



# “Inclusive Use of AI in Education in Vietnam”

(Mở rộng tiếp cận giáo dục thông qua trí tuệ nhân tạo trong dạy học ở Việt Nam)

**Ho Chi Minh City, 20 May, 2026**





**VIETNAM NATIONAL UNIVERSITY, HANOI**  
**VNU UNIVERSITY OF EDUCATION**



# **Application of Artificial Intelligence (AI) and Augmented Reality (AR) in Teaching at the High School of Education Sciences, VNU University of Education**

**(Ứng dụng trí tuệ nhân tạo (AI) và công nghệ thực tế tăng cường (AR)  
trong dạy học tại Trường THPT Khoa học Giáo dục,  
Trường Đại học Giáo dục, ĐHQGHN)**

**Nguyen Trung Thanh**

## OVERVIEW OF HES AND DIGITAL TRANSFORMATION ORIENTATION

- The High School of Education Sciences, or HES, is a high school under VNU University of Education, Vietnam National University, Hanoi.
- HES has close links with higher education, educational research, educational technology, and pedagogical innovation.
- Our orientation is to use digital technology, AI, digital learning resources, simulations, and learning data to improve teaching quality.
- AI and AR are used in a controlled way: teachers design the lessons, students experience the technology, and the school evaluates the results.



## Using AI in teaching: from solving problems to supporting deep understanding

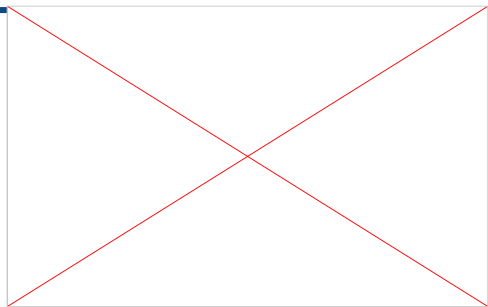
### Ứng dụng AI trong dạy học: từ hỗ trợ giải bài sang hỗ trợ học hiểu

- AI personalizes learning through tutoring systems that adapt to each student.  
AI **cá nhân hoá** việc học thông qua các hệ thống gia sư thích ứng với từng học sinh.
- Machine learning can predict learning outcomes and support real-time feedback.  
Học máy **dự đoán** kết quả học tập và hỗ trợ phản hồi theo thời gian thực.
- Chatbots provide interactive, on-demand support for self-paced learning.  
Chatbot cung cấp **hỗ trợ** tương tác, theo yêu cầu, phục vụ hình thức tự học theo nhịp độ cá nhân.
- AI automates grading and supports the design of customized lesson content.  
AI **tự động hoá** chấm điểm và hỗ trợ thiết kế nội dung bài học tùy biến.



Principle at HES: AI supports the thinking process; it does not replace students' mathematical reasoning.

Nguyên tắc tại HES: AI hỗ trợ quá trình tư duy, không thay thế lập luận toán học của học sinh.



# Applying digital technology, especially AI, to innovate teaching methods at HES

## Ứng dụng công nghệ số, đặc biệt AI, trong đổi mới PPDH Tại Trường THPT Khoa học Giáo dục

### Key technology trends

*Xu hướng công nghệ chủ đạo*

- Digitizing learning resources (GeoGebra, Desmos, Google Classroom, etc.);
- Virtual and interactive classrooms;
- Mathematical simulations and digital games.



- Số hoá học liệu dạy học (GeoGebra, Desmos, Google Classroom...);
- Lớp học ảo và tương tác;
- Mô phỏng và trò chơi toán học số.

### The role of AI in mathematics education

*Vai trò của AI trong giáo dục Toán*

- Personalizing learning;
- Providing instant feedback and support;
- Automating teaching support tasks;
- Creating immersive experiences with AR/VR.

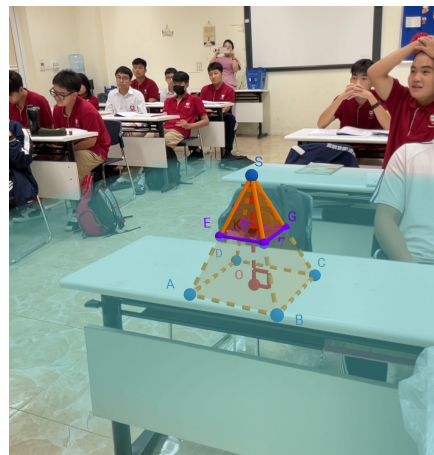


- Cá nhân hoá việc học;
- Phản hồi và hỗ trợ tức thời;
- Tự động hoá các tác vụ hỗ trợ dạy học;
- Trải nghiệm nhập vai với AR/VR.

# Mathematics: Developing mathematical modeling competence with AI/AR



- Step 1: Start from a real-life situation: a living room, a crystal chandelier, motion, GPS, a water tank, or a solid of revolution.
- Step 2: AI helps describe the situation, extract data, identify quantities, and clarify the question.
- Step 3: AR visualizes the model: points, lines, planes, spheres, trajectories, and 3D solids.
- Step 4: Students mathematize the situation: choose a coordinate system, define variables, write equations, solve, and verify.
- Step 5: Students interpret the result back in the real-life context.



## ILLUSTRATIVE EXAMPLE



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**Example 1:** A wine barrel has a radius of 30 cm at the top and 40 cm at the middle. The height of the barrel is 1 m. What is the maximum amount of wine it can contain, rounded to two decimal places? Assume that the side profile of the barrel is a parabola.

- A. 321,05 liters.
- B. 540 liters.
- C. 201,32 liters.
- D. 425,16 liters.

### Solution orientation

- The barrel can be modeled as a solid of revolution whose generating curve is a parabola:  $(P): y=ax^2+bx+c$  ( $a \neq 0$ ).



# ILLUSTRATIVE EXAMPLE



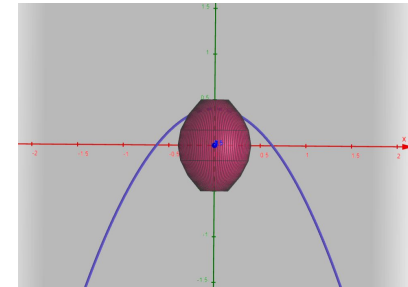
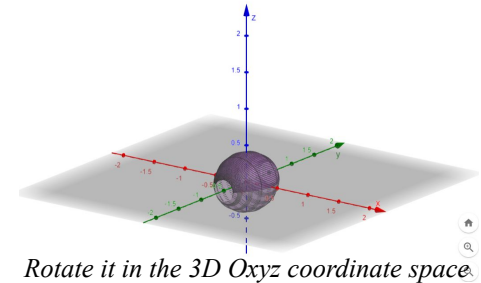
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## 1. Geometric modeling

**Step 1:** Help students understand the real-life situation: the barrel is symmetric around a vertical axis. Its side profile is a parabola representing the radius  $r$  along height  $y$ . The thickness of the barrel is ignored; only the internal volume is calculated.

**Step 2:** Simplify the situation and identify variables

**Step 3:** Mathematize the situation



*Rotate the barrel in the Oxy coordinate plane*

# ILLUSTRATIVE EXAMPLE

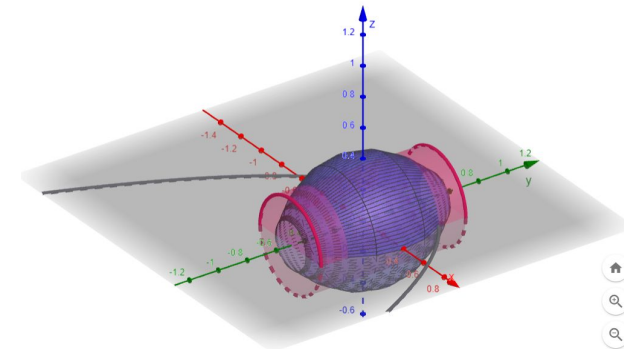
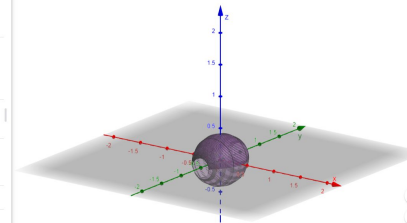
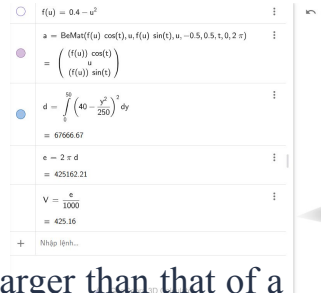


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**Step 4:** Solve the model using integration (with GeoGebra 3D Calculator)

**Step 5:** Interpret the result

- Because the barrel bulges in the middle, its volume is larger than that of a cylinder with the same height and a base radius of 30 cm.
- The value **425.16** liters indicates a relatively large barrel. For comparison, a cylinder with height 1 m and radius 0.30 m has volume  $\pi \times 0.30^2 \times 1 \approx 0.2827 \text{ m}^3 \approx 282.7$  liters. The parabolic barrel, with a middle radius of 0.4 m, increases the volume to about **425.16** liters.
- Practical meaning: if the parabolic curve represents the inner side of the barrel, excluding thickness, then the maximum capacity is approximately 425.16 liters. GeoGebra 3D Calculator can be used to draw a reference cylinder with radius 0.3 m for comparison.



# AI/AR-based teaching process for real-life mathematical problems



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Real-life situation

AI support: extract data, standardize units, suggest questions

Mathematical modeling

Simplify and identify variables

Mathematization: equations, expressions, conditions

Solve the model: calculation and reasoning

Interpret the result

Verify and adjust the model



# Applications of AI in Mathematics Teaching at HES



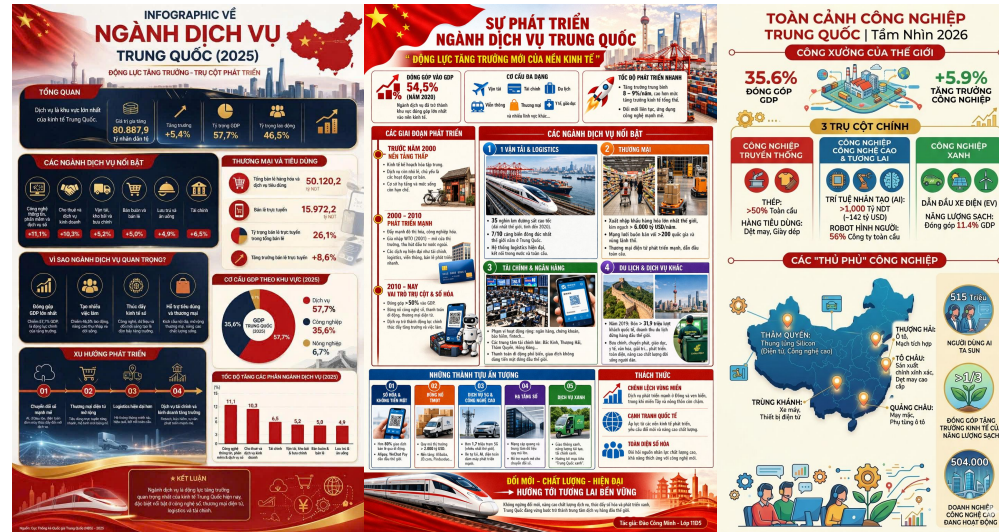
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- Participants: students in classes 12A2 and 12D4.
- Content: real-life problems involving spatial elements, coordinate modeling, 3D geometry, and mathematical modeling.
- Organization: the teacher presents the situation; students use AI to analyze data; they observe simulations or AR models; solve the problem in groups; then present and discuss their solutions.
- Initial observations: students were more engaged, found the content easier to visualize, participated more actively in discussions, and understood the connection between mathematics and real life more clearly.



# AI Applications in Geography at HES

- AI supports both teachers and students in Geography teaching.
- For teachers, AI helps design lessons faster and more visually. It can suggest learning activities, create questions, design slides and infographics, and produce short videos about geographical phenomena. AI also supports assessment by creating test versions, analyzing results, and giving feedback suggestions.
- For students, AI helps make geographical knowledge more visual and easier to understand. It also supports active learning, self-study, and exam preparation.



Student products

# AI Applications in Geography at HES



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## Examples of specific lessons

### \* *Grade 11 Geography:*

- Lesson 26: The Economy of China
- + Designing learning worksheets
- + Guiding students to use AI to complete learning tasks
- Lesson 29: Geographical location and natural conditions of South Africa
- + Designing comics to present knowledge in a more accessible way

### \* *Grade 12 Geography:*

- The South Central Coast region
- + Designing worksheets to explore the marine economy



*Classroom images*



***Student feedback:*** difficult content was visualized more clearly, AI provided effective support, and students became more interested in the lesson and understood it better.

# Opportunities, challenges, and implementation principles



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## OPPORTUNITIES

- Personalized learning.
- Stronger visualization.
- Support for teachers in lesson design.
- Development of digital competence and self-learning competence.

## CHALLENGES

- Risk of student dependence on AI.
- AI-generated information may be inaccurate or unverified.
- Teachers need professional training.
- Appropriate infrastructure and learning resources are required.

## PRINCIPLES

- Teachers provide direction; AI provides support.
- Students must be able to explain their reasoning.
- All AI-generated results must be verified.
- The priority is developing thinking, not merely producing products.

## CONCLUSION



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- AI and AR contribute to more visual, personalized learning and help connect knowledge with real-life contexts.
- In Mathematics, AI/AR can strongly support the development of mathematical modeling competence.
- In Geography, AI/AR can visualize data, phenomena, and issues related to sustainable development.
- HES has favorable conditions to build a controlled model for AI/AR integration.
- Next steps: develop subject-based AI/AR learning resources, provide teacher training, conduct evaluated pilots, and establish guidelines for students' use of AI.



# THANKS YOU!



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