

THE AGE-RELATED MODEL OF STUDENTS' THINKING PROCESSES

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Abstract. *This article explores the age-related model of students' thinking processes and its significance in contemporary education. The study examines the stages of cognitive development based on Piaget's theory, emphasizing the transition from concrete reasoning to abstract and critical thinking as students mature. It further analyzes the influence of age on critical thinking, problem-solving abilities, executive functions, and academic performance by drawing upon recent empirical research. The article highlights the importance of implementing age-appropriate instructional strategies that correspond to learners' cognitive maturity and developmental needs. The findings suggest that integrating age-related cognitive characteristics into educational practice enhances students' intellectual development, promotes effective learning, and improves educational outcomes.*

Keywords: *age-related model, thinking processes, cognitive development, Piaget's theory, critical thinking, executive functions, educational psychology, age characteristics, instructional strategies, modern education.*

Annotatsiya. *Mazkur maqolada talabalarning tafakkur jarayonlarining yoshga bog'liq modeli va uning zamonaviy ta'lim jarayonidagi ahamiyati tahlil qilinadi. Tadqiqotda kognitiv rivojlanishning yosh bosqichlari, xususan, Piagetning kognitiv rivojlanish nazariyasi asosida tafakkurning konkret fikrlashdan abstrakt va tanqidiy fikrlashga o'tish jarayoni yoritilgan. Shuningdek, yosh omilining tanqidiy fikrlash, muammolarni hal qilish, ijro funksiyalari va o'quv faoliyatiga ta'siri ilmiy manbalar asosida tahlil qilingan. Maqolada turli yosh guruhlariga mos pedagogik strategiyalarni qo'llash zarurati asoslanib, yoshga mos ta'lim yondashuvlari talabalarning kognitiv salohiyati va ta'lim samaradorligini oshirishga xizmat qilishi ko'rsatib berilgan.*

Kalit so'zlar: *yoshga bog'liq model, tafakkur jarayonlari, kognitiv rivojlanish, Piaget nazariyasi, tanqidiy fikrlash, ijro funksiyalari, ta'lim psixologiyasi, yosh xususiyatlari, pedagogik strategiyalar, zamonaviy ta'lim.*

Аннотация. *В статье рассматривается возрастная модель мыслительных процессов студентов и ее значение в современной системе образования. Особое внимание уделяется этапам когнитивного развития на основе теории Ж. Пиаже, раскрывающей переход от конкретного мышления к абстрактному и критическому мышлению по мере взросления личности. Анализируется влияние возрастных особенностей на развитие критического мышления, навыков решения проблем, исполнительных функций и учебной деятельности студентов. Обосновывается необходимость применения возрастно-ориентированных педагогических стратегий, учитывающих уровень когнитивной зрелости обучающихся. Сделан вывод о том, что учет возрастных особенностей способствует повышению эффективности образовательного процесса и развитию интеллектуального потенциала студентов.*

Ключевые слова: возрастная модель, мыслительные процессы, когнитивное развитие, теория Пиаже, критическое мышление, исполнительные функции, психология образования, возрастные особенности, педагогические стратегии, современное образование.

Introduction to the age-related model of students' thinking processes

The Age-Related Model of Students' Thinking Processes posits that cognitive abilities develop in conjunction with age, significantly influencing how students engage with and understand complex material. This model asserts that as students mature, their thinking evolves from simplistic, concrete reasoning to more sophisticated, abstract thought processes. Such growth encompasses critical thinking and problem-solving skills, which are paramount for academic success. In a study exploring the critical thinking development of psychology students over four years, findings indicated that while the overall critical thinking ability of students was characterized as weak initially, there was a notable upward trend in their skills, reflecting the impact of educational frameworks on cognitive advancements (Asgari M, 2024). Illustrative representations, such as Piaget's Cognitive Development Theory, offer insight into these developmental stages, reinforcing the model's applicability to academic contexts.

Cognitive development stages and age correlation

Cognitive development is a progressive journey through distinct stages, invariably linked to age, a concept thoroughly explored in Piaget's theory of cognitive development. Piaget outlines four primary stages: Sensorimotor, Preoperational, Concrete Operational, and Formal Operational, each representing a specific level of cognitive maturity that individuals typically reach at certain ages, thereby establishing a framework for understanding children's and adolescents' thinking processes (Wattad G et al., 2023). The interplay between biological and experiential factors further underscores this evolution, suggesting that older students often exhibit more sophisticated cognitive capabilities due to accumulated knowledge and life experiences. To illustrate these concepts, the image depicting Piaget's Cognitive Development Theory effectively summarizes these stages and their age-related implications, reinforcing the idea that cognitive processes develop progressively in parallel with age, thereby impacting educational strategies and psychological assessments .

Age Range	Cognitive Development Stage
0-2 years	Sensorimotor stage
2-7 years	Preoperational stage
7-11 years	Concrete operational stage
12 years and up	Formal operational stage

Cognitive Development Stages by Age

Implications of the age-related model in educational settings

The Age-Related Model presents significant implications for educational settings, particularly in how educators approach pedagogy across different age groups. Understanding that cognitive development is not a uniform trajectory allows for the recognition of diverse learning capabilities among students. As evidenced in research, including that which challenges the assumption of universal cognitive decline with age, many older learners

display unique cognitive strengths that can be harnessed in educational contexts. For instance, the findings discussed in (Klimczak-Pawlak A et al., 2023) emphasize the importance of recognizing that not all adults experience cognitive decline; indeed, some may exhibit significant cognitive gains, suggesting a potential to tailor curricula that leverage these strengths. Furthermore, the Age-Related Model encourages tailored instructional strategies that stem from the specific needs and abilities of learners at various stages of life. For instance, older learners may benefit from collaborative learning experiences that draw upon their life experiences while simultaneously developing new skills. In this context, visual aids such as , which illustrate the components of Executive Functions, become invaluable in guiding educators to foster these cognitive skills effectively. By accommodating the varying levels of cognitive maturity, educational institutions can enhance learning outcomes and empower students to engage more deeply with the material.



Image1: Diagram illustrating the components of Executive Functions

Conclusion

In concluding the exploration of the Age-Related Model of Students' Thinking Processes, it becomes evident that the developmental trajectory of critical thinking is both complex and significantly impacted by a multitude of factors, including age, education, and cognitive development. The quantitative findings from the studies highlight that while the overall trend in critical thinking amongst psychology students tends to improve over time, notable declines during specific academic phases, such as the third year, suggest an intricate relationship between educational structure and cognitive maturation. Specifically, as noted in (Asgari M, 2024) , the weak overall assessment of students' critical thinking does not preclude the positive growth catalyzed by university education.

Piaget's Cognitive Development Theory

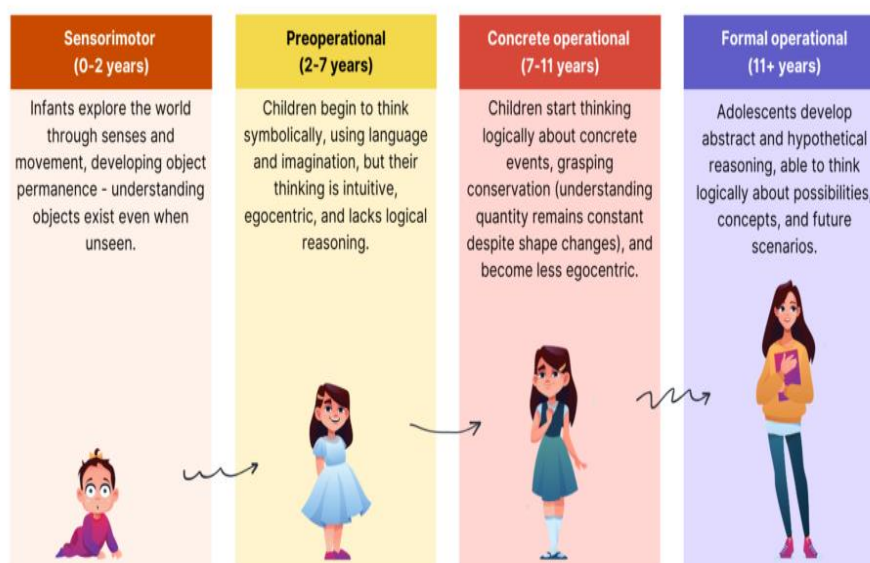


Image2: Overview of Piaget's Cognitive Development Theory

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