| RESEARCH ARTICLE

Inculcating the Positivism Paradigm of Research and Inquiry-Based Science among King Khalid University's Students Action Research

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| **ABSTRACT**

This study presents the significance of the research paradigms which constitute a set of theories, assumptions, and ideas that contribute to one's worldview and composing of axiology, ontology, epistemology, and methodology on action research and the study focuses on inquiry-based science adopting an investigative approach which investigates a problem, search for possible solutions, make observations, ask questions, test out ideas, and think creatively and use intuition. The study proposes that most King Khalid University postgraduate candidates conduct their studies without consideration of paradigm; as a result, they conduct their research without reflecting their beliefs about the world. The study aims to inculcate using paradigm and inquiry-based science in conducting action research among King Khalid University's postgraduate candidates. The researchers adopt an interpretive approach and tend to use case studies and ethnography as data sources. The study concludes that most of the postgraduate candidates at KKU conduct their action research without considering the research paradigm. They tend to follow the research design of previous researchers in terms of modelling and most of the candidates. Implement a scientific approach relying on inquiring-based science in their action research. The study recommends that King Khalid University postgraduate candidates conducting action researches should be taught research paradigms in their courses at postgraduates' studies.

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1. Study Background

A valid research involves answering questions, and the approach utilized is based on paradigms, and distinct methods or procedures. Researchers' approaches are influenced by their worldviews which comprise their beliefs and philosophical assumptions about the nature of the world and how it can be understood. A paradigm constitutes a set of theories, assumptions, and ideas that contribute to one's worldview and approach to engaging with other people or things. It is the lens through which a researcher views the world and examines the methodological components of their research to decide on the methods to use for data collection and analysis (Burns, 2010). Research paradigms have four philosophical elements: axiology, ontology, epistemology, and methodology. These four elements inform the design and conduct of research projects. A researcher must consider the paradigms within which they would situate their work before designing the research (Creswel,2009). A research entails knowledge which aims at describing the phenomena that we experience and the purpose of science is simply to stick to what we can observe and measure. Knowledge of anything beyond that and science is largely a mechanistic or mechanical affair. It uses deductive reasoning to postulate theories that entail testing and empiricism that involve observation and measurement, which are the core of the scientific endeavor. Thus, the key approach of the scientific method is the experiment, the attempt to discern natural laws through direct manipulation and observation (Creswell,2008). Inquiry-based science adopts an investigative approach to teaching

and learning. Students are given opportunities to investigate a problem, search for possible solutions, make observations, ask questions, test ideas, think creatively, and use their intuition. It relies on teachers recognizing the importance of presenting problems to students that will challenge their current conceptual understandings, forcing them to reconcile anomalous thinking and construct new understandings (Abrams, & Evans, 2007). Moreover, inquiry-based science challenges students' thinking by engaging them in investigating scientifically orientated questions where they learn to prioritize evidence, evaluate explanations in the light of alternative explanations and learn to communicate and justify their decisions. These are dispositions needed to promote and justify their decisions. In short, "Scientific inquiry requires the use of evidence, logic, and imagination in developing explanations about the natural world" (Acarli,& Dervişoğlu, 2021).This study focuses on inculcating the positivism paradigm of research and inquiry-based science among King Khalid University's students, aiming at disseminating the culture of researching scientifically and strictly to graduate as a genuine researchers regarding going on learning in their future. The researchers in this study adopt an interpretive approach, which entails theory generation based on the observational data generated. Thus, the researchers use case studies and ethnography as data sources. The use of ethnography has advantages that the researchers have enough time in the research environment to develop a true understanding of the data.

1.1 Statement of the problem

The study focuses on the common problems among King Khalid University post graduate candidates conducting an action research. This study focuses on the problems listed as: most candidates conduct their study without consideration of paradigm. As a result, they conduct their research without reflecting on their beliefs about the world which they live; hence, they rely on following the research paper structure and analyzing the data using tabulation form. Most candidates ignore the causal relationships which entails not focusing on understanding which variables affect other variables, in what way and to what extent. As a result, their studies lack objectivity, generalizability and replicability of findings. Furthermore, the candidates ignore adopting an investigative approach that concentrates on

recognizing the importance of presenting problems to students that will challenge their current conceptual understandings and they do not adopt scientific inquiry which requires the use of evidence, logic, and imagination in developing explanations about the natural world

1.2 Questions of the Study

-To what extent do KKU postgraduates implement research paradigms, including ontology, epistemology, methodology, and methods, in conducting their partial or full action research?

-Do KKU postgraduates rely on inquiry-based science, which involves implementing science to explore possible solutions, develop explanations for phenomena under investigation, and elaborate on concepts when conducting action research?

1.3 Aims of the Study

-The study aims to inculcate using of paradigm which includes ontology, epistemology, methodology, and methods in conducting research among King Khalid University's postgraduate candidate

-The research aims to inculcate inquiry-based science, which involves students implementing science to explore possible solutions, develop explanations for phenomena under investigation, elaborate on concepts and processes, and evaluate their understanding in the light of available evidence.

1.4 Limitations of the Study

This study tends to inculcate the positivism paradigm of research and inquiry-based science among King Khalid University's post graduates candidates conducting action research as partial research to complete the postgraduate program on applied linguistics.

2. Review of Literature

2.1 Action Research

Academic scientific research requires knowledge of research paradigms, which assists in reducing research method bias. Research is concerned with the generation of knowledge, and typically creating knowledge related to a concept, idea, phenomenon, or topic. Action research generates knowledge around inquiry in practical educational contexts. Action research allows educators to learn to develop personally or professionally through their actions. Due to its participatory nature, the action research process is also distinct in educational research. There are many models for how the action research process takes shape. I will share a few of those here. Each model utilizes the following processes to some extent: Plan a change; Take action to enact the change; Observe the process and consequences of the change; Reflect on the process and consequences; Act, observe, & reflect again. McNiff,

(2013) proposed that action research is an approach to educational research that educational practitioners and professionals commonly use to examine and ultimately improve their pedagogy and practice. In this way, action research represents an extension of the reflection and critical self-reflection an educator employs daily in their classroom. Moreover, action research as a method to enable and support educators in pursuing effective pedagogical practices by transforming the quality of teaching decisions and actions, to subsequently enhance student engagement and learning. Kemmis, Stephen, McTaggart, Robin and Nixon(2014) stated that research involves action, evaluation, and reflection. It is a process to gather evidence to implement change in practices. It is a process for improving educational practice. Its methods involve action, evaluation, and reflection. It is a process to gather evidence to implement change in practices. Thus, action research is participative and collaborative. Action research is situation and context based and it is based on problem solving. Furthermore, action research is iterative and plan are created , implemented, and revised, an ongoing process of reflection and revision.(Zuber-Skerritt, & Wood, 2019). Action research is a distinct paradigm of educational research and is a part of the larger concept of living knowledge. Living knowledge has been characterized as a quest for life, to understand life, and to create knowledge valid for the people working in the educational field. (Center for Collaborative Action Research,2022) Action research is meant to produce practical knowledge that is useful to people in the everyday conduct of their lives and to see that action research is about working towards practical outcomes" (Sagor, R2010). Stringer and Ortiz,(2021) define action research as a systematic activity directed toward providing knowledge, or adding to the understanding of existing knowledge which is relevant to improving the effectiveness of education. It refers to a research method that involves actively engaging in problem-solving activities and reflecting on the process. It emphasizes the use of suitable techniques, high-quality data analysis, and the involvement of key stakeholders in the research process.

2.2 Research Paradigm

[1]According to the Merriam-Webster Dictionary, a [1] paradigm is "a philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated."[1] As applied in the research context, a research paradigm is a worldview or philosophical framework that guides the research process, including ideas, beliefs, and biases. The research paradigm in which a study is situated helps determine how the research will be conducted. The research paradigm is the framework into which the theories and practices of your discipline fit to create the research plan. This foundation guides all areas of your research plan, including the aim of the study, research question, instruments or measurements used, and analysis methods. A research paradigm is a research method, model, or pattern. It is a set of ideas, beliefs, or understandings within which theories and practices can function. Most paradigms derive from one of two research methodologies: positivism or interpretivism**.** Every research project employs one of the research paradigms as a guideline for creating research methods and carrying out the research project most legitimately and reasonably.

Paradigm consists of four parts: ontology, epistemology, methodology, and methods. Ontology is "concerned with the nature of existence" (Crotty, 1998: 3), Epistemology, on the other hand, "deals with the nature of knowledge" (Crotty, 1998: 8). It deals with the nature of the relationship between the knower and the known. Ontology and epistemology can be considered as the foundations upon which research is built. The researcher's ontological and epistemological assumptions inform the choice of methodology and research methods. Methods are the range of approaches used in educational research to gather data which are to be used as a basis for inference and interpretation"(Dornyei, 2007). In contrast, methodology is the strategy, or action plan that justifies the use and choice of certain techniques (Crotty, 1998). Therefore, methods of inquiry reflect the researchers' assumptions about the nature of reality and the nature of knowledge. Three research paradigms are salient in action research: Positivist, Interpretive, and Critical.

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[1] *The term paradigm originated from the Greek word paradeigma which means pattern and was first used by Thomas Kuhn (1962) to denote a conceptual framework shared by a community of scientists which provided them with a convenient model for examining problems and finding solutions. Kuhn defines a paradigm as: "an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools…". According to him, the term paradigm refers to a research culture with a set of beliefs, values, and assumptions that a community of researchers has in common regarding the nature and conduct of research (Kuhn, 1977). A paradigm hence implies a pattern, structure and framework or system of scientific and academic ideas, values and assumptions (Olsen, Lodwick, and Dunlop, 1992:16). The positivist paradigm of exploring social reality is based on the philosophical ideas of the French Philosopher August Comte. According to him, observation and reason are the best means of understanding human behavior; true knowledge is based on experience of senses and can be obtained by observation and experiment*

2.1.1 Purposes of Research Paradigm

A research paradigm is important for a research project because the paradigm establishes the structure and foundation for the research project. Furthermore, it investigates how knowledge is understood and researched, thus, it outlines . Implementing a research paradigm in research provides researchers with a clear path to examine the topic of interest. As a result, it gives a logical and deliberate structure for carrying it out, besides improving the quality of the work and proficiency Grix, 2004).The research paradigm clearly outlines the path to investigate the topic, which brings clarity to the study and improves the quality of the methods and analysis. In addition, researchers need to understand how their own beliefs, assumptions, and biases can affect the research process. Knowing the underlying research paradigm and how it frames the study allows researchers to understand better the effect of their perspective on the study results (Johnson, & Onwuegbuzie, 2004).

2.2.2 Positivist Approach

Positivism is closely associated with the French philosopher Auguste Comte (Pring, 2000). Crotty (1998) holds that though Comte, who popularized positivism, is considered the founder of positivism, what he said about experiment, observation, and cause-effect relationship can be echoed in what was earlier preached by Francis Bacon. Positivists think that they can apply methods of the natural sciences to the practices of social sciences. Positivist social scientists try to replicate procedures followed by natural scientists to control and understand the natural world. They are committed to value neutrality, statistical measurement, quantifiable elements, and observable events to establish causal laws (Kumar, 1999).). Positivists believe in the possibility of establishing cause-effect relationship. After regularities, they make predictions and establish scientific laws; based on this factor, it is possible to use scientific methods to analyze the social world. Positivists believe that the role of the neutral researcher is to present an objective explanation of matters of concern and predict laws (such as what?). From the previous principles, we can understand the ontological and epistemological assumptions of the positivists (Mertens,2008).

Positivists state reality is assumed to exist, driven by immutable natural laws and mechanisms. For them, social reality is external to individuals. Objects exist independently and have no dependence on the knower (Perry,2005). Pring (2008: 58) defines realism similarly as "the view that there is reality, a world, which exists independently of the researcher and which is to be discovered."

[2]Epistemologically, positivists hold a dualist and objectivist view. Being objectivist is a fundamental aspect of any competent inquiry (Creswell, 2009). The knower and the object to be known are different entities. Neither of them exerts influence on the other. Positivists are interested in facts and hold that research should be value-free. Preventive procedures control threats to validity. Causal relationships can be established, so generalization and replicability are possible (Punch,2009). [1]Positivist methodology aims at explaining relationships (of what?). Cause and effect relationship is one of the tenets of the positivist paradigm (Creswell, 2009; Grix, 2004; McDonough and McDounough,1997). Experimental designs seem to provide an umbrella to explain this causal relationship (Creswell, 2009). Questions and hypotheses are tested and verified by experiments. The researcher should seek a cause-effect relationship between the independent variable, which is the intervention and cause of any improvement, and the dependent variable, the outcome of the intervention. The attribution of the effect to the independent variable can be warranted by the manipulation of other variables that may threaten research validity

Positivist researchers use data collection methods to gather quantitative, numerical data that can be tabulated and analyzed statistically. According to Creswell (2008), four major types of data are gathered in quantitative research. Individual performance is the first type. It includes norm-referenced tests, criterion-referenced tests, intelligence, and aptitude tests. The second type of data measures individual attitudes and uses an effective scale. Observation of individual behavior is the third type of gathered data. Researchers can use behavioral checklists to record observations about individual behavior. The last type of data is factual. Researchers may rely on public documents or school records to gather data about a sample. Creswell (2008) agrees with Dornyei

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[2] *At the ontological level, positivists assume that the reality is objectively given and is measurable using properties which are independent of the researcher and his or her instruments; in other words, knowledge is objective and quantifiable. Positivistic thinkers adopt scientific methods and systematize the knowledge generation process with the help of quantification to enhance precision in the description of parameters and the relationship among them. Positivism is concerned with uncovering truth and presenting it by empirical means (Henning, Van Rensburg and Smit, 2004, p. 17).*According to Walsham (1995b) the positivist position maintains that scientific knowledge consists of facts while its ontology considers the reality as independent of social construction. If the research study consists of a stable and unchanging reality, then the researcher can adopt an 'objectivist' perspective: a realist ontology - a belief in an objective, real world - and detached epistemological stance based on a belief that people's perceptions and statements are either true or false, right or wrong, a belief based on a view of knowledge as hard, real and acquirable; they can employ methodology that relies on control and manipulation of reality. Positivists believed that objectivity was a characteristic that resided in the individual scientist.

(2007) on the importance of choosing the sample in quantitative studies. Both started their chapters by discussing the collection of quantitative data by addressing the issue of random sampling. According to Creswell (ibid: 153), simple random sampling is "the most popular and rigorous form of probability sampling from a population." Likewise, Dornyei (2007) contends that sampling is important as it can guarantee generalizable findings.

2.2.3 Interpretive Approach

Interpretivism is mainly associated with Max Weber (Crotty, 1998) and Alfred Schutz (Pring, 2000). Talmy (2010) presents the distinguishing features of the interpretive paradigm. Interpretivists state that reality is multi-layered and complex. They believe that people are creative and actively construct their social reality. They hold a realist, anti-foundationalist ontology. Relativism is the view that reality differs from person to another (*Seale,2002*). Interpretive researchers believe in multiple realities (Crotty,1998; Pring, 2000) and that reality is socially constructed. Epistemologically, interpretivists adhere to a subjectivist view in that subjective meanings and interpretations are important (Pring, 2000). Crotty(1998: 79) states that the object " cannot be adequately described apart from the subject, nor can the subject be adequately described apart from the object." Therefore, the relationship between the knower and the subject to be known is not of detachment but of involvement and interaction.

Interpretive researchers use different methodologies such as case studies, phenomenology, and ethnography. Denzin and Lincoln (2008: 29) state that "qualitative researchers deploy a wide range of interconnected interpretive methods, always seeking better ways to make the worlds of experiences they have studied more understandable." Interpretivist methodology aims at exploring and understanding phenomenon inductively. Interpretivists believe that the "social world can only be understood from the standpoint of the individuals who are part of the ongoing action being investigated" (Welligton,2000).In terms of methods, positivists rely on randomization, purposeful sampling, and selecting information-rich individuals and sites (Cresswell 2008: 214). Interpretive researchers rely on various methods to collect qualitative data. Creswell (2008) categorized qualitative data into four categories: observations (participant and non-participant), interviews and questionnaires (one to one interviews, focus group, telephone, and electronic mail interviews), documents (public and private records, newspapers, letters and personal journals), and audiovisual materials (photographs, videotapes, digital images, paintings and pictures). Regarding preference and usefulness, Seale,(2000) states that "interview is the most prominent data collection tool in qualitative research." One of the reasons for this merit is underpinned to the flexibility of the interview as a tool since researchers may choose whether to design structured, semi-structured, unstructured interviews; or triangulate and use any two or all of them in one study. This means that researchers choose the type of interview aligned with the study's purpose and the research questions. Interpretive researchers' data collection methods enable them to build trust with the subjects; for example, participant observers who opt for prolonged engagement in natural settings build close relationships with their subjects. They may use introspective methods that enable them to achieve a deeper understanding of the phenomenon under their interrogation; their emotions, experiences, and perceptions of the subject matter under investigation (Punch,2009).

2.2.4 Critical Approach

Critical approach theorists propose that reality in the critical research paradigm is described within a political, cultural, historical, and economic context. Mertens (2008)states that the "transformative-emancipatory ontology assumption holds that there are diversities of viewpoints about many social realities but that these viewpoints need to be placed within political, cultural, historical, and economic value system to understand the basis for the differences." Epistemologically, the critical theory researchers emphasize the importance of the interactive relation between the researcher and the participants and the impact of social and historical factors that influence them. Mertens (Ibid; 99) holds that the "interaction between the researchers and the participants is essential and requires a level of trust and understanding to accurately represent viewpoints of all groups fairly." Critical methodology is based on action rather than discovery (Johnson,& Onwuegbuzie, 2004). Positivist and interpretivism research paradigms, sometimes referred to as quantitative and qualitative paradigms, are the two major approaches to research. While most research is based on either a positivist (quantitative) or interpretivist (qualitative) foundations, some studies combine both. These types of studies are referred to as mixed-method research. However, many other variations of these have been used. Following are brief descriptions of some of the more popular of these research paradigm variations(*Seale, 2002)*:

 – Pragmatists believe that reality is continually changing amid constantly changing situations. Therefore, rather than use a single research paradigm, they employ the framework that is most applicable to the research question they are examining. Qualitative and quantitative techniques are often used as both positivist and interpretivist approaches are combined. Pragmatists believe that the best research method is the one that will most effectively address the research question.

-**Constructivist paradigm** – Like interpretivists, constructivists believe there are numerous realities, not a single reality. The constructivist paradigm holds that people construct their own understanding of the world through experiencing and reflecting on those experiences. Constructivist research seeks to understand the meanings that people attach to those experiences. Therefore,

qualitative techniques, such as interviews and case studies, are frequently used. Constructivists are seeking the "why" of events. Constructivism is also a popular theory of learning that focuses on how children and other learners create knowledge from their experiences and learn better through experimentation than direct instruction.

-Post-positivism paradigm – Post-positivists veer away from the concept of reality as an absolute certainty and view it in a more probabilistic manner, thus taking a more subjective viewpoint. They believe that research outcomes can never be totally objective and a researcher's worldview and biases can never be completely removed from the research results.

-Transformative paradigm – Proponents of transformative research reject both positivism and interpretivism, believing that these frameworks do not accurately represent the experiences of marginalized communities. Transformative researchers generally use qualitative and quantitative techniques to understand the disparities in community relationships better, support social justice, and ultimately ensure transformative change.

[3]2.2.5 Paradigm Shift

Researchers bring a specific worldview to their work and produce higher quality work when they are aware of the effect their perspective has on their results. As a result, they create their paradigm, including beliefs, habits, and behaviors which can be changed personally to increase the quality of the research. A paradigm shift occurs when there is a fundamental change in the understanding of a field of study as conditions change or earlier assumptions are disproven. Historian and philosopher of science Thomas Kuhn introduced the term in his 1962 book, The Structure of Scientific Revolutions. In the book, Kuhn promotes the idea that theories have a social character and approaches them as social constructions that contain historical traces of the time and place in which they were generated. A[1] paradigm shift describes a profound change in a fundamental model or perception of events. Kuhn contrasts paradigm shifts, which characterize a Scientific Revolution, to the activity of normal science, which he describes as scientific work within a prevailing framework or paradigm. Paradigm shifts arise when the dominant paradigm under which normal science operates is incompatible (Perry,2005). Elihu Katz identifies an [2]institutional paradigm, a critical paradigm, and a technological paradigm. According to Katz, "the institutional model says that the media tell us what to think about, the critical paradigm what not to think or what not to think about, and the technological, how to think, or where to belong" (Welligton,2000). Shearon Lowery and Melvin De Fleur situate three paradigms: (1) the mass society paradigm, which approaches the audience as a mass of people receiving media content passively as if messages were hypodermic needles causing direct effects; (2) the cognitive paradigm, which focuses on how sensory inputs condition perceptions, beliefs, attitudes, values, memory, thinking, and acts; and (3) the meaning paradigm, which encourages researchers to look for evidence of long-term effects internal and external to people(Center for Collaborative Action Research, 2022)

Denscombe (2010) proposed that researchers tend to change their world view through the following steps:

1. Identify the paradigm element you want to change – what part of your worldview do you want to change? What habitual or hidden behavior may adversely affect your research or life?
2. Write down your goals – setting specific desired outcomes and putting them down on paper sets them in your subconscious.

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[3] 1-*paradigm shift is a fundamental change in the basic concepts and experimental practices of a scientific discipline. It is a concept in the philosophy of science that was introduced and brought into the common lexicon by the American physicist and philosopher Thomas Kuhn. Even though Kuhn restricted the use of the term to the natural sciences, the concept of a paradigm shift has also been used in numerous non-scientific contexts to describe a profound change in a fundamental model or perception of events. Kuhn presented his notion of a paradigm shift in his influential book The Structure of Scientific Revolutions (1962).Kuhn contrasts paradigm shifts, which characterize a Scientific Revolution, to the activity of normal science, which he describes as scientific work done within a prevailing framework or paradigm. Paradigm shifts arise when the dominant paradigm under which normal science operates is rendered incompatible with new phenomena, facilitating the adoption of a new theory or paradigm.*

2-Kuhn acknowledges having used the term "paradigm" in two different meanings. In the first one, "paradigm" designates what the members of a certain scientific community have in common the whole of techniques, patents and values shared by the members of the community. In the second sense, the paradigm is a single element of a whole, say for instance Newton's Principia, which, acting as a common model or an example... stands for the explicit rules and thus defines a coherent tradition of investigation

3. Adjust your mindset – intentionally influencing your thoughts to support your goals can motivate you to create the desired change. Some suggested activities to help with this include journaling, reading motivational books, and spending time with like-minded people.
4. Do uncomfortable things – you need to get out of your comfort zone to effect real change. This will get your subconscious out of its usual habits and move you toward your goal.
5. Practice being who you want to be – the change you want will become solidified and part of your new paradigm once you break out of your old habit and keep repeating the new behavior so as to cement it in your subconscious.

[4]2.3 Inquiry-Based Science

Inquiry-based science teaches researchers to communicate and justify their decisions based on evidence. "Scientific inquiry requires the use of evidence, logic, and imagination in developing explanations about the natural world" (Aditomo & Klieme, 2020). Inquiry-based science adopts an investigative approach based on investigating a problem, searching for possible solutions, making observations, asking questions, testing ideas, thinking creatively, and using intuition. It relies on researchers recognizing the importance of presenting problems of the study that s challenge the current conceptual understandings so they are forced to reconcile anomalous thinking and construct new understandings.

Aidoo, Anthony-Krueger, Gyampoh, Tsyawo & Quansah(2022). Bansal(2021).contends that inquiry-based science adopts an investigative approach to teaching and learning where students are provided with opportunities to investigate a problem, search for possible solutions, make observations, ask questions, test out ideas, and think creatively and use their intuition. In this sense, inquiry-based science involves students doing science, where they have opportunities to explore possible solutions, develop explanations for the phenomena under investigation, elaborate on concepts and processes, and evaluate or assess their understandings in the light of available evidence. This approach to teaching relies on teachers recognizing the importance of presenting problems to students that will challenge their current conceptual understandings so they are forced to reconcile anomalous thinking and construct new understandings. Inquiry-Based Science Education is a form of science education that allows the student to explore a subject/topic through hands-on activities, investigation and posing questions. It is designed to reflect how students learn, and engage students in the process of scientific inquiry. Increasingly it is seen as key to developing

their scientific literacy enhances their understanding of scientific concepts and heightens their appreciation of how science works(Nhlengethwa, Govender, & Sibanda, 2020).

 Okulu, & Ünver,(2018) stated that inquiry-based science instruction encourages students to:

-Express their own curiosity

-Investigate their own questions

-Present their findings and learnings

-Reflect on what they learned and their process of learning

The National Research Council states that inquiry "refers to the activities of students in which they develop knowledge and understanding of scientific ideas, as well as an understanding of how scientists study the natural world." Students encouraged to

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[4] 1- *Inquiry is driven by curiosity, wonder, interest, and a need to answer a question. Being able to ask rich questions enables students to construct their knowledge and develop an understanding of concepts and experiences. It is important that educators create a classroom environment that supports and encourages students' questions. This means creating an environment that provides opportunities for students to engage with others and to ask and respond to authentic, meaningful questions. Students develop the ability to ask different kinds of questions for different purposes when they observe questioning modeled by educators. Educators are encouraged to help students to ask many different types of questions, including questions that inspire scientific inquiries.*

use inquiry in the science classroom become more curious and apply the inquiry process to learn more about the world around them, even outside the classroom.

According to Tatar, (2012) there are four levels of [1]inquiry-based learning-progressing from the least to the most open-ended: confirmation, structured, guided, and open inquiry:

-Confirmation inquiries let students confirm a principle through an activity when the answers are known.

-Structured inquiries allow students to investigate a teacher-presented question through a prescribed procedure.

-Guided inquiries let students investigate a teacher-presented question using procedures designed or selected by students.

-Open inquiries allow students to investigate student-formulated questions using procedures designed or selected by students; teachers provide input to ensure the questions and procedures are appropriate.

Inquiry is portrayed as a linear, cyclical process and an iterative series of events influenced by observations and discoveries. which is based on the scientific method with a specific, prescribed set of steps (Colyer, & Watt, 2016). It requires actions and skills that regularly occur during inquiries, including asking questions; predicting; collaborating and communicating with others; observing; sorting and classifying; comparing and contrasting, planning; recording; analyzing and interpreting; reflecting; and making connections (Tessier, 2010).Arsal, (2017) listed the following stages of the inquiry process including: Questioning (which satisfies curiosity, wonder or interest, predicting(thinking about what will happen), planning (identify methods and tools of gathering information),investigate (observing ,sorting, classifying, comparing and contrasting information),record(documenting observational data and expressing information and thoughts), analyze and interpret(making meaning and explain patterns in data) , and connecting prior knowledge and new knowledge and reflect them on learning (Reimer, & Watters, 2017) .

3.0 Methodology and Data Collection

An interpretive approach, which entails theory generation based on the generated observational data, is applied in this study and case studies are used as data collection method. This study aims to explore the common problems among King Khalid University post graduate candidates conducting an action research focusing on the consideration of paradigm which reflects the beliefs about the world which the researchers live and inculcating inquiry-based science. The researchers believe that the paradigm is the core of action research and researchers should consider it. The researchers tend to use case studies and ethnography as data sources. The use of ethnography has the advantage that the researchers have enough time in the research environment to understand the data fully.

3.1 Data collection

The researchers in this study focus on interpretive case studies and ethnography as data sources, which gives the researchers enough time in the research environment to develop a true understanding of the data. The researchers use ethnography and they have enough time in the research environment to develop a true understanding of causes behind why KKU postgraduate candidates do not apply paradigm in their theses. The researchers believe that paradigm is a milestone of action research. This study has been conducted on two interpretive case studies to collect data for the research.

The first case was to determine where the case studies should be done. What is the major purpose of research paradigm in conducting action research. The researchers needed to bridge a gap between action research and the significance of research paradigm in conducting the research. The second case was to determine whom to interview in the KKU to determine who implements inquiry-based science in action research. The case study started with a short interview with the postgraduate candidate and ended with an extensive interview with the same postgraduate candidate. The researchers believe that starting the case study with a short interview with the postgraduate candidate has the distinct advantage of providing the researchers with an overview of the research.

3.1.1Perspective 1: A two-phase method of Implementing Research Paradigm

It is possible to divide the problem into two different phases. During the first phase, the data of implementing the research paradigm was studied through the spectacles of systems thinking. The aim is to discover how many candidates implement the research paradigm. The result of this study describes the practices of implementing the research paradigm. The second phase was to develop a similar network of ideas for systems thinking. This network of ideas is mainly based on literature. The result

of this phase was a set of principles that constitutes the use of systems thinking ideas in general. The advantage of this approach is that it eliminates the researchers' bias towards systems-thinking ideas.

3.1.2 Perspective 2: Two phases: From literature to practice

Another idea is to develop categories from systems thinking literature and attempt to ground them in implementing inquiry-based science. During the first phase, the researchers studied systems thinking from a data of implementing inquiry-based science perspective and developed categories that represent the stages of inquiry-based science.

Sample of the Study

The study sample includes   30 KKU postgraduates' candidates conducting action partial or full researches for obtaining a master degree in applied linguistics -ELT. The samples include   male and female students majoring in English language who absorb the techniques, methods, types of research, analysis of research and strategies of research methodologies.

Instruments of the Study

This study is an interpretive qualitative research. It systematically investigates the salient of the implementation research paradigm and inquiry based science in action research. The researchers analyzed the collected data according to the principles of Klein and Myers (1999) entailing the principle of contextualization which requires critical reflection on the social and historical background of the research setting, the principle of interaction between the researchers and the subjects which requires a critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and the participants, the principle of abstraction and generalization which requires relating the idiographic detail revealed by the data interpretation through the application of principles one and two to the theoretical general concepts that describe the nature of human understanding and social action, the principle of dialogical reasoning which requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual finding, and the principle of multiple interpretations which requires sensitivity to possible differences in interpretations among the participants as typically expressed in multiple narratives or stories of the sequence of events under study. They are like multiple witness accounts, even if all participants tell it as they saw it and the principle of suspicion requires sensitivity to possible biases and systematic distortions in the narratives collected from the participants. The researchers tend to explore the research paradigm and inquiring-based science from three-dimensional perspectives: a research analysis in terms of method, methodology, ontology and epistemology, the processes by which the action researches are conducted and the consideration of the socio-historical conditions which govern these processes including a unique form of textual content analysis (description), processing evaluation (interpretation), and social analysis (explanation).

Validity and Reliability of the Instruments

Validity: The selected sample researches are verified according to the principles of Klein and Myers (1999) to ensure their suitability and to decide whether or not they implement research paradigm and inquiring-based science.

Reliability: The researchers used a pilot study on the selected researches texts to ensure that the data flow of research and methodology are based on the research paradigm.

Procedures of the Study
   To conduct this study, the researchers followed these steps:

1. Setting up the questions and objectives of the study.
2. Collecting theoretical and empirical studies relevant to the subject.
3. Collecting 30 action research
4. Interviewing 30 postgraduate candidates
5. Checking the validity of the suitability of the questions.
6. Checking the reliability.
7. Explaining and analyzing the selected written translated texts.
8. Drawing out the conclusion.

4. Data Analysis and Discussion

Table gives perspectives on the problem situation from an interpretive methodological perspective according to the principles of Klein and Myers (1999).

1	**The principle of contextualization** requires critical reflection on the social and historical background of the research setting so that the intended audience can see how the current situation under investigation emerged. 30 of the KKU postgraduate's candidates used as a sample reflect the social and historical background in their researches.
2	**The principle of interaction between the researchers and the subjects** requires a critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and the participants. 20 of the KKU postgraduate's candidates were used as a sample accepted that the interaction between the researcher and the participants influences research material. The researcher will be careful not to influence the respondent by her reactions to the responses given. It is also important not to take on a consulting role. To manage this, the researcher aims to revisit the organizations after the completion of the research study to answer questions asked of the researcher during the data collection phase.
3	**The principle of abstraction and generalization** requires relating the idiographic detail revealed by the data interpretation through applying principles one and two to the theoretical general concepts that describe the nature of human understanding and social action. A method based on pattern matching is used to analyze the data responses reflecting the implementing paradigm in terms of system thinking and worldview. Questions covering paradigm data are explored from different systems thinking methodological approaches to guide the researcher in understanding the responses from specific systems thinking methodology's point of view. Two of the KKU postgraduate candidates used as a sample reflect that they have known the paradigm but have not implemented it. 28 of the KKU postgraduate's candidates used as a sample have no idea about it.
4	**The principle of dialogical reasoning** requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and the actual finding. The researcher conducted follow-up interviews to explore the relationship between the interpreted data, the resulting framework and reality. 30 of the KKU postgraduate's candidates used as a sample show that they understand the relationship between the interpreted data, the resulting framework, and reality.
5	**The principle of multiple interpretations** requires sensitivity to possible differences in interpretations among the participants as typically expressed in multiple narratives or stories of the sequence of events under study. They are like multiple witness accounts, even if all participants tell it as they saw it. Studying the different interpretations of factual events from a systems thinking point of view is very interesting. The researcher hopes to expose these differences to understand the problem situation and paradigm better. 25 of the KKU postgraduate's candidates used as a sample show that they used the interpretive data relying on inquiry-based based science.
6	**The principle of suspicion** requires sensitivity to possible biases and systematic distortions in the narratives collected from the participants. The number of respondents to be interviewed in the study is not determined prior to the case study. More respondents are interviewed when signs of such distortions are detected to clarify the understanding of the distortions. 30 of the KKU postgraduate's candidates used as a sample show that they care of the biases in the study in remedy techniques.
7	Through **abstraction**, critical social research aims to reveal underlying structures that are otherwise taken for granted. These structures specify the nature of the abstract concepts assimilated uncritically onto the prevailing conceptualization. This research study explores the underlying structures of data warehousing practices and success. These structures are explored from a philosophical and methodological point of view in terms of systems thinking. Systems thinking principles such as boundary judgment and ownership are examples of abstract concepts yet to be critically explored by data warehousing professionals. 27 of the KKU postgraduate's candidates used as a sample show an understanding of structures of data.
8	**Totality** refers to the view that social phenomena are interrelated to form a whole.

	Social phenomena should not be investigated in isolation but as part of a larger context. This research study focuses on the role of the research paradigm. 0 of the KKU postgraduate's candidates used as a sample show that they consider paradigm in their study.
9	**Essence** refers to the fundamental element of the analytical process. Systems thinking concepts and paradigms are key to unlocking the deconstructive process. According to Harvey (1990:22), **praxis** means practical reflective activity. It is the activity that changes the world. The critical social researcher is not only interested in understanding the world; he/she aims to change the world. It is not the actions of an individual that are of interest but rather the actions that change the social formations. From a critical perspective, this research aims to improve research quality by implementing research paradigm. 0 of the KKU postgraduate's candidates used as a sample show that they consider paradigm in their study..
10	The positive view of **ideology** sees it as a false consciousness that hides the interests of dominant groups from themselves. According to the negative view of ideology, it cannot be detached from the material conditions of their production; it is constantly reaffirmed through everyday practice. The nature of the ideology needs to be revealed by the researcher through the identification of the essence of social relations and separating this essence from structural forms through a process of dialectical deconstruction and reconstruction. These systems thinking methodologies' ontological and epistemological foundations are explored to identify their ideological nature. 0 of the KKU postgraduate's candidates used as a sample show that they consider paradigm in their study, but 30 of the KKU postgraduate's candidates used as a sample show that they tend to their ideology.

The table displays that %100 of the KKU postgraduate's candidates used as a sample show that they consider inquiry science based in their study and follow the scientific approach in their action research. Moreover, 75% of the KKU postgraduate's candidates accepted that the interaction between the researcher and the participants influences research material. None the less, 0% of the KKU postgraduate's candidates used as a sample in this study implemented research paradigm in terms of the world view and 96% of the KKU postgraduate's candidates used as the sample in this study had no idea about research paradigm. 75% of the KKU postgraduate candidates used as a sample show that they used the interpretive data relying upon inquiry science.100% of the KKU postgraduate's candidates used as a sample show that they care about the biases and systematic distortions in the narratives collected from the participants in the study in remedy techniques.0% of the KKU postgraduate's candidates used as a sample show that they consider paradigm in their study, but 100% of the KKU postgraduate's candidates used as a sample show that they tend to their ideology in their research conduction and that creates a gap between subjectivity and objectivity. This shows that research paradigm is not considered among most KKU postgraduates candidates conducting action research. Research paradigm plays a crucial role in conducting action research. The emphasis of action research on educational problem requires investigation of cause-effect relationship. As reality exists and is driven by natural laws and mechanisms, action research outcomes involve interpretive and positivist paradigms. From the ontological assumptions, the interpretive paradigm and positivist paradigm have an impact on action research conduction. Reality in the critical research paradigm is described within a political, cultural, historical, and economic context. Researchers in a critical context need more than involvement and interaction. They need to be conscientious and see the classroom as problematic regarding action research. Understanding research paradigms and their impact on educational research and teaching approaches helped researchers conduct a well-formed, objective research. Inquiry-based science involves scientific literacy is related to science in daily activities, to build a logical framework that enhances scientific thinking and knowledge (Alatli, 2020). This includes Knowledge of the concepts and ideas of science; understanding of the research process and the nature of how knowledge is obtained, and awareness of the influence of scientific activities in the social context in which they are carried out and their effects are mobilized and creating awareness and scientific utility, and the understanding of content, process, and epistemic knowledge.(Simamora, 2020).From a pedagogical-didactic perspective, for the development of scientific thinking, the thematic field most addressed in studies refers to scientific reasoning, which opens modeled educational practices that favor the affirmation and justification of what is learned. There is also a tendency toward scientific competencies allowing modeling and understanding processes to achieve knowledge and skills.

Question	Achieved	Non achieved	Remarks
KKU postgraduates implement research paradigm	2	28	Two KKU postgraduates know the research paradigm, but 28 of them have no idea about it
KKU postgraduates construct ontology	2	28	Two KKU postgraduates know the ontology as a component of paradigm, but 28 of them have no idea about it.
KKU postgraduates construct epistemology	2	28	Two KKU postgraduates know the epistemology as a component of paradigm, but 28 of them have no idea about it.
KKU postgraduates construct methodology from paradigm construction	2	28	Two of KKU postgraduates construct methodology from paradigm construction,whereas,28 of them have no idea about it.
Postgraduates rely on inquiry based science, which involves implementing science to explore possible solutions, develop explanations for phenomena under investigation and elaborate on concepts , in their conducting of the action research	30	0	30 of KKU postgraduates candidates rely on inquiry based science, which involves implementing science to explore possible solutions, develop explanations for phenomena under investigation and elaborate on concepts , in their conducting of the action research.

Table (2): The research interview

The tables show the research interviews of 30 KKU postgraduate candidates. 6.6% of KKU postgraduates know the research paradigm, but 93.4% do not know about it. 6.6% of KKU postgraduates know the ontology as a paradigm component, but 93.4% have no idea about it. 6.6% of KKU postgraduates know epistemology as a paradigm component, but 93.4% do not know about it.6.6%   of KKU postgraduates construct methodology from paradigm construction, whereas 93.4% do not. In conducting the action research, 100 %of KKU postgraduate candidates rely on inquiry-based science, which involves implementing science to explore possible solutions, develop explanations for phenomena under investigation and elaborate on concepts. It was evident that most candidates do not have an idea about research paradigm and do not consider it in their research. They tend to construct their action research relying on research design without considering ontology, epistemology, methodology and method as components of the research paradigm. Nonetheless, it has been noticed that most postgraduate candidates implement the scientific method and approach by strictly relying on inquiry-based science.

From the findings above, it can be interpreted that most KKU postgraduate candidates do not tend to implement research paradigm in their action research due to the lack of knowledge about the significance of research paradigm in conducting action research. They do not know that the components of paradigm entailing ontology, epistemology, methodology and method that assist them to conceptualize the pedagogical problem from social contextualization existence, the knowledge involvement in terms of worldview and interpretation. In addition, they do not derive their research methods from a paradigm perspective. The candidates strictly implement scientific methods and approaches related to research methodology and tend to follow action research design without considering the research paradigm.

Findings of the Study

To answer the questions of the study, which aimed to investigate the adequacy and quality of implementing a research paradigm and inquiring-based science in action research among KKU postgraduate candidates conducting action research to obtain a master's degree in applied linguistics, the results are reached:
-To what extent do KKU postgraduates implement research paradigms, including ontology, epistemology, methodology, and methods, in conducting their partial or full action research?

-Do KKU postgraduates rely on inquiry-based science, which involves implementing science to explore possible solutions, develop explanations for phenomena under investigation, and elaborate on concepts when conducting action research?

Findings

Since research paradigm and inquiry-based science are highly considered in action research, this study critically assesses the postgraduate candidates' research revealing the underlying implementation of research paradigm and inquiry-based science adopting Myers (1999) entailing the principle of contextualization, the principle of interaction between the researchers and the subjects, the principle of abstraction and generalization, the principle of dialogical reasoning and the principle of multiple interpretations. Thus, **t**he researchers analyze the structures, content and style of the candidates' action researches.

Conclusion and Recommendations

This study concludes with recommendations that:
-   Most postgraduate candidates at KKU conduct their action research without considering the research paradigm and follow previous researchers' research designs in modelling.
-   Graduate candidates' research products mirror the sense of research methodological knowledge as an epistemic structure, including research paradigm's components -ontology, epistemology, method, and methodology. In addition, it reflects the researchers' ideological structure.
-   Most candidates tackle the research problem from a pedagogical perspective, excluding the social perspective when conducting action research.
-   Most of the candidates implement a scientific approach relying on inquiring-based science in their action research; hence, their action researches follow the action research design strictly with the noticeable aspect of ignoring the phenomenological approach.
-   Postgraduate courses at Languages and Translation College ignore the teaching research paradigm in their syllabuses, and the research syllabuses do not imply the philosophical structure of research methodology.

Study Recommendations:

The study recommends the following:

-   King Khalid University postgraduate candidates conducting action research should be taught research paradigm in their post-graduation studies courses.

-   King Khalid University postgraduate candidates conducting action research should be taught the philosophical structure of research methodology, particularly those who tend to conduct action research.

-   King Khalid University postgraduate candidates should be taught that the focal point of action research is to tackle the pedagogical problem within its social context, including social factors, psychological factors, and the society's cultural background.
-   King Khalid University postgraduate candidates should be taught that action research is an objective process, not a subjective process; thus, personality, ideology and country bias should be avoided to retain the faith and reality of the action research. Thus, reliable solutions can be reached sensibly.
-   Postgraduate courses at Languages and Translation College should include a teaching research paradigm in its syllabuses and philosophical structure focusing on that research method extracted from the research paradigm.
-   Postgraduate courses at Languages and Translation College should accompany teaching the scientific approach, relying on inquiry-based science in action research and teaching phenomenological and other post-modernization approaches and methods.
-   Languages and Translation College postgraduate courses should prepare their postgraduate candidates as researchers, free thinkers, and critics.

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