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- Introduction to Generative Al
- The Roles of Generative AI in Modern Education
- Transforming Teaching and Learning
- Opportunities and Challenges
- Evolving Roles of Educators
- Q&A Session





GenAl Definition

- A form of AI that utilises Machine Learning models
- to create new, original content e.g. images, text, video or music
- based on patterns and structures learned from existing data

Data Artificial Intelligence
Simulations Code Audio
GENERATIVE ALE
SINSPIRATIVE ALE
Output Text Unexpected
Product Design Concept Text
Algorithms Deep Learning Copywriting Demand Computer

(Source: Cornell Center for Teaching Innovation)

Techniques and Framework

- Deep learning
- Transformer models
- Generative Adversarial Networks (GANs)



HOW DO AI IMAGE GENERATORS WORK?

Dataset

1.Dataset Collection

The first step involves compiling a large and diverse dataset of images.



Generate (often in response to prompts)

3.Generating New Images

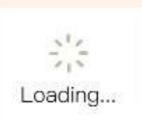
The Al image generator can create new Al images based on the input parameters or conditions.

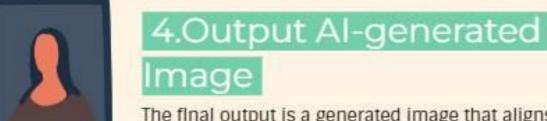


Training (ML)

2.Training the Al Image Generator

The developers will then train the Al image generator using machine learning (ML) algorithms, specifically neural networks.





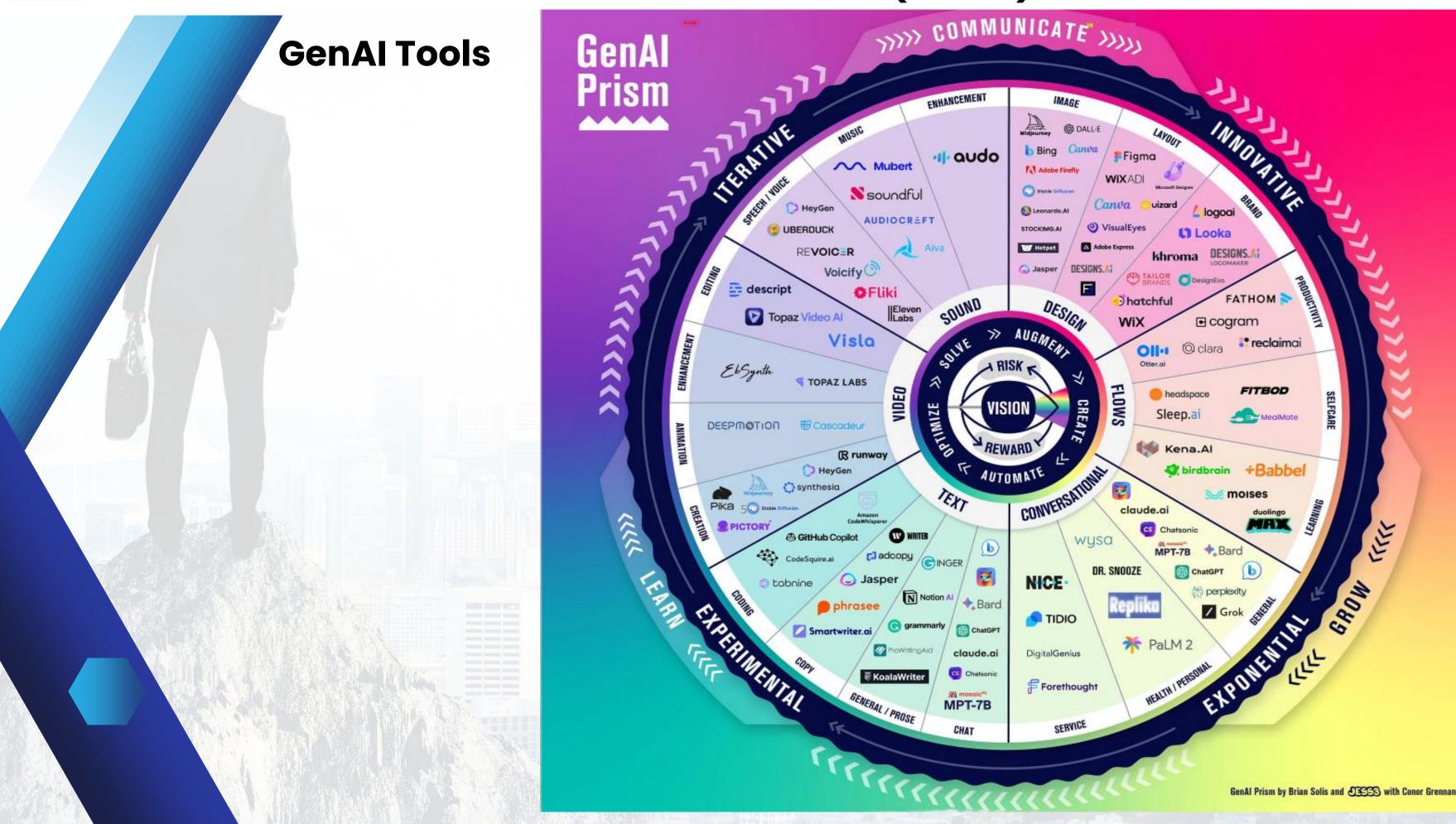
The final output is a generated image that aligns with the given input parameters.

(Source: PicLumen)





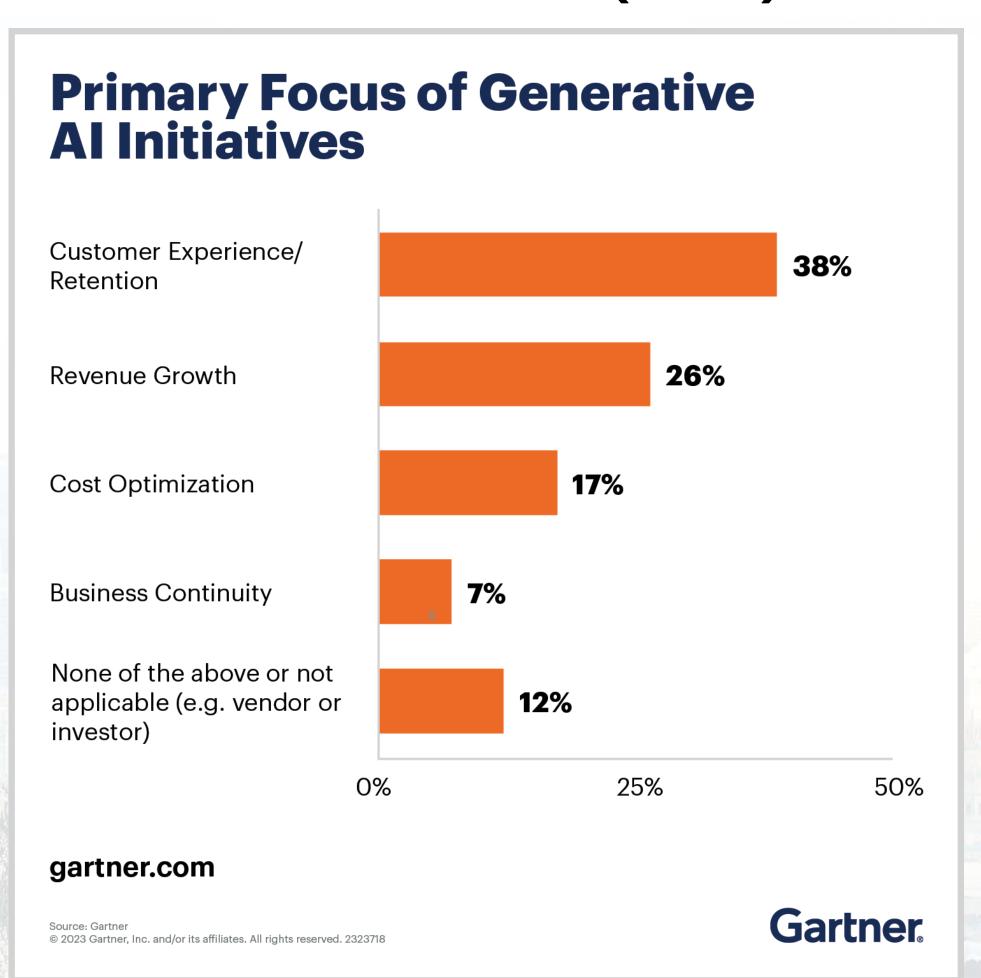
















Evolution of AI in Education

2011

champions on Jeopardy!,

demonstrating NLP

educational virtual

assistants.

IBM's Watson defeats human

advancements, which have

since been integrated into

1957

Linguist Noam Chomsky publishes Syntactic Structures, developing a theory of language and describing grammatical rules for parsing and generating natural language sentences.

1964

Joseph Weizenbaum created ELIZA, an early natural language processing program that simulates conversation.

1967

The first Intelligent Tutoring System (ITS) called "SAINT" (Student-Aligned Instruction) was developed at Stanford University aimed at teaching basic subjects like math and language.

1985

Judea Pearl introduced Bayesian networks causal analysis, which laid the foundation for statistical techniques to represent uncertainty and influence content generation in education.

1998

ALEKS (Assessment and Learning in Knowledge Spaces), an intelligent assessment tool for personalized mathematics education was introduced.



1997

IBM's Deep Blue defeated world chess champion Garry Kasparov, showcasing the power of Al in educational games and simulations.

2013

Coursera and Udacity introduced online courses with Al-powered assessment and feedback.

2008

The emergence of MOOCs (Massive Open Online Courses) made accessible online learning possible with the help of Al-driven adaptive learning platforins.

2014

Introduction of generative adversarial networks (GANs), machine learning system that could create convincing images, audio and videos of real people.

2015-16

Carnegie Learning's Al tutoring system, "Mika," achieved similar learning outcomes to human tutors. Chatbots like Duolingo's Al-powered virtual tutor and Microsoft's Xiaolce were introduced.

2022-23

Researchers from Runway Research,
Stability Al & CompVis LMU released
Stable Diffusion, an Al system that can
generate images from texts like Dall-E.
OpenAl released ChatGPT to the public.
Many other generative Al tools were also
released.

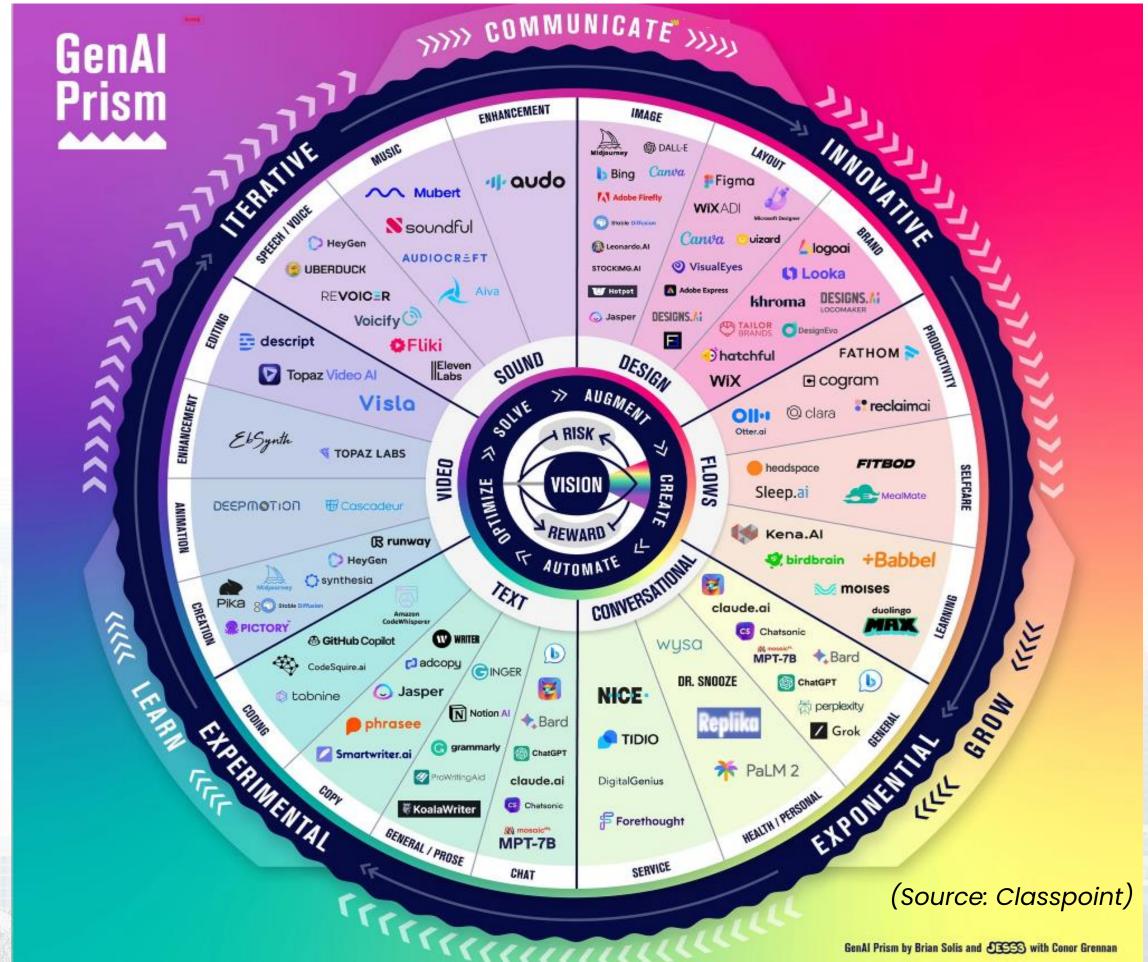
(Source: Classpoint)







- Personalisation
- Assessment
- Tutoring







Human or GenAl

TASKS

Tasks with moderately high creative difficulty, moderate context variability, and moderate accuracy

Tasks with high accuracy and low context variability

Tasks that have high context variability

Human / Gen Al / others

GenAl

Other forms of automation e.g.
ML based applications or RPA

Human

(Source: Deloitte)



Leveraging GenAI (Higher Education Institutions)

Operational excellence

Streamline administration

Automate document processing in expense reporting and procurement administration

Transform talent experience

Conduct initial screening of job applicants, onboarding assistants, inventory skills, and source training

Accelerate financial insights

Verify financial policy compliance and generate financial reporting, and enhance forecasting and budgeting

Student

Personalize learning

Enhance admissions screening, create virtual tutors that deploy individual learning plans and infobots to give personalized career path guidance

Support diversity, equity, and inclusion

Translate course materials, recruit diverse students with individualized recruiting, leverage sign language and AAC systems, create accessible campus maps

Improve affordability

Automate FAFSA renewal notifications, match students with aid and scholarships, and personalize loan repayment processes

Research

Identify opportunities

Identify research trends and synthesize emerging perspectives to discover research opportunities and enhance collaboration

Accelerate grant responses

Reduce workload to perform literature reviews and generate responses to grants, increasing pursuit quality and quantity

Support research administration

Enable rapid policy reviews and responses, support grant administrators with virtual assistants, and easily populate forms to reduce workload





Real World Application 1: Al-Powered Tutoring and Support Systems



- Virtual Tutors and Chatbots
- Feedback and Assessment
- Supplementary Learning Resources

Enhancing Learning with AI-Powered **Tutoring and Support Systems**









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Image: Created by the author using DALL-E 2

By Dr Muhammad Emdadul Haque, Senior Lecturer at LSST Wembley





Real World Application 2: Content Creation for Courses

- Assist in creating new teaching materials
- Generate additional materials:
 - Reading lists
 - Study guides
 - Discussion questions
 - Flashcards
 - · Summaries.

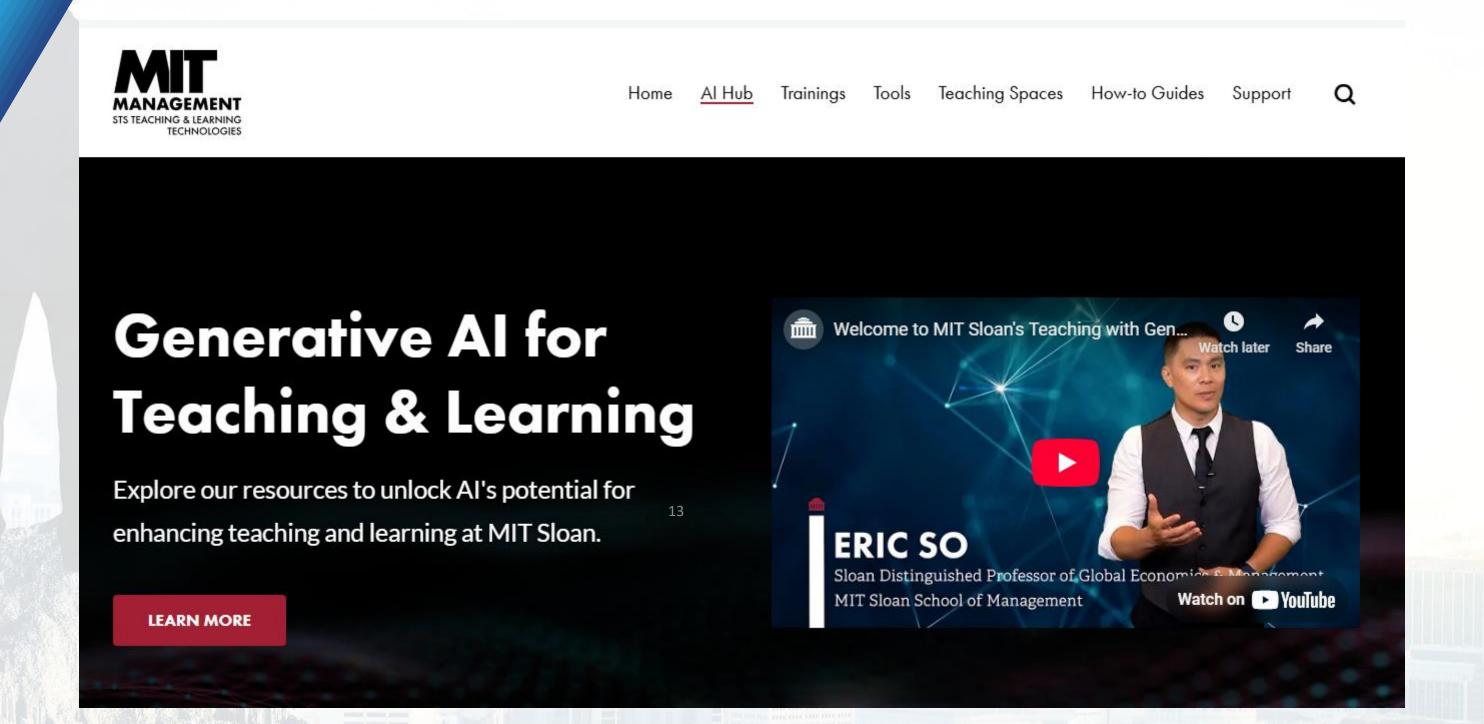


(Source: Nolej)





Real World Application 3: MIT Sloan Al for Teaching and Learning Hub



(Source: Nolej)



TRANSFORMING TEACHING AND LEARNING





Innovative Curriculum Design: Generate diverse learning pathways.



Real-Time Adaptation: Modify teaching on the fly to address student queries.



Interactive Learning: Enable simulations and gamified lessons.

14



Enhanced Creativity: Stimulate both teachers and students to explore new ideas.



Enhanced Student Engagement & Interaction

Dynamic Content: Al-generated visuals, simulations, and interactive quizzes.

Immediate Feedback: Automated grading and iterative learning cycles.

Collaboration Tools: Al-enhanced group projects and peer review systems.



TRANSFORMING TEACHING AND LEARNING



Responsible Integration of GenAl in Teaching and Learning



Awareness of Disruptive Change



Training Faculty



Changing Teaching and Assessment Practices



Students as Co-Partners with Faculty



Imparting Learning Literacies adapted to the GenAl Era

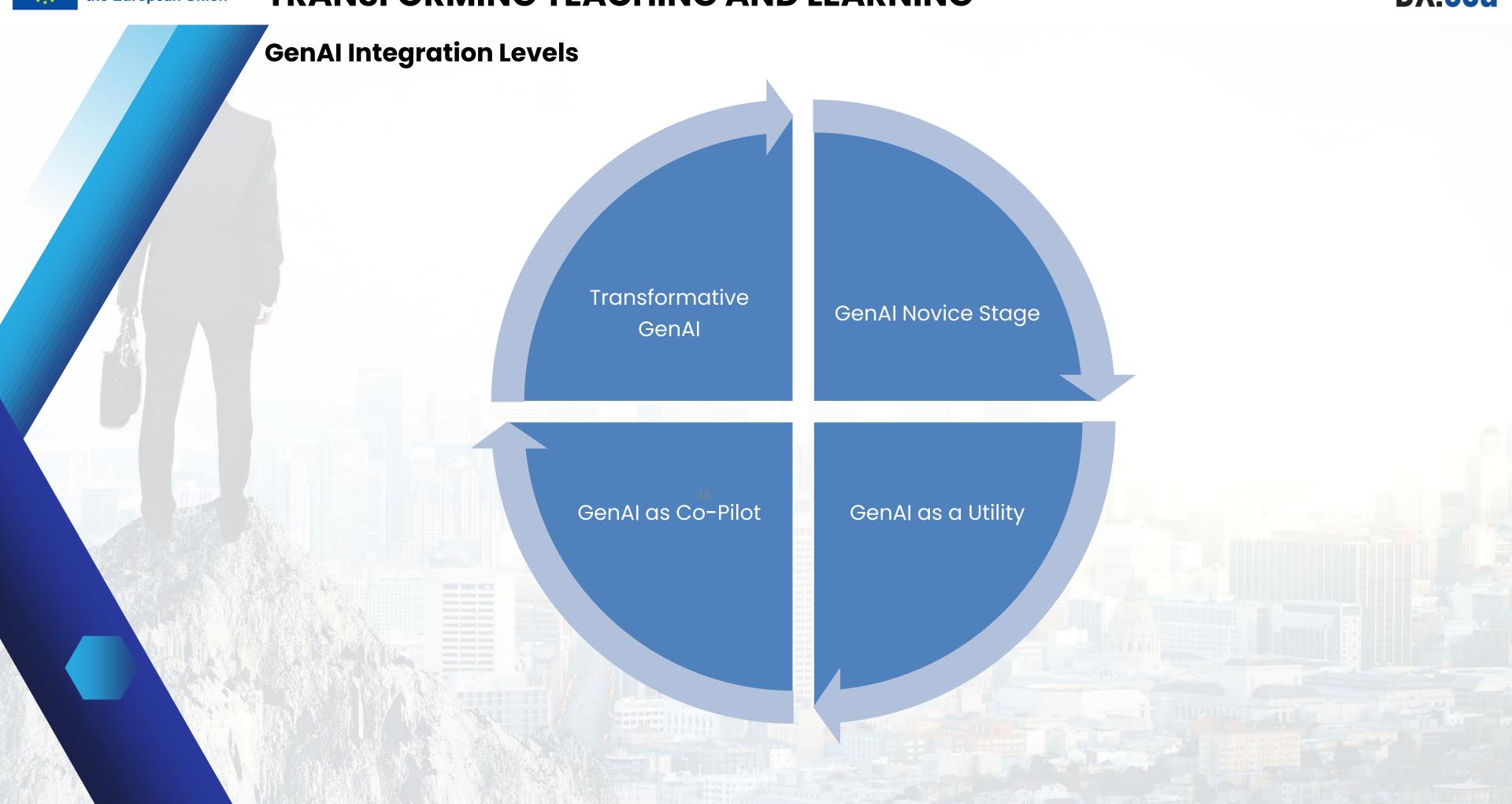


Applied Research is Needed



TRANSFORMING TEACHING AND LEARNING





OPPORTUNITIES AND CHALLENGES



Opportunities	Challenges
Personalised learning pathways	Bias and ethical issues in algorithm design
Scalable content creation	Data privacy and security concerns
Immediate feedback and assessment	Over-reliance on technology
Interactive learning and engagement	Digital divide and equal access

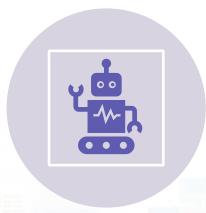
EVOLVING ROLES OF EDUCATORS





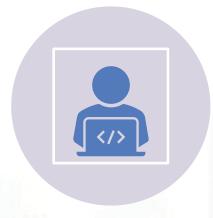
From content experts to facilitators:

Guiding student inquiry rather than delivering lectures.



Collaboration with Al

leveraging ai- 18 generated insights to enhance curriculum.



Continuous professional development

Updating skills to integrate emerging technologies.



Innovation & Creativity

Encouraging experimental teaching methods.

THANK YOU FOR YOUR ATTENTION

