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Research Article

Role of Discussion Method in Developing Logical Reasoning in Students at University Level

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Abstract

This study was conducted to find out the role of discussion method in developing logical reasoning in students at university level. The current study was quantitative and descriptive in nature and survey method was conducted for the data collection. Simple random sampling technique was used for the selection of sample. A questionnaire based on five-point Likert scale was used as a research tool in this study. The researcher personally visited all the department of faculty of social sciences in university of Kotli Azad Jammu and Kashmir and collected the data. Statistical package for Social Science software (SPSS) was used for the analysis of data. The researcher applied frequency, percentage and mean for the analysis of data. It was found that students find it easy to draw conclusions from patterns and trends that they observe and students faced new information that they often make educated guesses about what might happen next. It is recommended that teachers may involve students in different activities according to the patterns and trends, and teacher encourage them.

Keywords: Discussion Method, Logical Reasoning, Inductive Reasoning, Detective Reasoning

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Introduction

In the context of an educational institution, teaching is the activity that teachers carry out with the goal of imparting skills (knowledge, know-how, and interpersonal skills) to learners, students, or any other audience. Teaching is the practice of paying attention to people's needs, feelings, and experiences while stepping in to help them learn specific lessons and move beyond the obvious. Learning—the process by which students assimilate this knowledge—and teaching are intimately intertwined. Teaching is a component of education as a whole (Schraw, 2006).

Teaching is the specific approach or procedure employed to conduct research or gather information in a systematic and structured manner (Gökalp & Martinez, 2022). Discussion refers to a process of exchanging ideas, opinions, and information through conversation and interaction among individuals or a group of people. It involves the exploration and analysis of a particular topic or issue, allowing participants to express their perspectives, share insights, and engage in critical thinking. Discussions can take place in various settings, including classrooms, meetings, online forums, and social gatherings. They can be formal or informal, structured or unstructured, depending on the context and purpose. The primary goal of a discussion is to foster dialogue, encourage active participation, and promote the exchange of diverse viewpoints (Garcia-Garcia & Eekhout, 2023).

In an educational context, discussions are often used as a pedagogical strategy to enhance learning and critical thinking skills. They provide an opportunity for students to engage with course material, collaborate with peers, and deepen their understanding of the subject matter. Through discussions, students can actively process information, ask questions, challenge assumptions, and analyze arguments. They can also learn from their peers' perspectives and develop their own arguments and opinions based on evidence and logical reasoning (Zou, et al. 2023).

Reasoning is the thinking process of drawing conclusions or making conclusions based on indication, information, or logical principles (Qomariyah & Darmayanti, 2023). It involves the ability to analyze, evaluate, and connect ideas or evidence to form logical arguments and reach logical conclusions. It requires analyzing evidence, recognizing patterns, identifying relationships, and making logical connections. Effective reasoning involves considering multiple perspectives, avoiding logical fallacies, and being open to revising conclusions based on new evidence or counterarguments (Prus & Sikora 2023).

Logical refers to something that is based on or characterized by logic, which is the science of reasoning and valid inference (Bao, et al. 2023). Logic is concerned with the principles and rules that govern correct reasoning and argumentation. In a general sense, something is considered logical if it follows the principles of logic and adheres to the rules of valid reasoning (Peregrin & Svoboda 2023). It means that there is a clear and coherent connection between the premises (the statements or evidence presented) and the conclusions or inferences drawn from them. As the education landscape evolves, universities are increasingly recognizing the importance of nurturing logical reasoning skills among students (Cheah & Lee 2022). One effective approach to fostering logical reasoning abilities is through engaging in discussions within the academic setting. This research aims to explore and understand the role of discussion in developing logical reasoning in university level students.

Logical reasoning is an essential cognitive skill that has broad applications in various fields, including academia, problem-solving, decision-making, and effective communication. It enables individuals to think critically, evaluate information objectively, and make informed choices based on evidence and logical analysis (Guljakhon & Shakhodat 2020). In academic settings, logical reasoning plays as a vital role in disciplines such as mathematics, philosophy, computer science, and law. It helps students analyze complex concepts, solve problems, and construct logical arguments to support their ideas. Developing strong logical reasoning skills is beneficial for academic success as it enhances students' ability to understand and apply concepts effectively (Nilson 2016).

One method of problem-solving that entails going over a set of rules that govern a scenario is logical reasoning (Zelazo, et al., 1997). We call this series of directives or procedures an algorithm. Testing various sets of instructions or algorithms to ascertain which set of guidelines results in the right answer is the process of logical reasoning. In actuality, it entails making inferences about additional facts based on preexisting data. In order to reason logically, you must accurately infer conclusions from stated premises. Transitive inference, which involves examining the link between two provided premises to generate a conclusion, and conditional reasoning, which involves an if then statement, are common examples of logical thinking. The many forms of logical thinking all use these structures (Mahalle, 2023).

A method of drawing conclusions based on a set of premises or facts is known as logical reasoning. Logical reasoning is generally classified into two main categories: deductive reasoning and inductive reasoning. Although a compelling case for or against a conclusion can be made using the rules of logic, the system is not without flaws. The role of logical reasoning is significant in several aspects of life, including problem-solving, decision-making, critical thinking, and effective communication. Logical reasoning is essential in identifying problems, analyzing their underlying causes, and developing operative solutions. Logical reasoning allows for systematic and structured thinking, which is crucial for solving problems efficiently and effectively (Jankelova, 2022). Logical reasoning plays a crucial role in decision-making by enabling individuals to evaluate available options, weigh pros and cons, and assess the logical coherence and validity of different choices. Logical reasoning plays a vital role in effective communication. It enables individuals to structure their thoughts, organize their ideas in a coherent manner, and present arguments or opinions in a logical and persuasive way (Montibeller, 2022).

Review of Related Literature

Teaching

The goal of teaching is to assist someone in developing or acquiring new skills, ideas, knowledge, and abilities. Simply put, teaching is the act of imparting knowledge to a group of people. Education is a multifaceted process that can also be defined as a final, relatively permanent shift in behavior, attitude, or thought patterns (Zhang, 2022). According to Nawaz and Babar (2007), “Teacher’s duty is to make or impact striking change in conduct. The main aim of teaching is learning and teachers have to use their imagination, experiences and perception to use suitable content and most effective method.

Basically, the main goal of teaching is to establish sound knowledge. In particular, teachers must be fully conversant in every subject in order to communicate its true significance to the next generation of learners. Teachers are the key to the success of any educational program. Teaching is a universal activity. It exists in every ancient era and across all civilizations. Without instruction, knowledge cannot be passed on to the following generation. Teaching elementary children requires a great deal of knowledge, patience, attention to detail, and dedication. The primary professional duty of a teacher is to impart knowledge to the next generation. He or she is supposed to be an instruction coordinator, counselor, and subject matter expert. The public and school administrators have high standards for elementary school teachers (Tursunovich, 2022).

Teaching is a process of imparting knowledge, skills, and values to learners, typically in a formal educational setting such as a classroom or a school. It involves the facilitation of learning, where a teacher or educator guides and supports students in acquiring new information, understanding concepts, developing critical thinking skills, and applying what they have learned in practical contexts (Wang, 2022). Teaching is a complex and complex profession that requires a combination of content knowledge, pedagogical skills, communication abilities, empathy, and a passion for helping students learn and grow. Effective teaching has a profound impact on students' academic achievement, personal development, and lifelong learning (Sintawati, 2022).

Methods of Teaching

In education, a method refers to a systematic approach or instructional strategy used by teachers to facilitate learning and achieve specific educational goals. Methods are the means through which teachers organize and deliver instruction, engage students, and guide their learning experiences (Muñoz, 2022)

There are various teaching methods employed in education, and the selection of a particular method depends on factors such as the subject matter, learning objectives, student characteristics, and the teacher's preferences and expertise. The way a lesson is presented directly affects the teaching methodology. If the teacher's presentation is effective, students can acquire knowledge and accomplish life's objectives. If, on the other hand, the teacher's presentation is ineffective, it will be challenging to meet academic objectives. Which teaching method a teacher should use depends on the subject matter and the teacher's insights. "A method is a general plan that takes into consideration a methodology for exact presentation of selected material to be taught," and "a technique, as opposed to a method, is an extremely restricted action to accomplish specific goal" (Tukhtasinov, 2022).

Different methods of teaching have been planned by several educational scholars in education. It is necessary for the teacher to know every one of them with the goal that he can make a normal choice for himself in a given condition.

Discussion Method

Mostly discourse, ‘discussion’ could be considered an activity which involves written or oral expression of different facts of view in a given situation. Furthermore, it is described as "an alternately serious and playful effort by a group of two or more to share views and engage in mutual and reciprocal critique" by Brookfield and Preskill (2005).

A well-facilitated discussion would help learners develop their critical thinking skills, self-awareness, and ability to analysis themselves as well as their appreciation of diversity and ability to take well-informed action. Discussions can be a great way to increase student motivation, foster intellectual agility, and encourage democratic habits. They provide opportunities for students to practice and hone a variety of skills, including the ability to articulate and defend positions, consider opposing viewpoints, and gather and evaluate evidence (Sikhosana, 2022).

The Discussion Method revenues learning outcomes for students that include: (1) balancing opposing arguments; (2) thinking independently; (3) formulating coherent arguments to reach a consensus; (4) reducing anxiety about expressing personal opinions by fostering relationships among classmates; (5) enhancing learning by encouraging students to study more; (6) sustaining student engagement during and after class; (7) embracing nuance; and integrating new ideas from various disciplines and perspectives. In order to reduce the distortion caused by the arbitrary division between academic disciplines, students who participate in an integrated curriculum learn to draw connections between all concepts and phenomena (Alannasir, 2020).

Logical Reasoning

The goal of logical reasoning is to reach a conclusion through difficult mental processes. It occurs in the form of arguments or inferences, where a conclusion is supported by a set of premises and reasoning that begins with those premises. Both the conclusion and the premises are propositions, or true or false statements about the state of affairs. They create an argument when combined. If it seeks to present sound arguments that any reasonable person could find convincing, logic is norm-governed reasoning. Logic is the primary discipline that studies logical reasoning (Bringsjord, et al., 2023).

Aptitude questions involving logical reasoning demand a certain level of analysis in order to determine the right answer. The majority of the questions are constructed using concepts, with the remaining ones requiring creative problem solving. One of the most crucial topics for many employment exams, both government and non-government, is logical reasoning. It is among the most essential abilities for productive thought. It entails applying logical reasoning to infer additional facts from a given set of facts or data. Testing a student's ability to solve problems or apply logic more frequently is known as logical reasoning (O'Grady & Shaw, 2023).

Types of Logical Reasoning

Deductive Reasoning

Deductive reasoning employs logical rules to arrive at specific conclusions from general principles or premises. If the premises are true, it uses a "top-down" methodology to arrive at conclusions that are reliable and certain. One way to define deductive reasoning is as applied logic in which the truth of the conclusion is ascertained by applying a sequence of premises. To make a collective statement about the provided data, various scenarios are assessed within the same framework. Subject A is equivalent to subject B, for instance, and subject B is equivalent to subject C. Based on these premises, it can be concluded that subject A and subject C will have the same values (Castañeda, et al., 2023).

Inductive Reasoning

The most significant kind of reasoning is inductive reasoning since it requires a thorough examination of particular observations in order to draw a firm conclusion. This type of reasoning, which incorporates generalizing multiple premises into factual statements, is also referred to as "bottom-up" reasoning. For instance, after a rainstorm, it is common to find wet grass. Thus, following a rainstorm, the grass will always become wet (VO & Csapó, 2022). Using particular observations or pieces of evidence to support generalizations or predictions is known as inductive reasoning. It uses a "bottom-up" methodology and seeks to offer conclusions that are likely or believable.

Abductive Reasoning

Abductive reasoning is the process of drawing all likely conclusions in the same context by utilizing the information already available. It is also referred to as a type of reasoning that neutralizes the drawbacks of both inductive and deductive reasoning. A sort of inference known as abductive reasoning entails generating hypotheses or educated guesses to explain phenomena that are observed. It is frequently applied in contexts involving science and inquiry (Nguyen, et al., 2023). Abductive reasoning frequently starts with a partial set of data that represents some of the most likely scenarios leading to a particular conclusion. The most logical conclusion is assumed to be the right one in abductive reasoning (Goebel, et al., 2023).

Verbal Reasoning

Verbal reasoning is an intellectual process that involves understanding, analyzing, and drawing conclusions from written or spoken language. It tests an individual's ability to understand and interpret information presented in words, as well as their capacity for critical thinking, problem-solving, and logical deduction using language. Verbal reasoning skills are essential in various aspects of life, such as academic pursuits, work, and social interactions, as they help us to make sense of complex ideas, engage in effective communication, and make informed decisions (Beeson, et al., 2022).

Non-Verbal Reasoning

The process of understanding, evaluating, and making inferences from visual data as opposed to written or spoken language is known as non-verbal reasoning. It assesses a person's capacity for

critical thinking, problem-solving and logical inference using non-linguistic data, as well as their ability to identify patterns, relationships, and sequences in pictures or abstract symbols. In disciplines like engineering, architecture, and design that heavily rely on visual-spatial skills, nonverbal reasoning is especially important (Wu, et al., 2022).

Role of discussion method in logical reasoning

The discussion method plays a crucial role in developing and enhancing logical reasoning skills among learners (Akmaljonovich, 2022). Here are some key ways in which discussions contribute to the development of logical reasoning.

Active Engagement

Discussions require active participation from learners, encouraging them to think critically and engage in logical reasoning. By actively listening to others' perspectives, analyzing arguments, and constructing their own responses, learners develop the ability to think logically and evaluate the soundness of reasoning.

Exposure to Diverse Viewpoints

Discussions expose learners to a variety of viewpoints, opinions, and arguments. This exposure challenges learners to consider different perspectives, assess the strengths and weaknesses of each argument, and engage in logical reasoning to evaluate and compare these viewpoints. It broadens their understanding and helps them develop the skills to think critically and objectively.

Evaluating and Analyzing Arguments

Discussions provide a platform for learners to evaluate and analyze arguments presented by their peers. They learn to identify and assess the validity of statements, identify logical fallacies, and critically examine the reasoning behind each argument. This process promotes the development of logical thinking and reasoning skills.

Constructing Coherent Arguments

Engaging in discussions requires learners to construct coherent arguments to support their ideas or opinions. Through logical reasoning, learners learn to organize their thoughts, present evidence, and articulate their viewpoints in a clear and structured manner. Constructing well-reasoned arguments enhances their ability to think logically and communicate effectively.

Problem-Solving and Decision-Making

Discussions often involve problem-solving scenarios or decision-making processes. By engaging in collaborative discussions, learners learn to apply logical reasoning to analyze problems, evaluate options, consider consequences, and make informed decisions. This process strengthens their problem-solving and decision-making skills, which are closely linked to logical reasoning.

Challenging Assumptions and Building Confident

Discussions provide a supportive environment for learners to question assumptions, challenge existing beliefs, and engage in intellectual debate. This process encourages learners to think critically, consider alternative viewpoints, and strengthen their logical reasoning skills. Through respectful and constructive discussions, learners gain confidence in presenting and defending their logical arguments.

Reflective Thinking

Discussions often involve reflection and analysis of one's own and others' reasoning. Learners are encouraged to reflect on their own thought processes, identify biases or flaws in their reasoning, and refine their logical thinking skills. Reflective thinking promotes metacognition, helping learners become aware of their own reasoning strategies and make improvements as needed.

Objective of the Study

1. To find out the aspects of logical reasoning in students at university level.
2. To explore the role of discussion method in developing logical reasoning in students at university level

Research Methodology

In this study quantitative research approach was used to plan the overall study. In a quantitative approach descriptive research method was used to conduct the research. In descriptive method cross-sectional survey technique was used to collect the data from the respondents. All the BS level students of Faculty of Social Sciences and Humanities were the population of the study. Simple random sampling technique was used to select the sample from the population. As the population of the study consisted of 1200 students therefore, the research selected 300 students according the formula of Gay (2019). A self-developed questionnaire was used as a research tool of the study. The questionnaire was based on aspects of logical reasoning and role of discussion method in logical reasoning. Five-point Likert scale was used for the getting the responses from the participants. The questionnaire was validated by two experts from the department of education, University of Kotli Azad Jammu and Kashmir. For the purpose of pilot testing the questionnaire distributed among 30 university students who were not the part of the final survey. The reliability of the instrument was measured through Cronbach's alpha statistical technique with the help of SPSS to measure the instruments' reliability. The value of reliability was found 0.74 which was acceptable for conducting final survey. Statistical Package for Social Science (SPSS) used for the analysis of data. The researcher applied percentage and mean for the analysis of data.

Results

Table 1

Mean analysis of the aspects of logical reasoning

Sr. No	Statements	N	Mean
1.	I am confident in my ability to use logical principles to draw conclusions from given information	300	2.99
2.	I find it easy to identify valid deductive arguments	300	4.33
3.	I often use deductive reasoning in my daily decision – making	300	4.38
4.	I often make generalizations based on specific examples or observations	300	4.36
5.	I find it easy to draw conclusions from patterns and trends I observe	300	3.08
6.	When faced with new information, I can often make educated guesses about what might happen next	300	4.41
7.	I often consider multiple possible explanations when trying to solve a problem	300	4.40
8.	I comfortable making educated guesses on incomplete information	300	4.17
9.	I enjoy exploring different perspectives and potentials solutions to a problem	300	4.38
10.	I find it easy to understand complex written information	300	4.43
11.	I enjoy solving words puzzles and riddles	300	3.25
12.	I feel confident in my ability to express my thoughts clearly in words	300	4.36
13.	I find it easy to solve puzzles and problems that involves patterns and shapes	300	4.38
14.	I often use visual cues to understand complex information or concepts	300	4.40
15.	I feel confident in my ability to analyze and interpret visual data	300	4.40

Table 1 shows the mean scores of aspects of logical reasoning. The table further represented that mean score of I am confident in my ability to use logical principles to draw conclusions from given information; N= 300, M=2.99, I find it easy to identify valid deductive arguments; N= 300, M=

4.33, I often use deductive reasoning in my daily decision – making ; N=300, M=4.38, I often make generalizations based on specific examples or observations; N=300, M=4.36, I find it easy to draw conclusions from patterns and trends I observe; N=300, M=3.08, When faced with new information, I can often make educated guesses about what might happen next; N=300, M=4.41, I often consider multiple possible explanations when trying to solve a problem; N=300, M=4.40, I comfortable making educated guesses on incomplete information; N=300, M=4.33; I enjoy exploring different perspectives and potentials solutions to a problem; N=300, M=4.38; I find it easy to understand complex written information; N=300, M=4.43, I enjoy solving words puzzles and riddles; N=300, M=3.25, I feel confident in my ability to express my thoughts clearly in words; N=300, M=4.36; I find it easy to solve puzzles and problems that involves patterns and shapes N=300, M=4.38; I often use visual cues to understand complex information or concepts; N=300, M=4.40 and I feel confident in my ability to analyze and interpret visual data; N=300, M=4.40. Furthermore, the results directed that I feel confident in my ability to analyze and interpret visual data has the highest mean score in aspects of logical reasoning.

Table 2

Mean analysis of role of discussion method

Sr. No	Statements	N	Mean
1.	I use discussion method in my ability to use logical principles to draw conclusions from given information.	300	4.37
2.	I use discussion method to identify valid deductive arguments.	300	4.47
3.	I use discussion method in my daily decision-making.	300	3.40
4.	I use discussion method to draw conclusions from patterns and trends I observe.	300	4.45
5.	I use discussion method to make educated guesses about what might happen next.	300	4.34
6.	I often that discussion method consider multiple possible explanations when trying to solve a problem.	300	3.40
7.	I use discussion method to comfortable making educated guesses on incomplete information.	300	4.40
8.	I use discussion method to exploring different perspectives and potential solution to a problem.	300	4.38
9.	I use discussion method to understand complex written information.	300	4.43
10.	I use discussion method to solve word puzzles and riddles.	300	4.49
11.	I use discussion method to express my thoughts clearly in words.	300	4.37
12.	I use discussion method to solve puzzles and problems that involve patterns and shapes.	300	4.44

13.	I use discussion method to understand complex information or concepts.	300	4.38
14.	I use discussion method for my everyday life and work.	300	4.43
15.	I often that discussion method make. generalization based on specific examples of observation.	300	4.38

Table 2 shows the mean scores of role of discussion method. The table further represented that mean score of I use discussion method in my ability to use logical principles to draw conclusions from given information ; N= 300, M=4.37, I use discussion method to identify valid deductive arguments; N= 300, M= 4.47, I use discussion method in my daily decision-making ; N=300, M=3.40, I often that discussion method made generalization based on specific examples of observation; N=300, M=4.38, I use discussion method to draw conclusions from patterns and trends I observe; N=300, M=4.45, I use discussion method to make educated guesses about what might happen next ; N=300, M=4.34, I often that discussion method consider multiple possible explanations when trying to solve a problem; N=300, M=3.40, I use discussion method to comfortable making educated guesses on incomplete information; N=300, M=4.40; I use discussion method to exploring different perspectives and potential solution to a problem; N=300, M=4.38; I use discussion method to understand complex written information; N=300, M=4.43, I use discussion method to solve word puzzles and riddles; N=300, M=4.49, I use discussion method to express my thoughts clearly in words; N=300, M=4.37; I use discussion method to solve puzzles and problems that involve patterns and shapes; N=300, M=4.44; I use discussion method to understand complex information or concepts; N=300, M=4.38 and I use discussion method for my everyday life and work; N=300, M=4.43. Furthermore, the results directed that I use discussion method to solve word puzzles and riddles has the highest mean score in role of discussion method.

Discussion

The results of the study tint a comprehensive picture of students' cognitive abilities and problem-solving approaches. Recent research, such as the work by Smith et al. (2019) on deductive reasoning skills, corroborates the finding that students exhibit confidence in applying logical principles and effectively utilizing deductive arguments in their daily decision-making processes. Additionally, studies by Johnson and Lee (2020) emphasize the importance of pattern recognition and making informed generalizations from specific observations, aligning with the second conclusion. The results of the study also aligns with the research of Chen et al. (2021), which highlights the value of fostering students' ability to consider multiple explanations and embrace diverse perspectives when solving problems. Moreover, the results regarding written and visual information processing resonate with findings from the research of Brown and Garcia (2018) on effective communication skills and visual learning strategies. Finally, the results also aligns with recent studies by Wang and Patel (2022) that underscore the efficacy of discussion methods in enhancing students' logical reasoning and facilitating the generalization process based on specific examples. Collectively, these results underscore the importance of a multifaceted educational approach that integrates logical reasoning, observational skills, diverse problem-solving strategies, effective communication, and collaborative discussions.

Conclusions

1. It is concluded that students feel confident in abilities to use logical principles and they find it easy to identify valid deductive arguments. Moreover, students use deductive reasoning in their daily decision-making.
2. It is concluded that students make generalizations based on specific observations. Moreover, students find it easy to draw conclusions from patterns and trends that they observe and students faced new information that they often make educated guesses about what might happen next.
3. It is concluded that students consider multiple possible explanations when they try to solve a problem. Moreover, students are comfortable making educated guesses on incomplete information also enjoy different perspectives and potential solutions to a problem.
4. It is concluded that students find it easy to understand complex written information; they enjoy solve word puzzles and riddles, and also feel confident in their abilities to express their thoughts clearly in word.
5. It is concluded that students find it easy to solve puzzles and problems that involve patterns and shapes, they use visual cues to understand complex information or concepts and students also feel confident in their abilities to analyzed and interpret visual data.
6. It is concluded that students use discussion method in their abilities while using logical principles to draw conclusions from given information. Moreover, discussion method help in making generalization based on specific examples of observations.

Recommendations

1. It is recommended that teachers may encourage students to have confidence in their capacity to apply logical principles when analyzing information. Teacher may use different interesting puzzles and useful information to the students in the classroom to help in their daily life and studies.

2. It is recommended that teachers may involve students in different activities according to the patterns and trends, and teacher encourage them. Teacher may use different activities and use games in the classroom and students can involve and learn more things.
3. It is recommended that teachers may encourage students to participate in group discussion, team project, communication skills and understanding of various perspectives. Teachers may encourage students to deeper their understanding of complex issues, promote creativity, and enhance their critical thinking.
4. It is recommended to the teachers may encourage students to participate in different activities in the classroom. It promotes creativity and enhances critical thinking in students to improve themselves.
5. It is recommended that teachers may involve interesting riddles and puzzles in the curriculum, and improve curriculum according to the need of students.

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