation is knowledge expansion. It is a non-commercial research that doesn't facilitate in creating or inventing anything. For example: an experiment to determine a simple fact.

**Applied research:** Applied research focuses on analyzing and solving real-life problems. This type refers to the study that helps solve practical problems using scientific methods. Studies play an important role in solving issues that impact the overall well-being of humans. For example: finding a specific cure for a disease.

**Problem oriented research:** As the name suggests, problem-oriented research is conducted to understand the exact nature of a problem to find out relevant solutions. The term "problem" refers to multiple choices or issues when analyzing a situation.

For example, revenue of a car company has decreased by 12% in the last year. The following could be the probable causes: there is no optimum production, poor quality of a product, no advertising, or economic conditions.

**Problem solving research:** This type of research is conducted by companies to understand and resolve their own problems. The problem-solving method uses applied research to find solutions to the existing problems.

**Qualitative research:** Qualitative research is a process that is about inquiry. It helps create in-depth understanding of problems or issues in their natural settings. This is a non-statistical method.

Qualitative research is heavily dependent on the experience of the researchers and the questions used to probe the sample. The sample size is usually restricted to 6-10 people. Open-ended questions are asked in a manner that encourages answers that lead to another question or group of questions. The purpose of asking open-ended questions is to gather as much information as possible from the sample.

The following are the methods used for qualitative research:

1. One-to-one interview
2. Focus groups
3. Ethnographic research

4. Content/Text Analysis
5. Case study research

**Quantitative research:** Qualitative research is a structured way of collecting data and analyzing it to draw conclusions. Unlike qualitative methods, this method uses a computational and statistical process to collect and analyze data. Quantitative data is all about numbers. Quantitative research involves a larger population — more people means more data. With more data to analyze, you can obtain more accurate results. This method uses close-ended questions because the researchers are typically looking to gather statistical data. Online surveys, questionnaires, and polls are preferable data collection tools used in quantitative research. There are various methods of deploying surveys or questionnaires. Online surveys allow survey creators to reach large amounts of people or smaller focus groups for different types of research that meet different goals. Survey respondents can receive surveys on mobile phones, in emails, or can simply use the internet to access surveys.

There are three purposes of research:

1. **Exploratory:** As the name suggests, exploratory research is conducted to explore a group of questions. The answers and analytics may not offer a final conclusion to the perceived problem. It is conducted to handle new problem areas which haven't been explored before. This exploratory process lays the foundation for more conclusive research and data collection.
2. **Descriptive:** Descriptive research focuses on expanding knowledge on current issues through a process of data collection. Descriptive studies are used to describe the behavior of a sample population. In a descriptive study, only one variable is required to conduct the study. The three main purposes of descriptive research are describing, explaining, and validating the findings. For example, a study conducted to know if top-level management leaders in the 21st century possess the moral right to receive a huge sum of money from the company profit.
3. **Explanatory:** Explanatory research or causal research is conducted to understand the impact of certain changes in existing standard procedures. Conducting experiments is the most popular form of casual research. For example, a study conducted to understand the effect of rebranding on customer loyalty.

To understand the characteristic of research design using research purpose here is a comparative analysis:

	Exploratory Research	Descriptive Research	Explanatory Research
Research approach used	Unstructured	Structured	Highly structured
Research conducted through	Asking research questions	Asking research questions	By using research hypotheses.
When is it conducted?	Early stages of decision making	Later stages of decision making	Later stages of decision making

## Qualitative Methods

Qualitative research is a method that collects data using conversational methods. Participants are asked open-ended questions. The responses collected are essentially non-numerical. This method not only helps a researcher understand what participants think but also why they think in a particular way.

Types of qualitative methods include:

- **One-to-one Interview:** This interview is conducted with one participant at a given point in time. One-to-one interviews need a researcher to prepare questions in advance. The researcher asks only the most important questions to the participant. This type of interview lasts anywhere between 20 minutes to half an hour. During this time the researcher collects as many meaningful answers as possible from the participants to draw inferences.
- **Focus Groups:** Focus groups are small groups comprising of around 6-10 participants who are usually experts in the subject matter. A moderator is assigned to a focus group who facilitates the discussion amongst the group members. A moderator's experience in conducting the focus group plays an important role. An experienced moderator can probe the participants by asking the correct questions that will help them collect a sizable amount of information related to the research.
- **Ethnographic Research:** Ethnographic research is an in-depth form of research where people are observed in their natural environment without this method is demanding due to the necessity of a researcher entering a natural environment of other people. Geographic locations can be a constraint as well. Instead of conducting interviews, a researcher experiences the normal setting and daily life of a group of people.
- **Text Analysis:** Text analysis is a little different from other qualitative methods as it is used to analyze social constructs by decoding words through any available form of documentation. The researcher studies and understands the context in which the documents are written and then tries to draw meaningful inferences from it. Researchers today follow activities on a social media platform to try and understand patterns of thoughts.
- **Case Study:** Case study research is used to study an organization or an entity. This method is one of the most valuable options for modern this type of research is used in fields like the education sector, philosophical studies, and psychological studies. This method involves a deep dive into ongoing research and collecting data.

### Q.3 Describe in your own words the advantages of educational research.

Since the time of the Revolution, education has been an important part of the American ethos. When Europeans claimed that the social fabric would disintegrate without a king, the founders of the Republic argued that an educated citizenry would hold the polity together. A century later, as waves of newcomers filled the land, schooling was promoted as the way to make them Americans, to knit together a nation of immigrants. Now, two centuries later, the United States is in the midst of fundamental transitions: it can no longer dominate the world politically or economically as it did in the 35 years after World War II; industrial production is migrating



overseas, changing the nature—and the intellectual and technical demands—of the contemporary workplace; the concentration of poverty and disadvantage that characterizes large cities has become an intransigent problem. Once again, education is at the top of the national political agenda. Every state has mandated reforms and countless local programs and alliances have initiated efforts for improvements. Because education holds so central a place in the nation, education reform efforts in the United States have been almost continuous. These efforts have been based on passion, conviction, and, occasionally, research. Almost all have been declared a success by at least some people. And indisputable progress has been made in terms of school attendance, years of schooling, levels of literacy, and the quality of classrooms and equipment. Yet, as the twentieth century ends, few people are fully satisfied with the condition of education in the United States. Many individuals and institutions have been involved in school reform. From the great education reformers of the nineteenth century—Horace Mann in the 1840s, John Dewey in the 1890s—to the major philanthropies in the twentieth century—the Carnegie, Spencer, and Ford Foundations and the Julius Rosenwald Fund (which built schools all over the South) the idea of improving education in order to improve society has been a powerful force. Since the 1850s, when the principle of state-supported schools for all children triumphed in most parts of the country, state and local governments have played a central role in the governance of what rapidly became "school systems." In successive waves of reformist sentiment, schools have been used as the instrument for shaping a rural populace into an increasingly urban and industrial one. Each reform attempt is an exercise in optimism and creativity. Reform efforts require considerable energy and commitment. They also require financial resources and longtime horizons. The dynamism and ferment that characterize education reform efforts in the United States have led to significant change and progress on many fronts. But the country has undergone even greater change, with the consequence that public frustration with the quality of education in the United States has been as constant as reform efforts. Research is one of the most important tools society has for ensuring that government policies and practices are thoughtful and effective. Research has, for example, been a potent force for improved public health: because of advances in biomedical research that produced the polio vaccine, public health officials could confidently inoculate the entire youth population with a live virus. So axiomatic is the profitability of research in agriculture that one of the nation's foremost seed companies was willing to invest 40 years of effort in the development of a seedless watermelon. In education, however, the potential of research has not been realized. The sheer complexity of the enterprise has been a factor, as have underinvestment, lack of focus, and the difficulties of translating research results for practical ends.

### **Complexity**

Education in the United States is an extraordinarily complex, dynamic system, which has to continually adapt to changes in the society. More centralized systems or more traditional societies, or simply smaller countries, present more manageable challenges for designing education research, but in any setting it must deal with the behavior and development of individual students, group dynamics of the classroom, and institutional change of school systems—all in the context of the evolving needs of the society. Research in education examines an

ever-changing process, without end and without final answers. Yet good research can often make the difference between adaptations that improve the educational process and those that don't.

### **Underinvestment**

The federal government has made major investments in research in many fields in the last half century. As a result, medical treatment, defense, agriculture, space exploration, technology, and other social goods have made important progress. Although between 60 and 75 percent of support for education research comes from the federal government; that represents less than 1 percent of federal spending on education. And the dollar amount pales when compared with federal support of medical, defense, or even agricultural research. From another view, although education for kindergarten through grade 12 (K-12) costs close to \$340 billion per year (U.S. Department of Education, 1997), virtually no state funding supports education research. In short, the nation has made an enormous social investment in education with relatively little reflection, scientific rigor, or quality control.

### **Lack of Focus**

Past investments in education research can only be described as diffuse. K-12 schooling in the United States is such a vast enterprise and takes place in such diverse settings that letting "a thousand flowers bloom" in education research appeared to

be a sensible, responsive approach. The federal bodies that set priorities for education research have tended to frame their agendas very broadly. The foundations and agencies that fund research have encouraged and supported an extremely wide spectrum of research and development activities. This approach has resulted in innovative studies, fascinating findings, and isolated success stories, but it has not had the widespread effects on student learning that would create demand for the fruits of research. The National Research Council's recent assessment of the federal role in supporting education research concluded that the agencies responsible for education research have spread their limited resources "so thinly that mediocrity was almost assured.

### **Difficulties of Translating Research**

Because educational practice in the United States is controlled at the local, indeed, the classroom level, the challenge of incorporating even the strongest research findings into over a million classrooms is daunting. It is not that most people who are involved in helping children learn do not want to do a better job. Parents and teachers want their children to succeed. Policy makers and administrators want to improve the performance of their schools. Curriculum developers and entrepreneurs want to develop new ideas and provide new products. But few of these people have access to research findings, and there is no centralized system (such as exists in Japan or France) to convey the most important research knowledge and to systematically train practitioners in its application. Furthermore, the language of researchers is not the language of practitioners; there is a cultural divide that hampers accessibility, and the incentive structures in research universities tend not to reward researcher-practitioner interface. As a consequence, improvement efforts, no matter how conscientious or well intentioned, are—and are likely to remain—hit-or-miss attempts.

**Q.4 Describe action research in your own words. Why action research is not much conducted in Pakistan?**

<b>Difference Between Basic Research and Action Research</b>		
<b>Criteria</b>	<b>Basic Research</b>	<b>Action Research</b>
<b>Objectives</b>	Develop and test educational theory and derive generalizations.	To find solutions to problems in a specific context.
<b>Training</b>	Intensive training is needed in Research Methodology.	Limited training is needed.
<b>Selection of a problem</b>	A wide range of methods are used to select a problem.	Participating teacher identify problems during the teaching-learning processes.
<b>Hypothesis</b>	Highly specific hypotheses are developed.	Specific statement of the problem serves as hypotheses.
<b>Review of Literature</b>	An exhaustive and thorough review of literature is required.	No such thorough review of literature is needed.
<b>Sample</b>	Considerably large sample size is required.	Students studying in the class of a teacher forms sample.
<b>Experimental Design</b>	Well thought experimental design is developed to maintain comparable conditions and reducing error and bias.	Procedures are planned only in general terms.
<b>Analysis of Data</b>	Complex analysis is often called for.	Simple analysis procedures are usually sufficient.
<b>Conclusions</b>	Conclusions may be in the form of generalizations and developing theories.	Findings are local specific.
<b>Application of results</b>	The generalizations have broad applicability	Findings are used immediately in the classroom situations by participating

		teachers to improve their own practices
--	--	---

Action research is different because:

1. It is not the usual thing teachers do when think about their teaching. Action research is more systematic and collaborative in collecting evidence on which to base rigorous group reflection.
2. It is not simply problem solving. Action research involves problem –solving, not just problem solving. It motivated by a quest to improve and understand the word by changing it and learning how to improve it from the effects of changes made.
3. It is not research done on other people. Action research is research by particular people on their own work, to help them improve what they do, including how they work with and for others. Action research treats people as autonomous, responsible agents who participate actively in making their own practices to be more effective. It does not treat people as objects for research, but encourages people to work together as knowing subjects and agents of change and improvement.
4. It is not ‘the scientific method’ applied to teaching. Action research is not just about hypotheses-testing or about using data to come to conclusions. Action research is not just about hypotheses-testing or about using data to come to conclusions. Action research is concerned with changing situations, not just interpreting them like in historical sciences. Action research is systematically evolving, a living process changing both the researcher and the situations in which he/she acts; neither the natural sciences nor the historical sciences have their double aim.

Educational action research can be engaged in by a single teacher, by a group of colleagues who share an interest in a common problem, or by the entire faculty of a school. Whatever the scenario, action research always involves the same seven-step process. These seven steps, which become an endless cycle for the inquiring teacher, are the following:

1. Selecting a focus
2. Clarifying theories
3. Identifying research questions
4. Collecting data
5. Analyzing data
6. Reporting results
7. Taking informed action

### **Step 1—Selecting a Focus**

The action research process begins with serious reflection directed toward identifying a topic or topics worthy of a busy teacher's time. Considering the incredible demands on today's classroom teachers, no activity is worth doing unless it promises to make the central part of a teacher's work more successful and satisfying. Thus,

selecting a focus, the first step in the process, is vitally important. Selecting a focus begins with the teacher researcher or the team of action researchers asking:

### **Step 2—Clarifying Theories**

The second step involves identifying the values, beliefs, and theoretical perspectives the researchers hold relating to their focus. For example, if teachers are concerned about increasing responsible classroom behavior, it will be helpful for them to begin by clarifying which approach—using punishments and rewards, allowing students to experience the natural consequences of their behaviors, or some other strategy—they feel will work best in helping students acquire responsible classroom behavior habits.

### **Step 3—Identifying Research Questions**

Once a focus area has been selected and the researcher's perspectives and beliefs about that focus have been clarified, the next step is to generate a set of personally meaningful research questions to guide the inquiry.

### **Step 4—Collecting Data**

Professional educators always want their instructional decisions to be based on the best possible data. Action researchers can accomplish this by making sure that the data used to justify their actions are valid (meaning the information represents what the researchers say it does) and reliable (meaning the researchers are confident about the accuracy of their data). Lastly, before data are used to make teaching decisions, teachers must be confident that the lessons drawn from the data align with any unique characteristics of their classroom or school. To ensure reasonable validity and reliability, action researchers should avoid relying on any single source of data. Most teacher researchers use a process called triangulation to enhance the validity and reliability of their findings. Basically, triangulation means using multiple independent sources of data to answer one's questions. Triangulation is like studying an object located inside a box by viewing it through various windows cut into the sides of the box. Observing a phenomenon through multiple “windows” can help a single researcher compare and contrast what is being seen through a variety of lenses. When planning instruction, teachers want the techniques they choose to be appropriate for the unique qualities of their students. All teachers have had the experience of implementing a “research-proven” strategy only to have it fail with their students. The desire of teachers to use approaches that “fit” their particular students is not dissimilar to a doctor's concern that the specific medicine being prescribed be the correct one for the individual patient. The ability of the action research process to satisfy an educator's need for “fit” may be its most powerful attribute. Because the data being collected come from the very students and teachers who are engaged with the treatment, the relevance of the findings is assured. For the harried and overworked teacher, “data collection” can appear to be the most intimidating aspect of the entire seven-step action research process. The question I am repeatedly asked, “Where will I find the time and expertise to develop valid and reliable instruments for data collection?”, gives voice to a realistic fear regarding time management. Fortunately, classrooms and schools are, by their nature, data-rich environments. Each day a child is in class, he or she is producing or not producing work, is interacting productively with classmates or experiencing difficulties in social situations, and is completing assignments

proficiently or poorly. Teachers not only see these events transpiring before their eyes, they generally record these events in their grade books. The key to managing triangulated data collection is, first, to be effective and efficient in collecting the material that is already swirling around the classroom, and, second, to identify other sources of data that might be effectively surfaced with tests, classroom discussions, or questionnaires.

### **Step 5—Analyzing Data**

Although data analysis often brings to mind the use of complex statistical calculations, this is rarely the case for the action researcher. A number of relatively user-friendly procedures can help a practitioner identify the trends and patterns in action research data. During this portion of the seven-step process, teacher researchers will methodically sort, sift, rank, and examine their data to answer two generic questions:

- What is the story told by these data?
- Why did the story play itself out this way?

### **Step 6—Reporting Results**

It is often said that teaching is a lonely endeavor. It is doubly sad that so many teachers are left alone in their classrooms to reinvent the wheel on a daily basis. The loneliness of teaching is unfortunate not only because of its inefficiency, but also because when dealing with complex problems the wisdom of several minds is inevitably better than one. The sad history of teacher isolation may explain why the very act of reporting on their action research has proven so powerful for both the researchers and their colleagues. The reporting of action research most often occurs in informal settings that are far less intimidating than the venues where scholarly research has traditionally been shared. Faculty meetings, brown bag lunch seminars, and teacher conferences are among the most common venues for sharing action research with peers. However, each year more and more teacher researchers are writing up their work for publication or to help fulfill requirements in graduate programs. Regardless of which venue or technique educators select for reporting on research, the simple knowledge that they are making a contribution to a collective knowledge base regarding teaching and learning frequently proves to be among the most rewarding aspects of this work.

### **Step 7—Taking Informed Action**

Taking informed action, or “action planning,” the last step in the action research process, is very familiar to most teachers. When teachers write lesson plans or develop academic programs, they are engaged in the action planning process. What makes action planning particularly satisfying for the teacher researcher is that with each piece of data uncovered (about teaching or student learning) the educator will feel greater confidence in the wisdom of the next steps. Although all teaching can be classified as trial and error, action researchers find that the research process liberates them from continuously repeating their past mistakes. More important, with each refinement of practice, action researchers gain valid and reliable data on their developing virtuosity.

### Three Purposes for Action Research

As stated earlier, action research can be engaged in by an individual teacher, a collaborative group of colleagues sharing a common concern, or an entire school faculty. These three different approaches to organizing for research serve three compatible, yet distinct, purposes:

- Building the reflective practitioner
- Making progress on school wide priorities
- Building professional cultures

#### Building the Reflective Practitioner

When individual teachers make a personal commitment to systematically collect data on their work, they are embarking on a process that will foster continuous growth and development. When each lesson is looked on as an empirical investigation into factors affecting teaching and learning and when reflections on the findings from each day's work inform the next day's instruction, teachers can't help but develop greater mastery of the art and science of teaching. In this way, the individual teachers conducting action research are making continuous progress in developing their strengths as reflective practitioners.

#### Making Progress on School wide Priorities

Increasingly, schools are focusing on strengthening themselves and their programs through the development of common focuses and a strong sense of esprit de corps. Peters and Waterman (1982) in their landmark book, *In Search of Excellence*, called the achievement of focus “sticking to the knitting.” When a faculty shares a commitment to achieving excellence with a specific focus—for example, the development of higher-order thinking, positive social behavior, or higher standardized test scores—then collaboratively studying their practice will not only contribute to the achievement of the shared goal but would have a powerful impact on team building and program development. Focusing the combined time, energy, and creativity of a group of committed professionals on a single pedagogical issue will inevitably lead to program improvements, as well as to the school becoming a “center of excellence.” As a result, when a faculty chooses to focus on one issue and all the teachers elect to enthusiastically participate in action research on that issue, significant progress on the school wide priorities cannot help but occur.

#### Building Professional Cultures

Often an entire faculty will share a commitment to student development, yet the group finds itself unable to adopt a single common focus for action research. This should not be viewed as indicative of a problem. Just as the medical practitioners working at a “quality” medical center will hold a shared vision of a healthy adult, it is common for all the faculty members at a school to share a similar perspective on what constitutes a well-educated student. However, like the doctors at the medical center, the teachers in a “quality” school may well differ on which specific aspects of the shared vision they are most motivated to pursue at any point in time. Schools whose faculties cannot agree on a single research focus can still use action research as a tool to help transform themselves into a learning organization. They accomplish this in the same manner as do the

physicians at the medical center. It is common practice in a quality medical center for physicians to engage in independent, even idiosyncratic, research agendas. However, it is also common for medical researchers to share the findings obtained from their research with colleagues (even those engaged in other specialties).

**Q.5 Define historical research. Discuss the characteristics and significance of historical research.**

The major feature that distinguishes experimental research from other types of research is that the researcher manipulates the independent variable. There are a number of experimental group designs in experimental research. Some of these qualify as experimental research, others do not.

- In true experimental research, the researcher not only manipulates the independent variable, he or she also randomly assigned individuals to the various treatment categories (i.e., control and treatment).
- In quasi experimental research, the researcher does not randomly assign subjects to treatment and control groups. In other words, the treatment is not distributed among participants randomly. In some cases, a researcher may randomly assigns one whole group to treatment and one whole group to control. In this case, quasi-experimental research involves using intact groups in an experiment, rather than assigning individuals at random to research conditions. (Some researchers define this latter situation differently. For our course, we will allow this definition).
- In causal comparative (ex post facto) research, the groups are already formed. It does not meet the standards of an experiment because the independent variable is not manipulated.

**The statistics by themselves have no meaning. They only take on meaning within the design of your study.**

**If we just examine stats, bread can be deadly.** The term validity is used three ways in research.

1. In the sampling unit, we learn about external validity (generalizability).
2. In the survey unit, we learn about instrument validity.
3. In this unit, we learn about **internal validity** and **external validity**. Internal validity means that the differences that we were found between groups on the dependent variable in an experiment were directly related to what the researcher did to the independent variable, and not due to some other unintended variable (confounding variable). Simply stated, the question addressed by internal validity is “Was the study done well?” Once the researcher is satisfied that the study was done well and the independent variable caused the dependent variable (internal validity), then the research examines external validity (under what conditions [ecological] and with whom [population] can these results be replicated [Will I get the same results with a different group of people or under different circumstances?]). If a study is not internally valid, then considering external validity is a moot point (If the independent did not cause the dependent, then there is no point in applying the results [generalizing the results] to other situations.). Interestingly, as one tightens a study to control for threats to internal validity, one decreases the generalizability of the study (to whom and under what conditions one can generalize the results).

There are several common threats to internal validity in experimental research. They are described in our text.



- Subject Characteristics (Selection Bias/Differential Selection) — the groups may have been different from the start. If you were testing instructional strategies to improve reading and one group enjoyed reading more than the other group, they may improve more in their reading because they enjoy it, rather than the instructional strategy you used.
- Loss of Subjects (Mortality) — all of the high or low scoring subject may have dropped out or were missing from one of the groups. If we collected posttest data on a day when the honor society was on field trip at the treatment school, the mean for the treatment group would probably be much lower than it really should have been.
- Location — perhaps one group was at a disadvantage because of their location. The city may have been demolishing a building next to one of the schools in our study and there are constant distractions which interferes with our treatment.
- Instrumentation Instrument Decay — the testing instruments may not be scores similarly. Perhaps the person grading the posttest is fatigued and pays less attention to the last set of papers reviewed. It may be that those papers are from one of our groups and will received different scores than the earlier group's papers
- Data Collector Characteristics — the subjects of one group may react differently to the data collector than the other group. A male interviewing males and females about their attitudes toward a type of math instruction may not receive the same responses from females as a female interviewing females would.
- Data Collector Bias — the person collecting data may favor one group, or some characteristic some subject possess, over another. A principal who favors strict classroom management may rate students' attention under different teaching conditions with a bias toward one of the teaching conditions.
- Testing — the act of taking a pretest or posttest may influence the results of the experiment. Suppose we were conducting a unit to increase student sensitivity to prejudice. As a pretest we have the control and treatment groups watch Shindler's List and write a reaction essay. The pretest may have actually increased both groups' sensitivity and we find that our treatment groups didn't score any higher on a posttest given later than the control group did. If we hadn't given the pretest, we might have seen differences in the groups at the end of the study.
- History — something may happen at one site during our study that influences the results. Perhaps a classmate dies in a car accident at the control site for a study teaching children bike safety. The control group may actually demonstrate more concern about bike safety than the treatment group.
- Maturation — There may be natural changes in the subjects that can account for the changes found in a study. A critical thinking unit may appear more effective if it taught during a time when children are developing abstract reasoning.
- Hawthorne Effect — the subjects may respond differently just because they are being studied. The name comes from a classic study in which researchers were studying the effect of lighting on worker

productivity. As the intensity of the factor lights increased, so did the work productivity. One researcher suggested that they reverse the treatment and lower the lights. The productivity of the workers continued to increase. It appears that being observed by the researchers was increasing productivity, not the intensity of the lights.

- **John Henry Effect** — One group may view that it is competition with the other group and may work harder than they would under normal circumstances. This generally is applied to the control group “taking on” the treatment group. The term refers to the classic story of John Henry laying railroad track.
- **Resentful Demoralization of the Control Group** — the control group may become discouraged because it is not receiving the special attention that is given to the treatment group. They may perform lower than usual because of this.
- **Regression (Statistical Regression)** — a class that scores particularly low can be expected to score slightly higher just by chance. Likewise, a class that scores particularly high, will have a tendency to score slightly lower by chance. The change in these scores may have nothing to do with the treatment.
- **Implementation** — The treatment may not be implemented as intended. A study where teachers are asked to use student modeling techniques may not show positive results, not because modeling techniques don’t work, but because the teacher didn’t implement them or didn’t implement them as they were designed.
- **Compensatory Equalization of Treatment** — someone may feel sorry for the control group because they are not receiving much attention and give them special treatment. For example, a researcher could be studying the effect of laptop computers on students’ attitudes toward math. The teacher feels sorry for the class that doesn’t have computers and sponsors a popcorn party during math class. The control group begins to develop a more positive attitude about mathematics.
- **Experimental Treatment Diffusion** — Sometimes the control group actually implements the treatment. If two different techniques are being tested in two different third grades in the same building, the teachers may share what they are doing. Unconsciously, the control may use of the techniques she or he learned from the treatment teacher.

When planning a study, it is important to consider the threats to internal validity as we finalize the study design. After we complete our study, we should reconsider each of the threats to internal validity as we review our data and draw conclusions.