Methods of Forming Students' Analytical Thinking Ability and the Role of Creative Thinking and Critical Thinking in the Progress of Students' Education

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Abstract: Although analytical thinking, creative thinking and critical thinking are among the thoughts that express the personal nature of a person, but the main purpose of this research is to connect the students' analytical thinking ability with critical thinking and creative thinking at the same time and the nature of all three thoughts. In the development and formation of education and training of students from family to kindergarten, from kindergarten to school and higher levels of education, it will be analysed and investigated. It is more important to relate analytical thinking to creative thinking and critical thinking in predicting changes in students' academic progress at the same time as all three thoughts are together because it is one of the factors that form the individuality of human nature and plays a fundamental role in the formation of a student's worldview. In the elementary courses, one plays. The ability to think critically and analytically is one of the main competencies expected of a learning process in higher education institution, especially in science area. A scientist should be able to explore a problem, choose the appropriate method, obtain the solutions, and communicate their analysis correctly.

Keywords: Students, Analytical thinking, critical thinking, creative thinking, analysis, Development of children's thinking, methods.

Introduction

One of the expected outcomes of learning activities in an institution of higher education, especially in the fields of science, is the ability to think critically creative and analytically. Critical thinking, in simple language, is the ability to analyse and evaluate information (Duron et. Al, 2006). A person who thinks critically is able to explore a problem from the phenomena that occurred in the environment, modelling the problem clearly, getting the right solution, and be able to effectively communicate the results of their analysis. The purpose of starting this research on the formation of children's thinking is that children are human beings devoid of nature and are the result of the future person of the congregation, and parents are obliged to raise and educate the child and provide a basic guide for the formation of the child's thoughts. Critical, creative analytical thinking skills are formed and nurtured from childhood through a combination of environmental influences, educational experiences, and individual cognitive development. Here are some key factors that contribute to the development of these thinking skills in children:

1) Early Learning Experiences

2) Encouragement of Curiosity and Exploration

3) Problem-Solving Opportunities

4) Exposure to Diverse Perspectives

5) Opportunities for Creative Expression

6) Encouraging Questioning and Reflection

7) Role Modelling

8) Educational Approaches

1. Early childhood experiences, such as exposure to books, educational games, and interactive toys, can stimulate a child's imagination and curiosity. These experiences lay the groundwork for creative thinking by encouraging exploration and open-ended play.

2. Encouragement of Curiosity and Exploration:

➢ Parents, caregivers, and educators play a crucial role in fostering critical and creative thinking by encouraging children to ask questions, explore their surroundings, and engage in imaginative play. This helps children develop a sense of wonder and an openness to new ideas.

3. Problem-Solving Opportunities:

➢ Providing children with age-appropriate puzzles, challenges, and hands-on activities encourages the development of analytical thinking skills. These activities help children learn to break down problems into manageable parts and develop strategies for finding solutions.

4. Exposure to Diverse Perspectives:

➢ Exposing children to diverse cultures, traditions, and viewpoints through literature, art, and social interactions can broaden their understanding of the world and encourage critical thinking by prompting them to consider different perspectives.

5. Opportunities for Creative Expression:

➢ Engaging children in artistic activities, such as drawing, painting, storytelling, and music, provides opportunities for creative expression and the development of imaginative thinking.

6. Encouraging Questioning and Reflection:

➢ Adults can nurture critical thinking in children by encouraging them to ask "why" and "how" questions, promoting reflection on their experiences, and guiding them in evaluating information.

7. Role Modelling:

➢ Adults who model critical thinking behaviours and demonstrate creativity in problem-solving serve as powerful influences on children's development of these skills. When children see adults engaging in thoughtful analysis and creative approaches to challenges, they are more likely to emulate these behaviours.

8. Educational Approaches:

➢ Progressive educational approaches that emphasize inquiry-based learning, project-based learning, and open-ended exploration provide an ideal environment for fostering critical and creative analytical thinking skills in children.

By creating a supportive environment that values curiosity, exploration, and open-mindedness, caregivers and educators can help children develop the foundational skills of critical and creative analytical thinking from an early age. As children grow and mature, continued reinforcement of these skills through educational experiences and real-world problem-solving opportunities further strengthens their ability to think critically, creatively, and analytically. The role of parents in fostering analytical thinking, critical thinking, and creative thinking in the home environment is crucial for the holistic development of children. Here are several ways in which parents can support and nurture these cognitive skills:

1. Encouraging Curiosity and Questioning:

➤ Parents can cultivate analytical thinking by encouraging children to ask questions, explore their interests, and seek out new information. By fostering a sense of curiosity, children develop a natural inclination to analyse and evaluate the world around them.

2. Engaging in Thought-Provoking Conversations:

➤ Parents can engage their children in meaningful discussions that stimulate critical thinking. By discussing current events, ethical dilemmas, or thought-provoking topics, parents provide opportunities for children to analyse different perspectives and develop their own reasoning skills.

3. Providing Access to Educational Resources:

➤ Parents can create an environment that supports analytical thinking by providing access to books, educational games, puzzles, and other resources that encourage problem-solving and critical analysis. These resources help children develop their cognitive abilities in a fun and engaging way.

4. Encouraging Creative Expression:

➤ Supporting creative thinking involves providing opportunities for children to express themselves through art, music, storytelling, or imaginative play. This fosters a mind-set of exploration and innovation, which is essential for developing creative thinking skills.

5. Emphasizing the Process of Learning:

➤ Parents can shift the focus from simply achieving correct answers to emphasizing the process of learning. Encouraging children to explain their reasoning, justify their conclusions, and learn from mistakes helps develop analytical and critical thinking skills.

6. Exposing Children to Diverse Experiences:

➤ Parents can broaden children's perspectives by exposing them to diverse experiences, cultures, and viewpoints. This exposure encourages open-mindedness, critical analysis of different perspectives, and the development of empathy—essential components of analytical and critical thinking.

7. Encouraging Problem-Solving:

➤ Parents can present children with age-appropriate challenges and problems that require critical thinking and creative solutions. This could involve puzzles, riddles, or real-life scenarios that encourage children to think analytically and creatively.

8. Modelling Analytical and Critical Thinking:

➤ Parents can model analytical and critical thinking in their own decision-making processes and problem-solving activities. By demonstrating how to approach problems systematically and think critically about various options, parents provide a valuable example for their children.

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9. Supporting Risk-Taking and Innovation:

➤ Encouraging children to take calculated risks, try new approaches, and learn from failure fosters a mind-set of innovation and creative problem-solving. Parents can support this by creating a safe environment for experimentation and learning from mistakes.

10. Providing Constructive Feedback:

➤ Offering constructive feedback that encourages children to reflect on their thought processes, consider alternative approaches, and refine their ideas helps develop their analytical and critical thinking skills.

By integrating these practices into the home environment, parents can play a significant role in nurturing their children's analytical thinking, critical thinking, and creative thinking abilities. This support not only enriches children's cognitive development but also equips them with essential skills for success in academics and beyond. Creativity can happen anywhere. Use common everyday experiences on teach creativity – in the car, on a walk or when you're cooking together. Creativity is the freest form of self-expression and, for children, the creative process is more important than the finished product. There is nothing more fulfilling for children than to be able to express themselves freely. The ability to be creative can do much to nurture children's emotional health. All children need to be creative is the freedom to commit themselves to the effort and make whatever activity they are doing their own.

What's important to remember in any creative activity is the process of self-expression. Creative experiences help children express and cope with their feelings. Creativity also fosters mental growth in children by providing opportunities for trying out new ideas and new ways of thinking and problem solving. Creative activities help acknowledge and celebrate the uniqueness and diversity of your children as well as offer excellent opportunities to individualize parenting and focus on each of children. Children start learning even before they are born. No wonder parents are called children's first teachers! Parents make a powerful difference in what children learn and how they think So spark kids" creativity by encouraging their curiosity, using common everyday experiences to inspire new ideas, building their confidence and using their art to spark conversations. Children are naturally curious. Children know instinctively to ask questions. Children often ask better questions than adults. Parent should listen and build on their curiosity. Continue to inspire their imagination with simple questions, while encouraging them to think of the answers or solutions. One of the important factors that support the success of an educational process is the family. As the smallest unit in a society of, shape and style of the family also colouring to community as whole. Family life requires the planning, structuring, and improvement, including the rearing of children.

Build your child's critical thinking skills Building critical thinking skills happens through everyday interactions as you talk to your child, ask open-ended questions, and allow your child to experiment and solve problems. Provide opportunities for play. Building with blocks, role-playing with friends, or playing board games all build children's critical thinking.

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Pause and Wait It's important to give your child enough time to think, try to do a task, or develop a response. This gives your child a chance to think about and perhaps modify their response rather than responding to their first gut reaction. Do not intervene immediately, children need challenges to grow. Wait and watch before jumping in to fix a problem.

Ask open questions. Instead of automatically answering questions your child asks, help them think critically by asking questions in return: "What ideas do you have? What do you think is going on here?

Help children develop hypotheses. Taking time to form hypotheses while playing is a critical thinking exercise that helps develop skills. Try asking your child, "What do you think will happen if we do this?" or "Let's predict what will happen in the future."

Encourage new and different ways of thinking. By allowing children to think differently, you help them develop their creative problem-solving skills.

Of course, when parents need to step in, it's helpful to model your own critical thinking. As you work through the decision-making process, verbalize what is going through your mind. Children

learn from observing how you think. Taking the time to let your child solve problems is essential to developing your child's critical thinking skills in the long run.

The role of creative thinking, analytical thinking, and critical thinking in the academic progress of students is significant. Each type of thinking plays a distinct but complementary role in fostering academic success and holistic development.

➢ Creative thinking encourages students to generate original ideas, think outside the box, and approach problems in innovative ways.

➢ It fosters curiosity, imagination, and the ability to find unique solutions to complex problems.

➢ In an academic setting, creative thinking can lead to the development of inventive projects, artistic expressions, and novel approaches to learning and understanding concepts.

➢ It helps students to adapt to new challenges, think flexibly, and develop a sense of self-expression and individuality.

➢ Analytical thinking involves breaking down complex information into smaller components, identifying patterns, and making logical connections.

➢ It enables students to examine data, evaluate evidence, and draw conclusions based on systematic reasoning.

➢ In an academic context, analytical thinking is crucial for understanding and interpreting texts, conducting scientific experiments, and solving mathematical problems.

➢ It helps students develop a structured approach to problem-solving and equips them with the skills to analyse and synthesize information effectively.

➢ Critical thinking involves the ability to evaluate information, assess arguments, and make reasoned judgments based on evidence and logic.

➢ It encourages students to question assumptions, consider different perspectives, and make informed decisions.

➢ In an academic environment, critical thinking is essential for engaging with complex concepts, engaging in debates, and developing persuasive arguments.

➢ It helps students become discerning consumers of information, develop a deeper understanding of subjects, and cultivate a habit of intellectual scepticism.

The integration of these three types of thinking in the academic environment is crucial for nurturing well-rounded students who are equipped to thrive in various disciplines. Educators can support the development of these thinking skills by incorporating activities that promote creativity, providing opportunities for analytical problem-solving, and encouraging critical inquiry and discussion.

Furthermore, these thinking skills are not only beneficial for academic progress but also for preparing students for future careers and life beyond school. They foster adaptability, resilience, and the ability to navigate complex challenges in diverse contexts. Therefore, promoting creative, analytical, and critical thinking is essential for the holistic development of students and their long-term success.

Creative thinking is the ability to generate original, innovative, and imaginative ideas or solutions to problems. It involves breaking free from traditional or conventional ways of thinking and approaching challenges with an open mind, curiosity, and a willingness to explore new possibilities. Developing students' creative thinking skills is important for nurturing their ability to think outside the box, adapt to change, and come up with novel solutions to complex problems.

There are several strategies and methods that educators can use to promote creative thinking among students: Encouraging curiosity and exploration: Providing opportunities for students to ask questions, investigate topics of interest, and engage in open-ended exploration.

Embracing risk-taking: Creating a classroom environment where students feel comfortable taking risks and making mistakes as part of the learning process. Fostering a growth mind-set: Encouraging students to view challenges as opportunities for growth and to persist in the face of setbacks. Divergent thinking activities: Engaging students in activities that require them to generate multiple possible solutions or ideas for a given problem or prompt. Cross-disciplinary learning: Integrating different subject areas and perspectives to encourage students to make connections and think creatively across disciplines. Encouraging reflection and self-expression: Providing opportunities for students to express their thoughts, feelings, and ideas through writing, art, or other creative outlets. Research suggests that these approaches, when implemented effectively, can enhance students' creative thinking abilities. Additionally, providing opportunities for collaboration, feedback, and reflection can further support the development of creative thinking skills. Assessing students' creative thinking can be challenging, but educators can use a variety of methods such as creative projects, presentations, or portfolios that allow students to demonstrate their originality and innovation. Overall, fostering students' creative thinking is essential for preparing them to thrive in a rapidly changing world and to become innovative problem solvers and creators. Critical thinking is the ability to analyse, evaluate, and synthesize information in a logical and coherent manner. It involves the use of reasoning, evidence, and sound judgment to make decisions and solve problems. Developing students' critical thinking skills is a fundamental goal of education, as it prepares them to think independently, make informed choices, and engage with complex issues.

There are various methods and strategies that educators can employ to foster critical thinking among students. Socratic questioning: Encouraging students to ask and answer open-ended questions that prompt deeper thinking and reflection. Problem-based learning: Presenting students with real-world problems or scenarios that require critical analysis and problem-solving. Collaborative learning: Engaging students in group discussions, debates, or projects that require them to consider multiple perspectives and defend their ideas. Inquiry-based learning: Encouraging students to explore questions and topics through research, experimentation, and investigation. Use of case studies: Presenting students with specific cases or examples that require them to analyse and apply their knowledge to real-life situations. Teaching metacognitive strategies: Helping students understand their own thinking processes and develop self-regulation skills. Research indicates that these methods, when implemented effectively, can enhance students' critical thinking abilities. Additionally, integrating critical thinking across the curriculum and providing opportunities for practice and feedback can further support its development. It's important for educators to assess students' critical thinking skills regularly and provide constructive feedback to help them improve. This can be done through assignments, discussions, presentations, and other forms of assessment that require students to demonstrate their critical thinking abilities. Overall, fostering students' critical thinking is essential for preparing them to navigate the complexities of the modern world and become lifelong learners. From the author's observation as a lecturer, here are some positive things that can be learned from the implement ation of this research-based learning program:

Result: Students can learn to explore a problem, choose the appropriate method, solve these problems, and communicate their analysis in the article form. So that students can practice critical and analytical thinking to problems that arise in real life and solve the problems by using statistical tools, in particular, stochastic methods. Students understand the application and the use of stochastic methods to solve the problems in the real life. Students can discuss research issues related to stochastic methods. The learning outcomes of students showed significant differences compared to when using conventional teaching methods. The level of satisfaction and student interest in following the course Introduction to Stochastic Processes is quite high. Critical thinking involves analysing and evaluating information in a logical and systematic manner. It involves questioning assumptions, examining evidence, and considering multiple perspectives

before reaching a conclusion. Creative thinking, on the other hand, involves generating new and innovative ideas, approaching problems in unconventional ways, and thinking outside the box. When summarizing critical and creative thinking information, it is important to highlight the key components of each concept, such as the importance of evidence-based reasoning in critical thinking and the value of originality and imagination in creative thinking. Additionally, it's important to emphasize the interconnectedness of critical and creative thinking, as they often work in tandem to solve complex problems and generate new insights. In summary, critical thinking involves careful analysis and evaluation of information, while creative thinking involves generating new ideas and approaching problems in innovative ways. Both are essential for effective problem-solving and decision-making.

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