

EDITION NOV 16, 2024

PYTHAVERSE NAVIGATING THE AI ERA

EXTENSION REPORT OF
PYTHAVERSE CO-CREATE LEARNING FRAMEWORK

The image shows the front cover of a whitepaper titled "PYTHAVERSE COCREATE FRAMEWORK". The cover is blue and features the title in large, bold, white letters. Below the title, a subtitle reads "EMPOWERING CREATORS: HARNESSING AI, IOT, ROBOTICS, AND THE METAVERSE WITH PYTHAVERSE COCREATE LEARNING COMPETENCIES". At the bottom of the cover, there is a collage of three images: a young boy, a woman smiling, and a person working on a computer.

PYTHAVERSE WHITEPAPER

COCREATE FRAMEWORK

VERSION JAN 15, 2024

PYTHAVERSE
COCREATE
FRAMEWORK

EMPOWERING CREATORS: HARNESSING AI, IOT,
ROBOTICS, AND THE METAVERSE WITH PYTHAVERSE
COCREATE LEARNING COMPETENCIES





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Executive Summary



At Pythaverse, we believe that technology should serve humanity, not replace its core values. As AI and Digital Twin technologies reshape the world, our goal is to ensure that students grow into thinkers, creators, and compassionate leaders. Education must go beyond technical skills; it must cultivate empathy, critical thinking, and the resilience to adapt with purpose.

The CoCreate Framework is our commitment to integrating human values into every aspect of digital learning. By empowering students to wield technology ethically and responsibly, we are building a future where human agency remains at the heart of progress.

Trung Nguyen- Founder, CEO, Pythaverse

The Pythaverse CoCreate Framework Whitepaper, initially released in January 2024, introduced a visionary approach to preparing students and educational institutions for the transformative challenges posed by AI, Digital Twin technologies, and the demands of Education 2.0. This updated Whitepaper provides clarity and actionable insights on the critical questions educators, parents, and institutions face as AI reshapes the educational landscape.

Need for Pythaverse CoCreate Framework

With AI disrupting traditional roles and creating new opportunities, there's an urgent need to equip students with competencies beyond academic knowledge. The CoCreate Framework, developed by Pythaverse, emphasizes a holistic approach, integrating skills in AI, Digital Twin technology, and human-centered values, ensuring students are prepared to thrive in a digital and collaborative world.

Key Contents of the Report

1. Future Skill Predictions

- Data highlights a projected surge in demand for AI and Digital Twin expertise, with job growth expected across multiple sectors. By 2030, there will be millions of new roles requiring AI skills, with nearly half of organizations adopting Digital Twin technologies.
- Key metrics include a 74% annual growth in AI roles, upskilling needs for 375 million workers, and a significant increase in global investment in AI-driven educational tools.

2. Stages of Cognitive and Emotional Development

- Based on Joscha Bach's stages of lucidity, the report identifies "Rational Agency" as a pivotal stage for students, enabling critical thinking, independent decision-making, and ethical reasoning- skills crucial for navigating AI-integrated environments.

- The framework stresses helping students progress beyond the "Social Self" stage to develop personal agency and resilience, essential for dealing with digital overload and social challenges.

3. CoCreate Learning Framework

- This framework integrates Responsible Citizen, Digital Twin, and Co-Creation competencies, providing a structured pathway for students to master technology while fostering ethical values and creativity.
- It offers schools a clear pathway to implement technology-driven, hands-on learning that aligns with future workforce demands.

4. Pythaverse Solutions in Action

- **Leanbot:** Offers digital twin operations and machine simulations, allowing students to engage in system analysis, optimization, and problem-solving.
- **TwinSpace:** Focuses on AI development, enabling students to design, test, and ethically apply AI solutions in digital twin environments, enhancing their understanding of real-world applications and responsible AI practices.

5. Supporting Different Stakeholders

- **For Parents:** Guidance on fostering a home environment that supports curiosity, critical thinking, and digital literacy, ensuring children are prepared for an AI-driven future.
- **For Educators:** Strategies for incorporating AI and Digital Twin learning, emphasizing ethical considerations and project-based activities that develop adaptive skills.
- **For Students:** Advice on building foundational STEM and AI skills, critical thinking, and hands-on experience with emerging technologies.
- **For Partners:** Opportunities for technology and content providers to collaborate in shaping Education 2.0, providing resources and real-world applications.

6. Implementation and Partnership Network

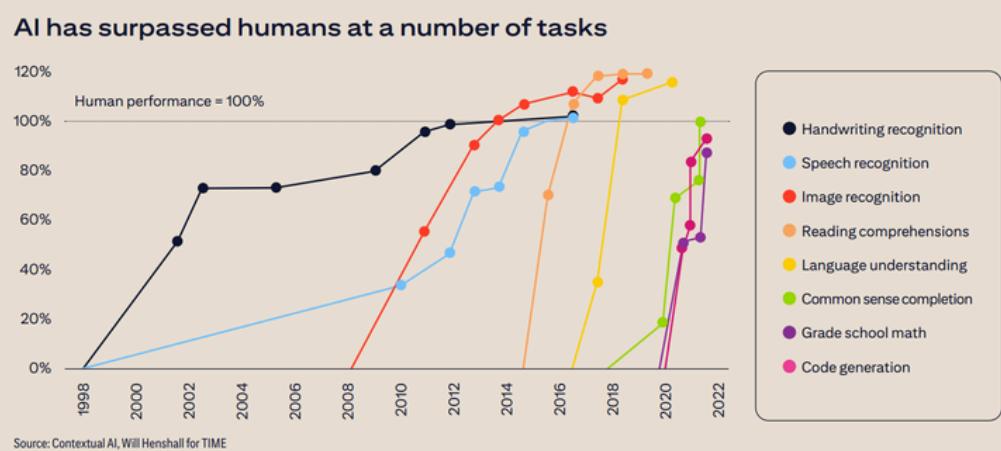
- Pythaverse has established an ecosystem of partner schools, content developers, and technology providers, creating a robust support network for educational transformation. This section outlines how schools can leverage these partnerships to integrate the CoCreate Framework seamlessly.

This report reaffirms Pythaverse's commitment to leading the educational sector through AI disruption. By adopting the CoCreate Framework, schools, parents, and partners can ensure that students not only adapt to but excel in the digital age.

The report provides a roadmap for integrating AI and Digital Twin technologies with an emphasis on ethical, human-centered learning, preparing the next generation for meaningful and impactful roles in an AI-enhanced world.

Navigating the AI Era

Artificial intelligence is seamlessly integrating into every aspect of our lives—transforming industries, redefining jobs, and reshaping society. This is our current reality, bringing both opportunities and challenges that we must address head-on.



"According to the World Economic Forum, by 2025, machines and algorithms will create 97 million new jobs, but also displace 85 million existing jobs."

Are we ready to equip our children with the skills they need to thrive in this new landscape? Our children might ask.



Q: How will AI affect my future career options? How can I be better than a robot?

A: AI is transforming many industries by automating routine tasks and creating new roles. Careers in AI development, data science, robotics, and AI ethics are growing rapidly. While robots and AI are excellent at processing data and performing repetitive tasks, humans possess unique qualities that set them apart. You can excel beyond robots by developing skills such as creativity, emotional intelligence, critical thinking, and ethical judgment. These human-centric abilities enable you to innovate, connect deeply with others, and make complex decisions.



Q: I'm interested in robotics and AI ethics. What skills should I focus on to pursue a career in these areas?

A: To pursue robotics and AI, focus on learning programming languages like Python and C++, understanding mathematics (algebra, calculus), studying machine learning basics, and gaining knowledge in electronics and mechanics. Developing problem-solving skills is also important.



Q: Please suggest what should I do to be ready, do you have some courses to get started?

A: Absolutely! To get future-ready, start learning programming, explore AI fundamentals, and boost your problem-solving skills. Pythaverse offers the exciting Leanbot STREAM Robotics (SWRP) program, which jump-starts your journey through hands-on, learn-by-doing experiences. Let's begin this adventure together!

Future Prediction



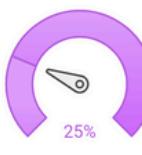
AI Specialist Roles Growth



Demand for AI Skills in Labor Markets



Automation of Current Hours Worked



Wage Premium for AI Skills

Up to **40%** of the workforce may need to reskill due to AI and automation implementation over the next **three years**.
Source: World Economic Forum.

Rapid Growth in AI-Related Skills:

- Depict the 74% annual growth rate of AI specialist roles over the past four years, indicating a strong demand for AI expertise.
- Source: The Wall Street Journal.

Increasing Demand Across Occupations:

- Illustrate the rise in demand for AI skills across 16 labor markets over the past decade, with Singapore and the US leading.
- Source: Lightcast.

Impact on Workforce Skills Composition:

- Show projections that up to 30% of current hours worked could be automated by 2030, accelerated by generative AI.
- Source: McKinsey & Company.

Wage Premium for AI Skills:

- Highlight that jobs requiring AI specialist skills carry up to a 25% wage premium in some markets.
- Source: PwC.

Category	Metric	Current Value (2024)	Projected Value (2030)	Source
Job Creation	New Jobs from AI and Automation	85 million (2020)	97 million (2025)	World Economic Forum
Adoption of Digital Twins	Percentage of Organizations Using Digital Twins	13% (2020)	48% (2025)	Gartner
Upskilling Needs	Workers Needing to Change Occupations Due to Automation	250 million (2020)	375 million (2030)	McKinsey Global Institute
AI Job Growth	Growth Rate of AI Specialist Roles	74% annual (2020)	Continued rapid growth	LinkedIn
Digital Divide	Percentage of Students with Access to Digital Tools	67% (2022)	90% (2030)	UNESCO
Investment in AI and Digital Technologies	Global Venture Capital Investment in EdTech	\$16 billion (2020)	Estimated continued annual increase	Global Venture Capital Reports
Urban Planning Adoption	Cities Using Digital Twin Technology	8 cities (2020)	40+ cities (2025)	Industry Reports
Skill Demand Shift	Increase in Demand for AI/Machine Learning Skills	High (2020)	Very High (2030)	Industry Analysis
Emerging Job Roles	Number of Emerging AI and Digital Twin Engineers	1 million (2024)	3 million (2030)	Industry Projections

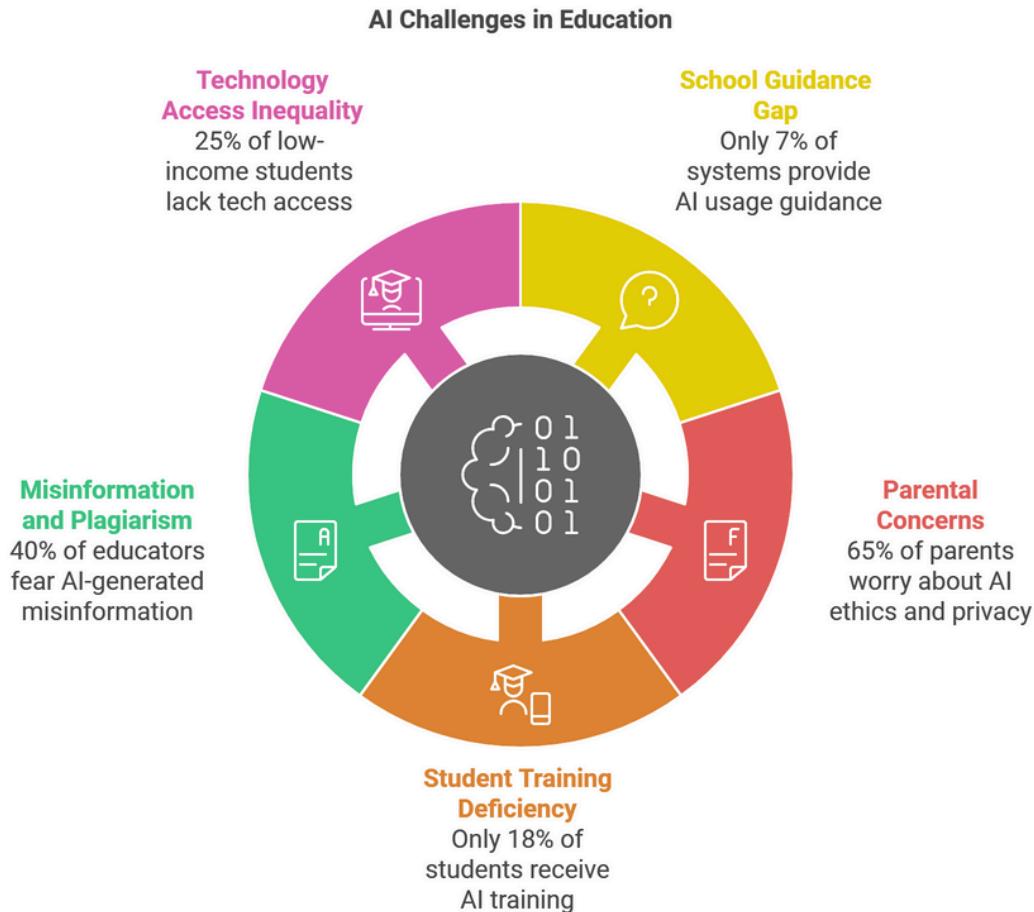
Q: What does this mean for my school?

A: As an educator, this diagram highlights the urgent need to adapt our curriculum to meet the fast-growing demand for AI skills. With a 74% annual growth in AI roles and up to 40% of the workforce needing reskilling within three years, it's clear that integrating AI education is critical. Preparing students for automation-driven changes, higher-paying AI roles, and adaptability will ensure their future success in a rapidly evolving job market. Prioritizing STEM and AI literacy is no longer optional- it's essential.

Q: What does this mean for my kid?

A: As a parent of a K-12 child, this diagram is a wake-up call: the future job market will be driven by AI. With 74% growth in AI roles and 40% of the workforce needing reskilling, it's crucial to prepare your child now. Encouraging STEM learning and adaptability will set them up for success, higher-paying roles, and resilience in a world where automation is the norm. Equip them today for tomorrow's opportunities.

Challenges in Modern Education



Challenges for	Challenges	Fact
Schools	Lack of comprehensive AI guidance in education systems.	Only 7% of education systems worldwide offer specific guidance on the use of generative AI, indicating a significant gap in support for educators and students in navigating AI technologies.
Schools	Limited state-level policies on AI integration.	As of August 2024, only 22 out of 50 U.S. states have official guidance or policy on the use of AI in K-12 schools, highlighting the uneven landscape of AI implementation across the country.
Parents	Concerns about the ethical use of AI in education.	A survey found that 65% of parents are worried about privacy violations and ethical implications of using AI tools in classrooms without proper oversight from educational institutions.
Students	Insufficient training on responsible AI usage.	A UNESCO survey revealed that only 18% of students report receiving training on how to use AI responsibly, which is crucial for their academic integrity and future employability.

**Q: What does this mean for my school?**

A: Your school can transform these AI challenges into opportunities by modernizing your curriculum with integrated digital literacy and AI education, while actively engaging parents to address their privacy concerns. By partnering with educational content providers and implementing interactive tech-driven learning methods, you'll not only bridge the technological gap but also prepare students for future workforce demands. This comprehensive approach ensures your school stays ahead of the 93% of systems lacking AI guidance while addressing the critical need for student training, currently missing in 82% of schools.

**Q: What does this mean for my kid?**

A: In today's rapidly evolving educational landscape, proactive parental engagement is crucial to ensure children receive a relevant and comprehensive education. Many schools continue to teach outdated technologies, such as fax machines, which do not prepare students for modern IT careers. Over half of parents fear that AI could reduce job availability and hinder their children's creativity. Traditional teaching methods may not resonate with today's tech-savvy students, leading to disengagement. Limited access to modern educational content can restrict your child's exposure to diverse learning materials, potentially hindering their academic growth. By actively collaborating with educators, parents can advocate for curriculum updates, integrate technology into learning, and support their child's academic journey, ensuring they are well-prepared for future challenges.



A Conversation about Education

At a school community event, Mrs. An, a concerned mother, approaches Mr. Lim, her son's headmaster, as they watch children play nearby.



Mrs. An: Mr. Lim, with AI and new technology changing everything, I'm really worried. What should my son be learning to be prepared? I'm not sure if schools can even keep up with what's coming.

Mr. Lim: I understand, An. We want to prepare students, but it's overwhelming. How do we bring in AI and digital skills when even teachers aren't fully trained for it?

Mrs. An: I feel the same. I wonder if I should be doing more at home, but I don't know where to start.

Mr. Lim: And I wonder if a school like ours can ever keep up, given the resources we have.

They share a pause, both unsure of the answers, silently watching the kids playing and thinking maybe they should just ask ChatGPT.





Mrs. An-Parent

Q: What skills should I focus on teaching my son to prepare him for a future shaped by AI and technology?

ChatGPT: To prepare your son for a technology-driven future, it's helpful to focus on a combination of digital, cognitive, and social skills:

- Digital Literacy: Introduce basic computer skills and, if he's interested, beginner-friendly coding platforms. These foundational skills help in understanding the basics of how technology works.
- Problem-Solving and Critical Thinking: Encourage activities that build logical reasoning, such as puzzles, games, or hands-on projects where he can solve challenges.
- Creativity: Creativity is essential for adapting to change and generating new ideas, especially in fields that intersect with technology.
- Emotional Intelligence and Adaptability: Social skills, like empathy, communication, and flexibility, are valuable as AI changes workplace dynamics. They help in collaboration and navigating environments where people work with both humans and AI systems.
- Starting with these areas can help him build a balanced skill set that will remain relevant as technology evolves.



Mr. Lim-School Head

Q: How can I start introducing AI and tech skills in our school when we have limited resources and our teachers aren't fully trained?

ChatGPT: To begin integrating AI and tech skills with limited resources, consider these steps:

- Start with Digital Literacy Basics: Use free or low-cost online resources to introduce students to digital skills, coding, and logical thinking.
- Teacher Training: Identify a few teachers interested in technology and provide them with access to introductory online courses in digital literacy, coding, or AI. There are many free and affordable training options available for teachers.
- Project-Based Learning: Focus on project-based learning, where students work on small tech-related projects or problem-solving activities. Many foundational skills for AI and technology can be learned through practical exercises in coding, logic, and data handling.
- Collaborate with Local Resources: Look for partnerships with local businesses, tech hubs, or other schools that may be open to sharing resources or supporting tech-related initiatives.
- These steps allow for a gradual introduction to technology and AI while working within budget and resource constraints.

Good information but give me some concrete examples

Discover Future Jobs with Pythaverse: Insights from Japan and USA



AI Reshapes U.S. Workforce, Reducing Routine Roles and Boosting Efficiency

AI is transforming the U.S. workforce by automating routine tasks in sectors like warehousing, legal, and healthcare, reducing the need for entry-level roles. Skilled professions are also seeing changes, with AI tools enhancing efficiency in areas such as diagnostics and document processing. This shift is leading companies to downsize in specific departments, like marketing and customer support, as AI can handle much of the workload. Overall, the trend suggests a growing demand for AI-literate workers, while roles requiring repetitive tasks continue to decline.

US Automation & AI Cases		
Case Study	Facts	Source
Amazon	<ul style="list-style-type: none">300,000 warehouse positions automated45% of internal code AI-assisted50% faster deployment cycles	Amazon Annual & Tech Reports
	<ul style="list-style-type: none">360,000 hours of legal work automated40% of code review automated30% reduction in junior legal staff	
	<ul style="list-style-type: none">50% faster bug detection70% of Office users using AI tools40% reduction in documentation time	
Google	<ul style="list-style-type: none">25% of code AI-generated55% increase in developer productivity30% reduction in testing time	Google AI Research
	<ul style="list-style-type: none">60% of content moderation AI-assisted45% of ad copy AI-generated35% reduction in marketing staff	
	<ul style="list-style-type: none">40% of customer service automated50% reduction in IT support tickets30% faster problem resolution	
Salesforce	<ul style="list-style-type: none">35% of CRM tasks automated45% reduction in data entry needs50% faster report generation	Salesforce Analytics
	<ul style="list-style-type: none">40% of compliance checks automated25% reduction in back-office staff60% faster document processing	
	<ul style="list-style-type: none">3,700 financial reports automated quarterly50% of earnings reports AI-generated30% reduction in junior reporting staff	
Healthcare AI	<ul style="list-style-type: none">30% of US hospitals using AI for radiology40% reduction in diagnostic time25% increase in accuracy	American Hospital Association



How Japan Embraced a Robotic Future, Today



The global agriculture robots market was valued at just under \$6 billion in 2021,



| MOMENTUM-BLOOMBERG YOUTUBE

At Komatsu, construction workers are transitioning from on-site physical labor to remote operations. Workers can now operate machinery and plan construction projects from home offices using digital twin technology and drones. As mentioned by Chike-san from Komatsu, this allows workers to "remotely operate machinery at a construction site from your home."

Japan Automation & AI Cases		
Case Study	Facts	Source
Toyota Manufacturing	<ul style="list-style-type: none"> 80% automation in welding & painting processes by 2020 AI quality control reduces defects by 35% 	Toyota Corporate Reports
Lawson Retail	<ul style="list-style-type: none"> 1000+ stores using shelf-stocking robots AI inventory management reduces waste by 30% 	Lawson Annual Report
FamilyMart	<ul style="list-style-type: none"> 3,000 stores with AI self-checkout 40% reduction in staffing costs 	METI Retail Innovation Report
Mizuho Financial Group	<ul style="list-style-type: none"> 19,000 positions transitioned to AI systems 50% of customer queries handled by AI 	Mizuho Financial Group Reports
FANUC Robotics	<ul style="list-style-type: none"> 24/7 automated facilities 90% reduction in human intervention needed 	JARA Reports
SoftBank	<ul style="list-style-type: none"> 35% of code generated by AI 45% faster development cycles 	SoftBank Tech Reports
Recruit Holdings	<ul style="list-style-type: none"> 60% of content creation AI-assisted 40% reduction in marketing staff 	Recruitment Industry Analysis

AI Skills and Digital Twin Machines Operation: Future Essentials?

	Metric	Current Value (2024)	Projected Value (2030)	Source
Job Creation	New Jobs from AI and Automation	85 million (2020)	97 million (2025)	World Economic Forum
Adoption of Digital Twins	Percentage of Organizations Using Digital Twins	13% (2020)	48% (2025)	Gartner
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Emerging Job Roles	Number of Emerging AI and Digital Twin Engineers	1 million (2024)	3 million (2030)	Industry Projections

YES, AI-related skills and operating Digital Twin machines are projected to be highly popular, and in which shows a high demand for these skills.

Growth in AI Job Roles: There is a rapid growth rate in AI specialist roles, expected to continue. The data indicates:

Adoption of Digital Twins: The adoption of Digital Twin technology by organizations is projected to increase from 13% in 2020 to 48% by 2025, indicating a significant rise in usage and the need for expertise.

Emerging Job Roles: The number of emerging job roles specifically for AI and Digital Twin engineers is expected to triple from 1 million in 2024 to 3 million by 2030, showing a clear trend toward these skills.

Skill Demand Shift: The demand for AI and machine learning skills is projected to be very high by 2030, further highlighting the importance of these competencies in the future workforce.

In summary, both AI skills and Digital Twin operations are set to become essential in the coming years as organizations increasingly adopt these technologies.



Mr. Lim-School Head

Q: How can I prepare my students for careers that involve AI and Digital Twin technologies?

A: Start by incorporating foundational skills in coding, data analysis, and critical thinking into your curriculum. Use project-based learning to simulate real-world applications of AI and Digital Twin concepts. Platforms like Pythaverse, which offers hands-on tools and simulations, can make these topics accessible and engaging for students, helping them build relevant skills early on.

Q: What are the core skills students need to succeed in AI-related fields?

A: Beyond technical skills in AI and digital systems, students need strong analytical abilities, problem-solving skills, and adaptability. Encouraging them to learn how to evaluate data, work collaboratively, and approach problems creatively will give them a solid foundation to succeed in fields where AI and Digital Twin technologies are prevalent.

Q: How can schools without advanced technology resources introduce students to AI and Digital Twins?

A: Focus on building conceptual understanding through case studies, critical discussions, and project-based learning that doesn't require advanced hardware. Educators can also leverage online tools, simulations, and partnerships with organizations that provide educational access to AI and Digital Twin resources, helping bridge the technology gap.



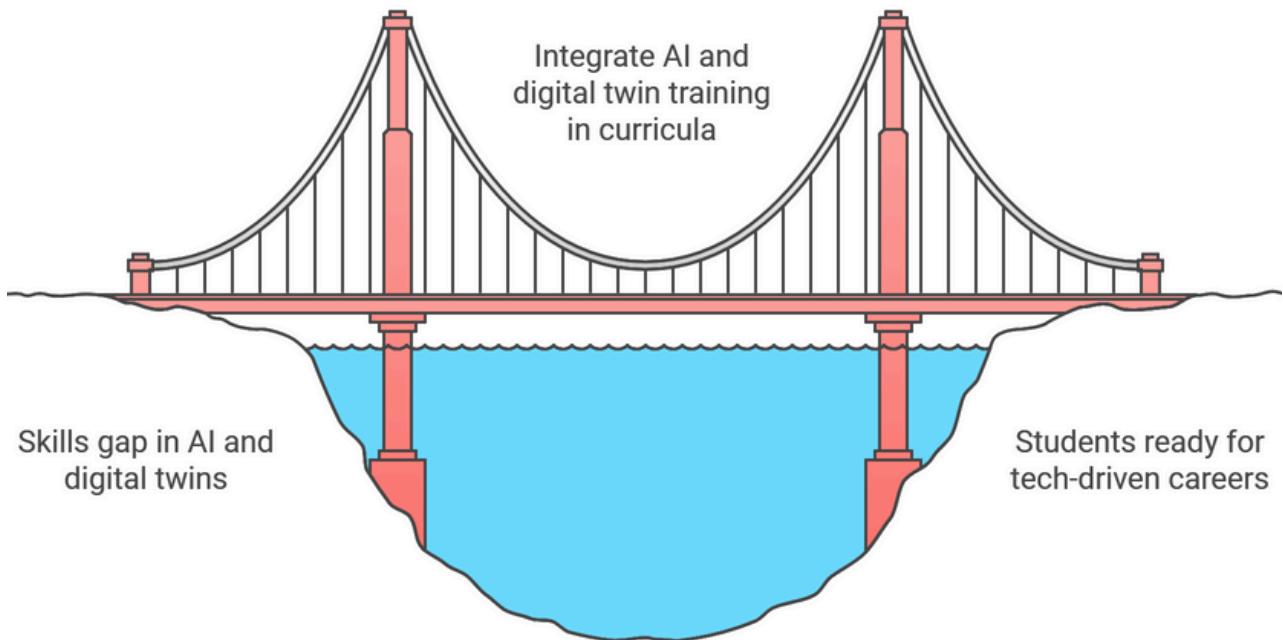
Mrs. An-Parent

Q: Will learning AI and Digital Twin skills make a significant difference in my child's career opportunities?

A: Yes, as these technologies are rapidly growing across sectors, having foundational knowledge and skills in AI and Digital Twin operations can open doors to numerous career paths. Industries are increasingly adopting these technologies, and students with these skills will be well-positioned to fill emerging job roles, which are projected to triple in the coming years.

The Urgent Need for AI Agent Driving and Digital Twin Competencies

Equip Students with AI and Digital Twin Skills



Integrating competencies in Artificial Intelligence (AI) agents and Digital Twin technologies into K-12 education is increasingly essential. This integration has several implications:

- 1. Early Exposure to Emerging Technologies:** Introducing AI and Digital Twin concepts at the K-12 level familiarizes students with technologies that are becoming integral across various industries. Early exposure can demystify these concepts and spark interest in technology-related fields.
- 2. Development of Critical Skills:** Engaging with AI and Digital Twin technologies fosters critical thinking, problem-solving, and analytical skills. These competencies are valuable not only in technology sectors but also in diverse career paths.
- 3. Enhanced Employability:** As industries increasingly adopt AI and Digital Twin technologies, there is a growing demand for professionals skilled in these areas. Providing students with foundational knowledge can enhance their future employability. A report by McKinsey highlights the transformative potential of AI agents in business processes, underscoring the need for a workforce adept in these competencies.
- 4. Promotion of Lifelong Learning:** Introducing these technologies encourages a mindset of continuous learning. Students learn to adapt to technological advancements, preparing them for lifelong learning in a rapidly evolving digital landscape.

5. Bridging the Digital Divide: Integrating AI and Digital Twin education can help bridge the digital divide by providing all students, regardless of background, with access to knowledge about cutting-edge technologies. This inclusivity is crucial for equitable opportunities in the future job market.

6. Curriculum Development Challenges:

Educators and policymakers face the challenge of developing curricula that effectively incorporate these technologies. This includes providing adequate training for teachers and ensuring access to necessary resources. The U.S. Department of Education emphasizes the importance of aligning AI models with educational goals and involving educators in the integration process.

7. Ethical Considerations: Teaching AI and Digital Twin technologies also involves discussions about ethical implications, such as data privacy, algorithmic bias, and the societal impact of automation. This prepares students to think critically about the responsible use of technology.

In summary, integrating AI agent and Digital Twin competencies into K-12 education prepares students for future technological landscapes, enhances critical skills, and promotes equitable access to emerging technologies. However, it requires careful curriculum development, teacher training, and consideration of ethical implications.

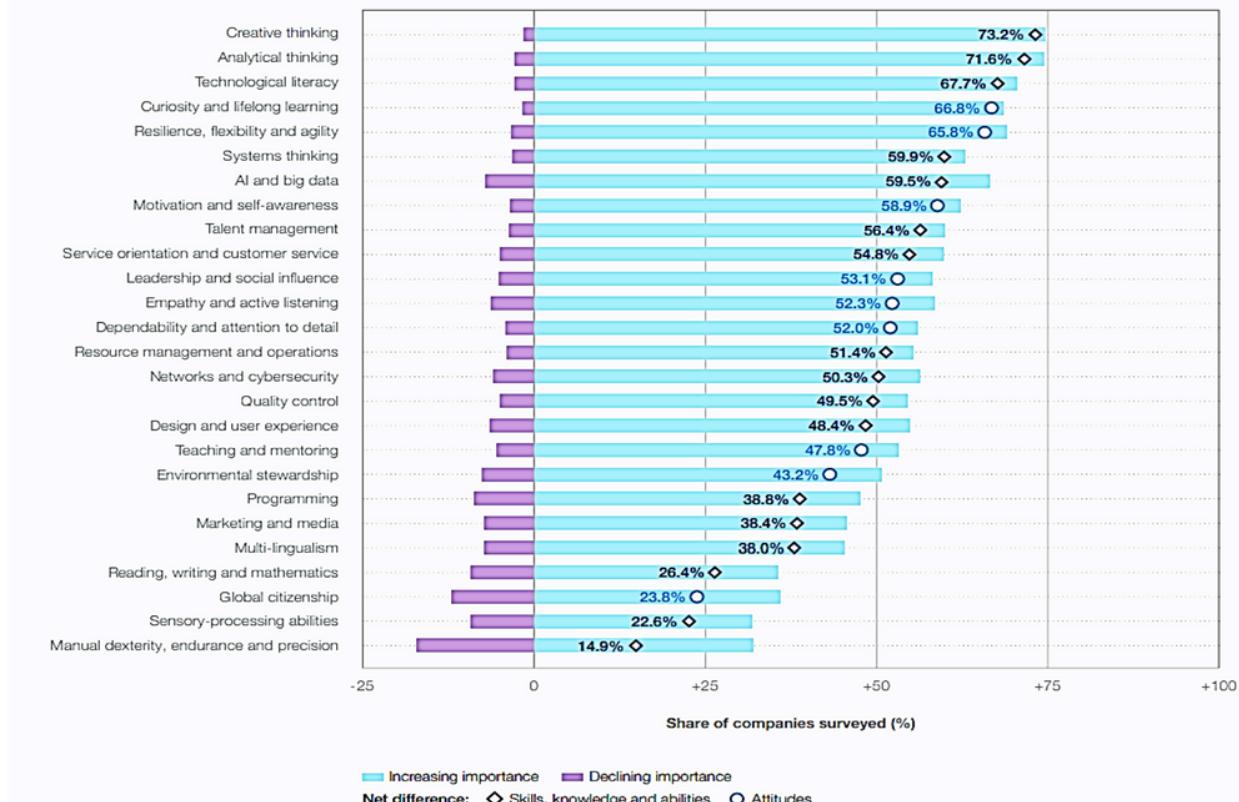


Clear! But what about actual skills needed?

Understand AI and Digital Twin is urgently important, what Skills are needed for that?

The need for Education 2.0!

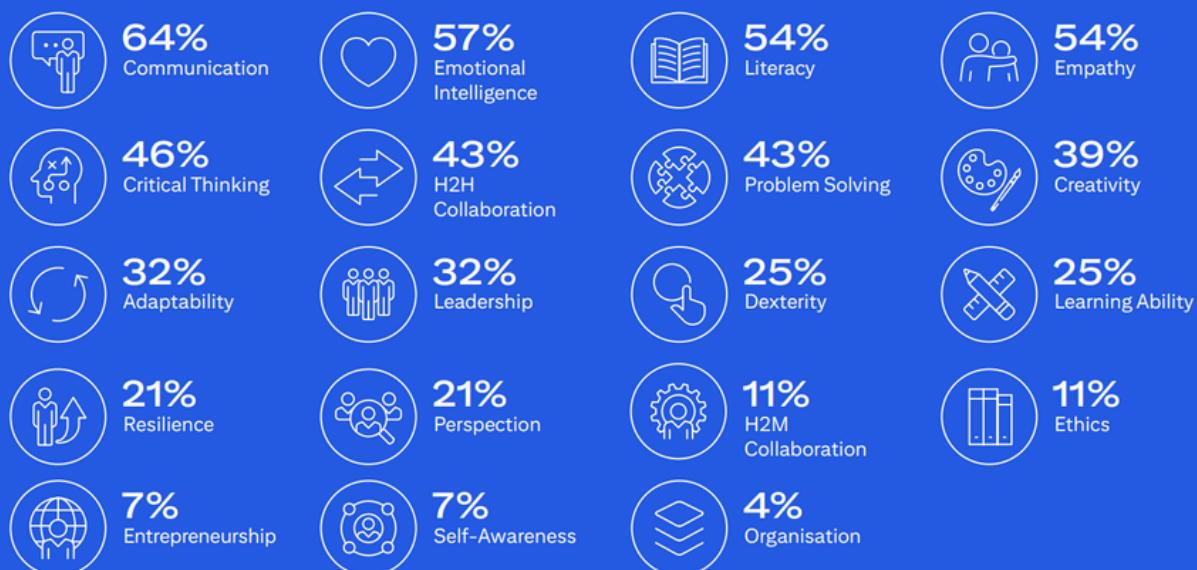
Figure 15. Skills on the Rise 2023



Heart skills such as communication, emotional intelligence, empathy are mentioned much more than other skills.

Source: Citi Global Insights

Mentions of Different Skills (as % of total interviewees)

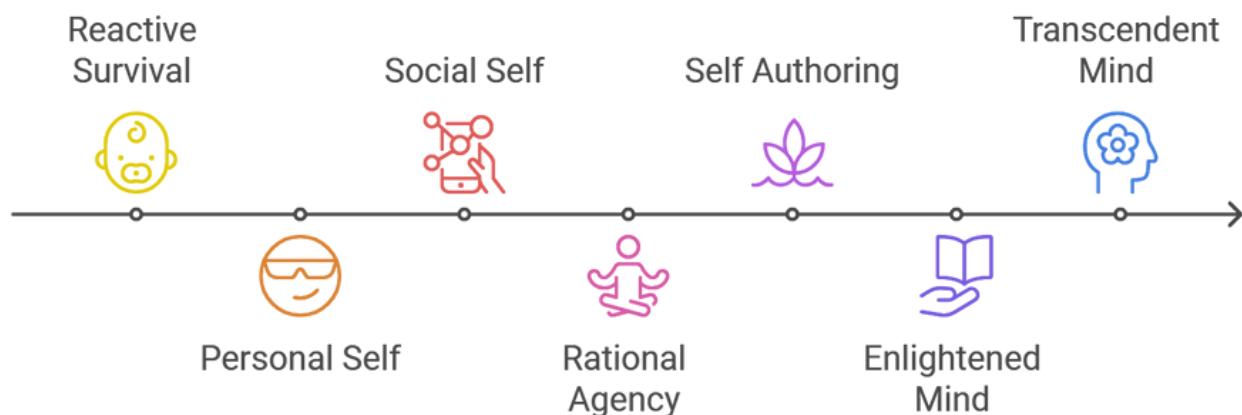




Q: What does this mean to Education?

A: Welcome to Education 2.0, where heart skills are the new hard skills, and schools must modernize to meet this evolving landscape. The data is clear: communication (64%), emotional intelligence (57%), and empathy (54%) are as essential as technical skills, highlighting the need for a learning environment that blends these heart skills with digital competencies. This isn't just about integrating technology; it's about using engaging teaching tools and "learning by doing" in STEM subjects to help students experience and internalize both emotional and analytical skills. Schools must embrace immersive, hands-on learning platforms and environments that bring STEM to life through Digital Twin and AI technologies, enabling students to practice adaptability, problem-solving, and empathy in a real-world context. This future-ready approach empowers students to become not only skilled but emotionally aware and socially responsible, equipping them to thrive in an interconnected world.

The urgent importance of Agency



In the stages of lucidity model¹, these are the stages:

1. **Reactive Survival** (Infant Mind): This initial stage is characterized by innate reflexes and basic learning processes forming the foundation of consciousness and perception.
2. **Personal Self** (Young Child): Here, the development of a personal identity begins, with the mind distinguishing itself from its external environment.
3. **Social Self** (Adolescence, Domesticated Adult): This stage involves developing a social identity, understanding social emotions, and assimilating societal ideas and morality.
4. **Rational Agency** (Epistemological Autonomy, Self-Directed Adult): Individuals gain the ability to think independently, develop their own belief systems, and take responsibility for their emotions and desires.
5. **Self Authoring** (Full Adult, Wisdom): This stage involves a deeper understanding of one's motivations and the formation of a more mature, self authored identity.

6. Enlightened Mind: A stage characterized by profound insight into the nature of perception, motivation, and consciousness, often associated with advanced meditation practices.

7. Transcendent Mind: This final stage involves surpassing conventional consciousness and exploring more expansive forms of sentience and agency.

In the AI era, adapting Bloom's Taxonomy becomes crucial, particularly when integrated with Joscha Bach's stages of lucidity. This combination within the Pythaverse COCREATE Framework offers a comprehensive framework for cognitive and emotional development, emphasizing the need for higher cognitive and emotional maturity, especially in creative processes:

In the current digital age, students are at risk of getting “stuck” at the **Social Self** stage in their cognitive and emotional development. This stage, typically associated with adolescence, involves identifying with societal norms, understanding social dynamics, and absorbing external ideas.

However, without progressing to **Rational Agency** and **Human Agency** stages, students may lack the capacity for independent thinking, critical analysis, and self-directed values. Achieving **Rational Agency** is particularly critical, as it enables students to make informed judgments, form independent beliefs, and navigate complex global and technological challenges responsibly. The development of Rational Agency and beyond is essential for fostering resilience, ethical reasoning, and adaptability, qualities necessary for active and thoughtful participation in today’s society.



Q: How can I support my child in developing Rational Agency at home?

A: Encourage your child to question information, even from familiar sources. Engage them in conversations about current events or ethical dilemmas, asking them to explain their reasoning. Show interest in their opinions and help them explore different viewpoints, which fosters confidence in independent thinking.

Q: How can I prevent my child from becoming overly influenced by social media?

A: Set boundaries on passive social media use, encouraging them to use technology actively, for learning or creative projects. Discuss the information they encounter online and guide them on how to evaluate credibility. Teaching your child to think critically about digital content will help them become more discerning and less influenced by peer pressures or trends.

Q: What are some activities that promote human and rational agency?

A: Reading, problem-solving activities, and even simple debates at the dinner table can build reasoning skills. Additionally, encourage activities that require planning, such as setting personal goals or managing a small project. These activities teach your child to evaluate choices, consider consequences, and take responsibility for their actions.

Get Your School Ready for Education 2.0 with Pythaverse CoCreate Framework

Responsible Citizen Competencies:

Promote Human Values in Technology Era

1. Collaboration and Teamwork
2. Creative and Critical Thinking
3. Ethics - Human Values



Digital Twin Technology Competencies:

Foundational and Future Technology Readiness

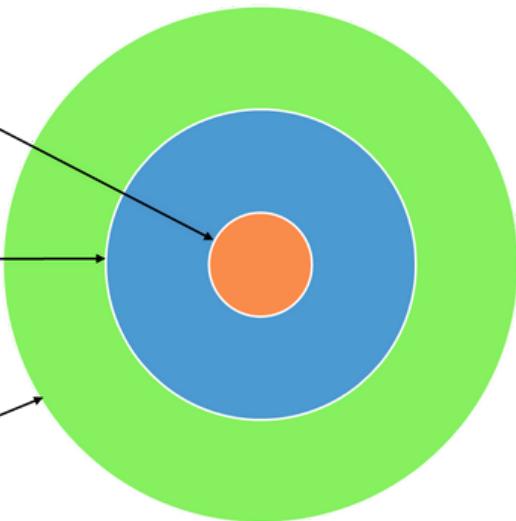
1. Core Technological Skills
2. Emerging Technologies
3. Technical Proficiency



Co-Creation Competencies:

Equip new machine and AI empowered creativity

1. AI Driving
2. Design Thinking
3. Ethical Judgement and Complexity Handling
4. Interdisciplinary Knowledge
5. Resilience and Resolve



Pythaverse Co-Create learning framework



Q: What does this framework mean for my child's future?

A: This framework envisions a progressive approach to learning, where students begin with developing a sense of **Responsible Citizenship** at the core. This foundational layer emphasizes values, ethics, and understanding their role in society. Moving outward, the **Digital Twin Technologies** layer equips students with essential digital skills, technical competencies, and familiarity with emerging technologies, making them proficient in navigating a technology-driven world. The outermost layer, **Co-Creation Competencies**, focuses on collaborative skills, creativity, and the ability to innovate with others, preparing students to actively participate in and shape a future defined by shared problem-solving and global collaboration. This structure ensures that your child not only gains core values but also acquires advanced technical and collaborative skills, empowering them to succeed in a rapidly evolving world.

Q: How can I support my child within this framework?

A: You can encourage curiosity and critical thinking at home, support learning in multiple areas (e.g., digital literacy, empathy, problem-solving), and promote activities that develop their adaptability and teamwork. Helping your child engage in diverse experiences, like collaborative projects and real-world problem-solving, will also align with the goals of this framework.



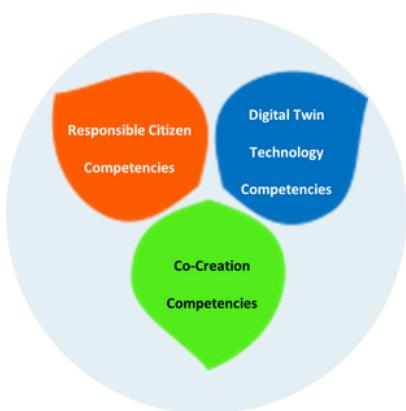
Q: How should teaching strategies change to align with this framework?

A: Teaching strategies should move beyond traditional lectures. Educators should incorporate project-based learning, interdisciplinary lessons, and opportunities for students to work on real-world challenges. Focusing on activities that encourage collaboration, empathy, and problem-solving will ensure students progress through all layers effectively.



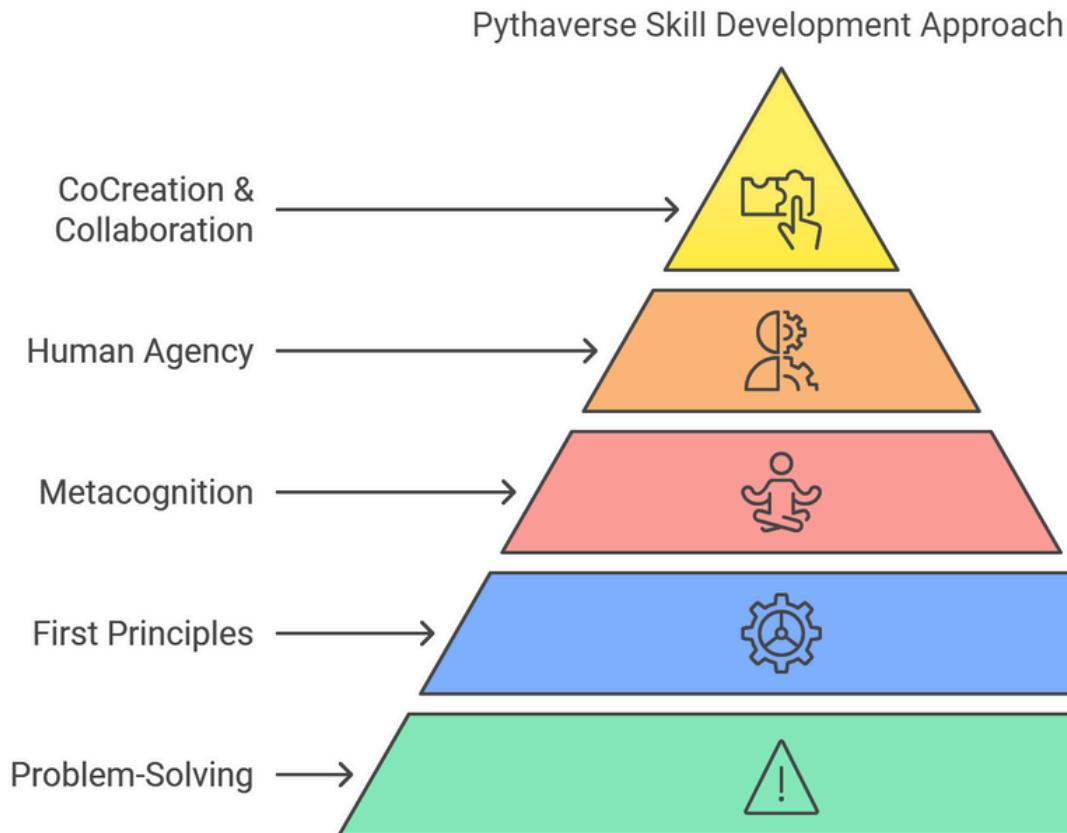
Q: Why is this framework important for me as a student?

A: This framework is important because it prepares you for a world that requires not only academic knowledge but also flexibility, emotional intelligence, and the ability to work well with others. Each layer builds on the previous one, giving you a well-rounded skill set that will be valuable in any career path.



empathy
creativity
AI driving
resolve
design thinking
critical thinking
computational thinking

Learning Approach



The Pythaverse Skill Development Approach is a structured framework designed to cultivate essential skills for the modern learner. At its foundation lies **Problem-Solving**, encouraging students to tackle real-world challenges through analysis and solution development.

Building on this, **First Principles** thinking empowers learners to break down complex problems into basic truths, fostering deeper understanding and innovation. **Metacognition**—thinking about one's own thinking—enables students to reflect on their learning processes, enhancing self-awareness and adaptability. Moving up the framework, **Human Agency** emphasizes individual empowerment, encouraging students to take ownership of their actions and learning outcomes.

At the peak is **CoCreation & Collaboration**, which prepares students to work effectively with others, leveraging collective intelligence for creative and impactful solutions. Together, these layers form a comprehensive approach to skill development, preparing learners to thrive in collaborative, technology-driven environments.



Q: Why is Problem-Solving placed at the foundation of this approach?

A: Problem-solving is foundational because it is a critical skill for addressing challenges in any field. By starting with problem-solving, students learn to approach issues systematically, making it easier to build more complex skills as they progress through the framework.

Q: How does First Principles thinking help students?

A: First Principles thinking encourages students to break down complex ideas and identify core truths, which promotes deeper understanding and innovation. It helps students develop analytical skills and avoid relying solely on assumptions, fostering original thinking.

Q: What is the purpose of teaching Metacognition?

A: Metacognition, or “thinking about thinking,” helps students become more aware of their learning strategies and processes. This awareness allows them to self-reflect, adapt their learning methods, and improve their ability to learn independently.

Q: What does Human Agency mean in this framework?

A: Human Agency emphasizes empowering students to take control of their learning and actions. It encourages independence, self-efficacy, and the confidence to make decisions, which are crucial skills for personal and professional growth.

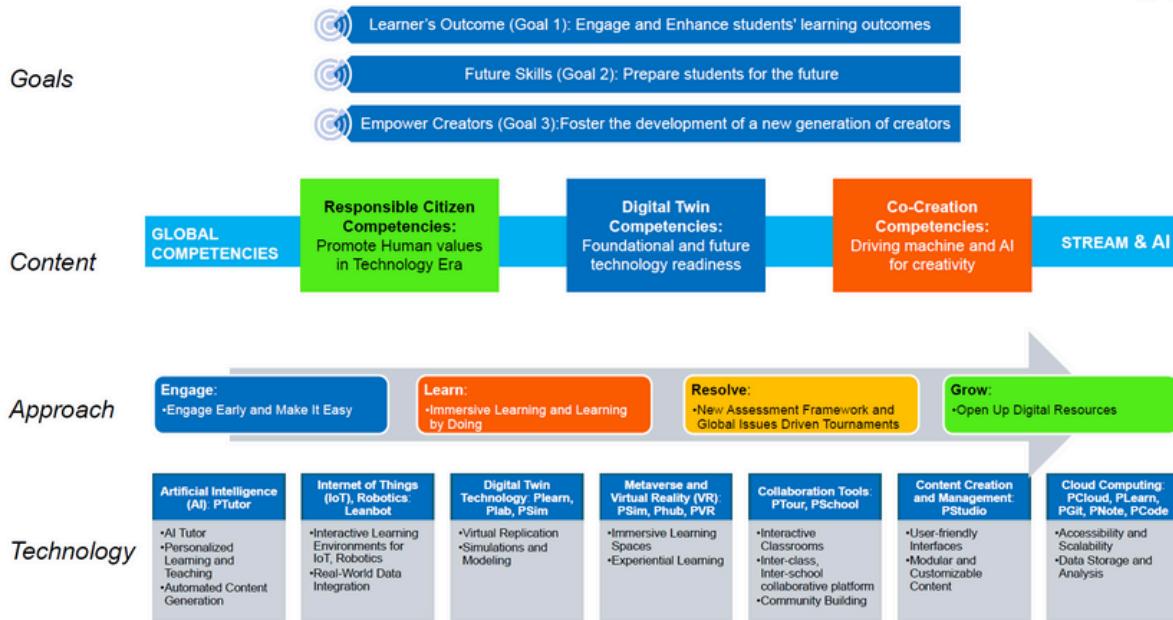
Q: How does CoCreation & Collaboration benefit students?

A: CoCreation & Collaboration at the top of the framework prepares students to work with others effectively. It teaches them how to combine ideas, leverage diverse perspectives, and create solutions collaboratively, which is essential for success in a connected, team-oriented world.



Pythaverse Co-Creation Learning Framework

Pythaverse Digital Twin and Co-Creation learning framework with Global Competencies, STREAM and AI



Description of the Pythaverse Digital Twin and Co-Creation Learning Framework

The Pythaverse Digital Twin and Co-Creation Learning Framework aims to develop globally competent, future-ready students with the skills needed to thrive in a technology-driven world. It is structured around three primary goals: enhancing students' learning outcomes, equipping them with future skills, and empowering them to become creators.

The framework integrates **Global Competencies** to promote responsible citizenship, **Digital Twin Competencies** to build foundational technology skills, and **Co-Creation Competencies** that encourage creative use of AI and machines.

The learning approach emphasizes **Engagement** (starting early and simplifying access), **Learning by Doing** (immersive, hands-on experiences), **Resolution of Real-World Issues** (assessment and global issue-based tournaments), and **Growth** (expanding digital resources). Technologies like AI tutors, IoT labs, digital twin simulations, VR spaces, and collaboration tools support this learning environment, fostering interactive, accessible, and community-driven education.

**Q: How does this framework prepare students for the future?**

A: This framework focuses on building essential future skills, such as digital literacy, global competency, and creative problem-solving with AI and digital twins. It gives students hands-on experience with advanced technology, which prepares them to navigate and innovate in the technology-driven world.

Q: What are Digital Twin Competencies, and why are they important?

A: Digital Twin Competencies involve using virtual models of real-world systems to simulate and understand complex concepts. This is important because it helps students develop technical skills, such as modeling and critical analysis, which are highly relevant in industries that rely on digital twin technology for design and testing.

Q: How does the framework promote responsible citizenship?

A: By integrating Global Competencies, the framework encourages students to consider human values and ethical implications in the technology era. This approach helps students become responsible citizens who use technology thoughtfully and understand its societal impacts.

Q: What is meant by "Co-Creation Competencies"?

A: Co-Creation Competencies refer to the ability to work creatively with AI and digital tools, using them as partners to solve problems and innovate. This competency encourages students to think of AI and technology as collaborative tools for creativity rather than simply functional tools.

Q: How does the technology used support this learning approach?

A: Technologies like AI tutors, IoT labs, VR environments, and cloud computing provide interactive and accessible ways to learn complex topics. These tools facilitate immersive learning, foster collaboration, and allow students to engage deeply with real-world problems, enhancing their skill development.

Pythaverse Solutions in Action



Pythaverse is designed to enhance student engagement, prepare students for future readiness, and empower them as creators through a cutting-edge digital learning ecosystem. The platform achieves these goals with two core components:

1. Leanbot: Digital Twin Machines Operation & Engineering

Leanbot allows students to create and manipulate digital replicas of real-world machines and systems. Through Leanbot, students learn to analyze data, interpret insights, and experiment with optimization techniques in a simulated environment, developing practical skills in system efficiency.

2. TwinSpace: AI Agent Driving and Development

TwinSpace enables students to build, program, and manage AI agents. It includes tools for ethical AI considerations and allows for the integration of AI agents with digital twins, facilitating advanced simulations and applications. This experience gives students a hands-on approach to AI development with an emphasis on ethical use and integration capabilities.

Additionally, **Partner Integration** supports distribution and content partners, offering an easy onboarding process for distribution and seamless content integration with technical assistance for content partners.



Mr. Lim-School Head

Q: What are the primary goals of the Pythaverse platform?

A: Pythaverse aims to enhance student engagement, prepare students for future readiness, and empower them as creators. The platform provides interactive tools and immersive environments that equip students with practical skills in digital twins and AI.



Mrs. An-Parent

Q: How does Leanbot help students understand digital twins?

A: Leanbot provides a simulation environment where students can create, manipulate, and experiment with digital replicas. This hands-on experience with data analysis and optimization helps students develop a foundational understanding of digital twin technology and system efficiency.

Q: What can students learn from TwinSpace's AI capabilities?

A: Through TwinSpace, students can build and program AI agents, gaining skills in AI development. They also learn about ethical considerations in AI and how to integrate AI agents with digital twins, giving them practical experience in advanced AI applications.



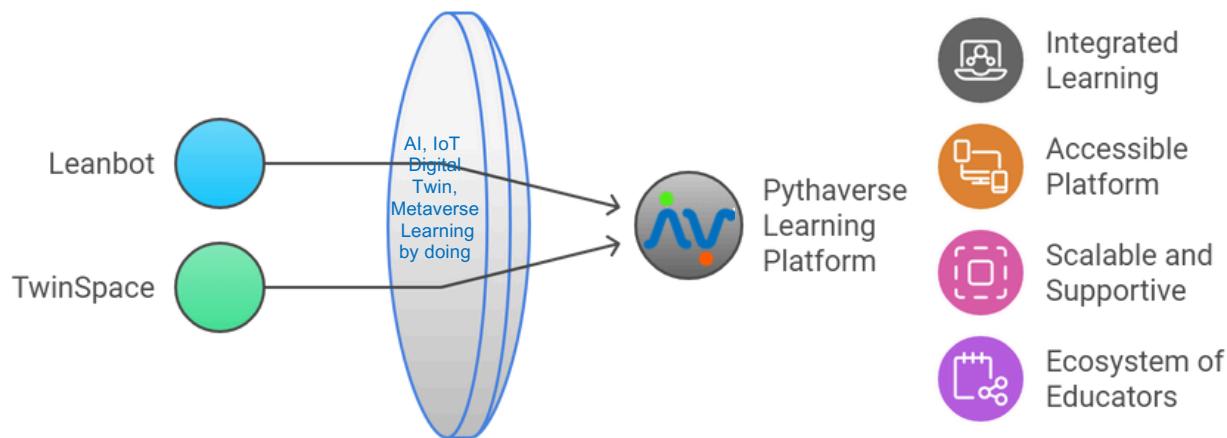
Mr. Wisit-Partner

Q: How does Pythaverse support partners in education?

A: For distribution partners, Pythaverse offers a streamlined onboarding process, training, and support. For content partners, it provides technical assistance, co-marketing opportunities, and an integration framework, allowing them to deliver specialized content on the platform.



Pythaverse: Bridging Education and Technology



Pythaverse bridges the gap between theoretical knowledge and practical application, offering tools that make learning interactive and impactful.

Leanbot: Digital Twin Machines Operation

Leanbot provides a virtual environment where students can:

- Create Digital Twins:** Build virtual models of machines or systems for simulation.
- Perform Simulations:** Test scenarios and observe outcomes without physical constraints.
- Data Analysis:** Collect and interpret data to make informed decisions.
- Optimize Operations:** Experiment with variables to enhance performance and efficiency.

TwinSpace: AI Agent Driving

TwinSpace empowers students to:

- Develop AI Agents:** Design and program AI agents for various tasks.
- Experiment with AI Models:** Access a range of AI algorithms for learning and application.
- Ethical AI Practices:** Understand and apply ethical considerations in AI development.
- Integrate with Digital Twins:** Combine AI agents with digital twins for advanced simulations and problem-solving.



Mr. Lim-School Head

Q: How does Leanbot help students in understanding Digital Twin technology?

A: Leanbot provides students with a physical-virtual environment to create, simulate, and analyze digital twins. This allows them to model machines or systems, run it to test scenarios, and analyze data to make informed decisions. Through Leanbot, students can experiment with optimization and gain hands-on experience with digital twin technology together with physical robot.

Q: What skills do students develop through TwinSpace?

A: TwinSpace enables students to develop skills in AI, including designing and programming AI agents. It also provides a platform for experimenting with AI models, understanding ethical AI practices, and integrating these AI agents with digital twins. This approach fosters a deep understanding of AI application and ethics, which are essential skills in today's tech-driven world.

Q: How does Pythaverse ensure learning is interactive and impactful?

A: Pythaverse bridges theoretical knowledge with practical application through tools like Leanbot and TwinSpace. These tools provide immersive environments for students to engage in simulations, AI model testing, and problem-solving, making learning interactive and relevant to real-world applications.

Q: What role does data analysis play in Leanbot's simulations?

A: Data analysis is a key component in Leanbot's simulations, as it allows students to collect and interpret data from actual robot operation. By analyzing this data, they can understand system performance, make data-driven decisions, and experiment with variables to optimize operations, which helps them learn how to enhance efficiency and solve complex problems.

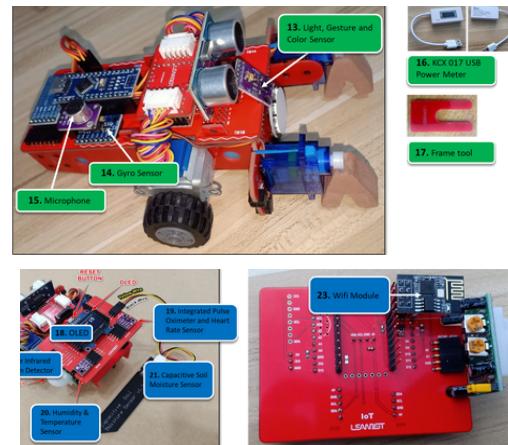
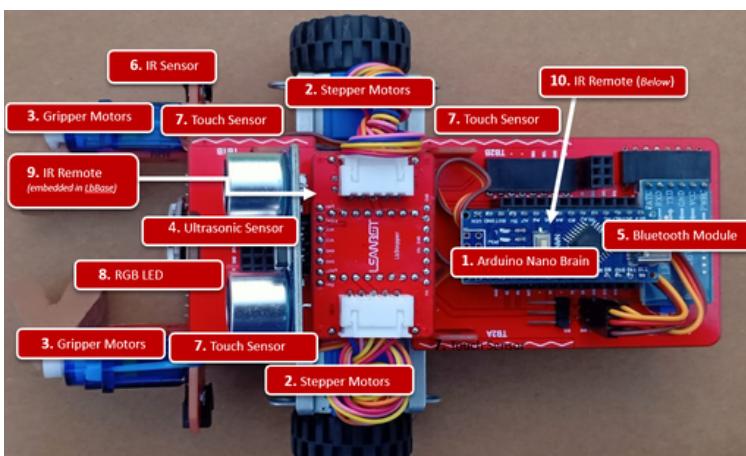


Mrs. An-Parent

Q: How does Pythaverse promote ethical practices in AI through TwinSpace?

A: TwinSpace includes modules on ethical AI practices and apply it to the virtual world, which teach students to consider the societal and ethical implications of AI. This component emphasizes responsible AI development, encouraging students to apply ethical principles in designing and programming AI agents, ensuring that their knowledge is grounded in responsible technology use.

Digital Twin Robotics mastering with Leanbot



Leanbot, innovative robot for the STREAM with Robotics Pythaverse (SWRP) and the Pythaverse After-School Program (ASP), is an innovative educational tool designed to teach robotics, AI, and digital twin technology to students from elementary to high levels and beyond. Leanbot provides a unique learning experience through hands-on interaction with both physical and digital representations of robots, fostering essential skills in programming, problem-solving, and critical thinking. The programs offer a comprehensive and age-appropriate curriculum, integrating IoT, AI, and the metaverse for a holistic approach to STREAM education. By using real-world applications and project-based learning, Leanbot helps students internalize complex concepts and prepares them for a technology-driven world.

- **Leanbot: Digital Twin Machines Operation**

- A Leanbot is a semi-industrial engineering robot that is designed for teaching STREAM with Robotics Pythaverse.
- It is a compact robot with many sensor systems and infinitely expanded intelligent features.
- It is designed to teach STREAM with Robotics Pythaverse by helping students to absorb and internalize knowledge faster and more deeply via Learning by doing approach.

- **Unique Digital Twin Feature**

- Virtual representation of the physical Leanbot robot
- Created using sensors and cameras to capture real-time state and movements.
- Simulates the robot's behavior in a virtual environment
- Allows students to experiment or troubleshoot with programming commands for limited spaces.



Mr. Lim-School Head

Q: What is Leanbot's Digital Twin feature, and why is it important for students learning about Digital Twin Operation and Engineering?

A: Leanbot's Digital Twin feature creates a virtual representation of the physical robot, allowing students to simulate its operations and behaviors in a digital environment. This feature is essential because it enables students to experiment, troubleshoot, and optimize robot functions without the constraints of physical space or hardware limitations. Learning with digital twins gives students hands-on experience in engineering principles and digital simulation, which are crucial skills in fields like automation, manufacturing, and systems design. By working with Leanbot's Digital Twin, students can understand how digital twins are used in real-world industries to improve efficiency, predict outcomes, and develop innovative solutions, making it an invaluable toolkit for future engineering and technology roles.



Mrs. An-Parent

Q: How can my child start learning with Leanbot, and what resources are available to support them?

A: Your child can begin learning with Leanbot through the Pythaverse STREAM with Robotics Pythaverse (SWRP) program or the Pythaverse After-School Program (ASP). These programs offer hands-on lessons designed for different learning levels, from elementary to advanced, introducing foundational concepts in robotics, AI, and Digital Twin technology. To get started, you can explore beginner tutorials and step-by-step guides available on the Pythaverse platform, which cover Leanbot's basic functions, programming, and sensor-based activities. Additionally, interactive online sessions, workshops, and resources are available, allowing your child to learn by doing in a structured yet engaging environment.



Boosting Student Outsome with AI, IoT, Metaverse and Digital Twin using the Innovative LEANBOT



STREAM with Robotics Pythaverse (SWRP)

The STREAM with Robotics Pythaverse (SWRP) Program is a cutting-edge educational initiative that integrates STREAM with emerging technologies such as robotics, IoT, AI, and the Metaverse. This program provides an immersive learning experience from elementary to secondary levels, helping students acquire crucial skills needed in a technology-driven world.

Key Features of SWRP

Digital Twin Technology: Exposure to physical and digital representations of Leanbot

Hands-on Robotics Learning: Engage Leanbot in robotics, coding, and AI.

Project-Based Learning: Project challenges to solve real-world problems, encouraging creativity and critical thinking.

Age-Appropriate Curriculum: SWRP is structured into different levels suitable for K-12 students, progressing from elementary (block-based coding) to secondary (text-based coding).

Comprehensive Coverage: Add-on IoT and AI into practical coding, problem-solving, and teamwork skills.

Metaverse Integration: Interact virtual environment with STREAM concepts.

Integrate Into School Time-table: SWRP is structured to be learnt in school time-table.

Leanbot After-School Programs (ASP)

The Leanbot After School Program (ASP) offers an exciting after-school experience for students in Grades 1-12. Designed to bring STREAM concepts to life, ASP provides a hands-on approach to learning using Leanbot robots and Digital Twin technology, encouraging students to explore beyond the classroom.

Key Features of ASP

Fun and Engaging Activities: ASP sessions have enjoyable activities designed to teach STREAM concepts. It comes with creativity and innovation challenges and projects.

Robotics and Digital Twins: Through Leanbot, both the physical and digital twins of their robots, enable students to experiment in both environments.

Academic Impact: ASP is designed to enhance academic performance, improving test scores, school grades, attendance, and engagement in learning.

Adaptable Curriculum: ASP sessions are customizable to different educational settings.

Structured Learning: The curriculum aligns with Bloom's Taxonomy, providing a comprehensive approach to learning that focuses on critical thinking, problem-solving, and creativity.

Club, After-School or Project-based Program: Run with focus based content.

**Q: What is the STREAM with Robotics Pythaverse (SWRP) Program?**

A: SWRP is a program that combines robotics, IoT, AI, and the metaverse to provide an immersive learning experience for K-12 students. It focuses on hands-on learning and project-based activities to teach critical skills in a structured, age-appropriate way, within regular school hours.

Q: How does the Pythaverse After-School Program (ASP) enhance learning?

A: ASP offers an engaging after-school experience for grades 1-12, focusing on STREAM concepts through activities and challenges. It utilizes Leanbot robots and digital twins to allow students to experiment with robotics in both physical and virtual environments, encouraging exploration beyond the classroom.

**Q: What unique features does Leanbot offer?**

A: Leanbot offers a digital twin feature that enables students to create virtual models of the robot, simulating its behavior in a virtual environment. This feature allows students to conduct experiments and troubleshoot commands without needing physical space, enhancing their understanding of robotics and programming.

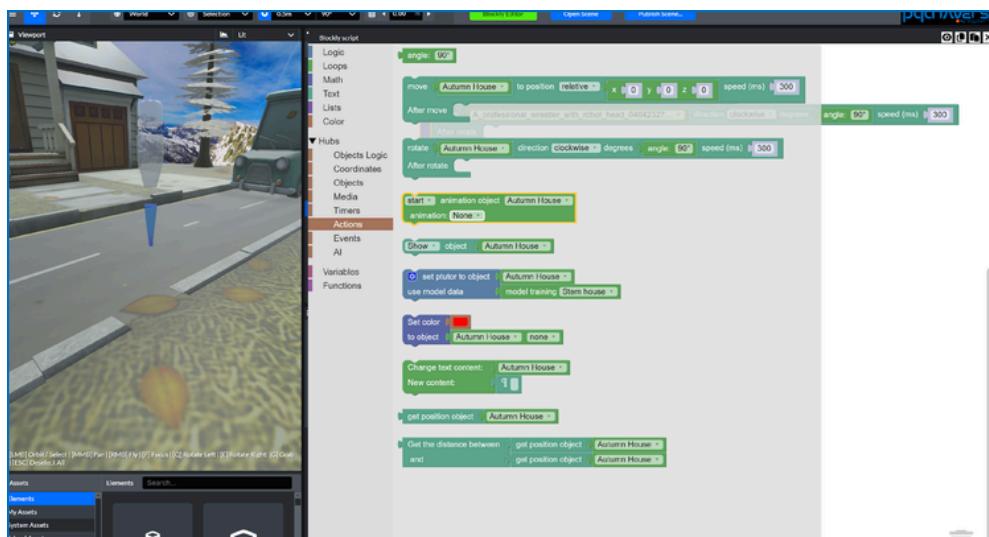
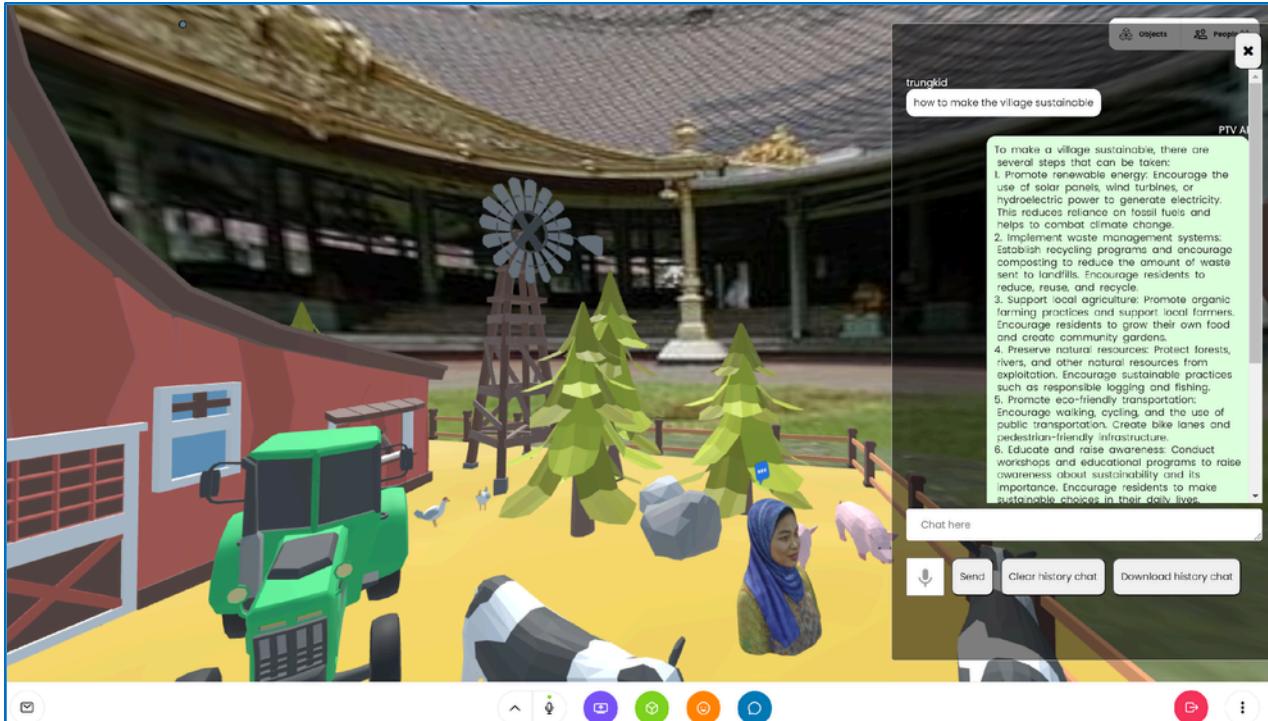
Q: How does Leanbot help students develop critical skills?

A: Leanbot emphasizes project-based learning and problem-solving, requiring students to tackle real-world challenges. Through robotics, digital twins, and IoT integration, students build skills in data analysis, critical thinking, and system optimization, essential for future careers in technology.

Q: What support is provided for different educational settings?

A: Both SWRP and ASP are adaptable to various educational environments. SWRP can be integrated into regular school timetables, while ASP is customizable for after-school clubs or project-based programs, with a curriculum structured around Bloom's Taxonomy to ensure comprehensive learning outcomes.

AI Driving and Development Mastering with TwinSpace



TwinSpace is an immersive learning platform designed to teach students the fundamentals of AI and digital twin technology through interactive, hands-on experiences. The program guides students through a structured learning pathway that includes designing AI agents, experimenting with AI models, and applying ethical practices in AI development. TwinSpace emphasizes critical thinking, creativity, and collaborative problem-solving by allowing students to create AI-driven avatars, explore virtual worlds, and tackle real-world challenges. Through a combination of design thinking and AI integration, students gain valuable skills in AI-driven development, digital twin operation, and responsible technology use.



Q: What is TwinSpace, and how does it benefit students?

A: TwinSpace is an immersive platform where students can create avatars, develop AI agents, and explore virtual worlds. It benefits students by making AI concepts accessible and engaging, encouraging hands-on learning, and developing skills in problem-solving and critical thinking through interactive projects.

Q: How does TwinSpace integrate AI and digital twin technology?

A: TwinSpace allows students to combine AI agents they develop with digital twins, enabling complex simulations and advanced problem-solving. This integration teaches students how AI and digital twins work together in real-world applications, such as virtual space building and programming with multiple AI agents.

Q: Why is ethical AI emphasized in TwinSpace?



A: Ethical AI is essential to ensure that students understand the societal and moral implications of their creations. TwinSpace includes modules on ethical AI practices to teach students about responsible AI development, preparing them to build fair and considerate AI solutions.

Q: What skills do students gain from TwinSpace's learning pathway?

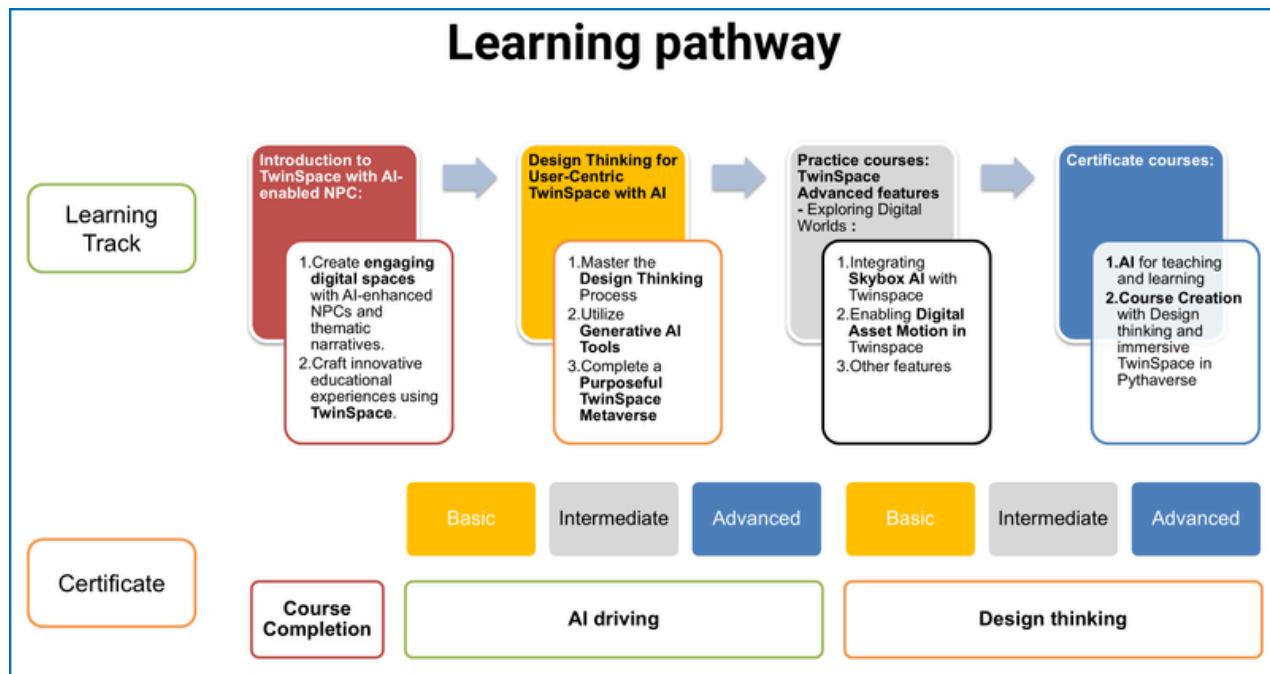
A: Students gain skills in AI development, design thinking, and digital twin integration. They also develop critical thinking, creative problem-solving, and collaboration skills, which are vital for future roles in technology and engineering.

Q: How does TwinSpace ensure a safe learning environment?

A: TwinSpace maintains a safe environment through content moderation and privacy controls. It provides a secure space where students can explore, collaborate, and learn with peace of mind, ensuring parents can trust the platform's educational integrity.

AI Driving mastering with TwinSpace

Learning pathway





Feature/Aspect	Pythaverse TwinSpace
Platform Focus	Design thinking, metaverse building, 3D assets creation, coding, multiple subjects focusing on Non-STEM students
Lesson Plans & Resources	AI-aided lesson plans creation for teachers
Collaboration Features	Metaverse mode by default, real-time interactions, digital twin of space, bridging offline to online via avatar, spatial audio, collaborative meetings, AI-aided interactive objects and NPCs
Target Subjects	Non-STEM to STEM skills and global competencies, various subjects
Professional Development	Online teachers training, certifications, workshops
Engagement Tools	Competitions (3C), Multiverse, Showcases
Real-World Learning	Real-world scenarios simulations, Game-based learning, Collaborative learning
Accessibility	User-friendly, attached to real people and spaces
Hardware Requirements	PC, MAC, iOS, Android via browser based
Community Involvement	Competitions (3C), Multiverse, Showcases
Objectives	Teachers as creators, Students as creators. NonSTEM to STEM skills
Targeted Student Age	10 to 18
Learning Outcomes	Design thinking, metaverse building, 3D assets creation, coding, global competencies, AI driving
Case Studies	K-12
Benefits	Engaging, collaborative, creativity, AI driving
Unique Value Proposition	Design thinking, AI driving, Community driven Metaverse creation

How Does TwinSpace Work?

- **Educator Toolkit:** Offers resources for teaching AI and Metaverse concepts interactively.
- **Metaverse Creation:** Empowers students to build their own virtual spaces, applying knowledge practically.
- **Community Sharing:** Students can publish and share their creations, fostering a collaborative ecosystem.
- **AI-Enhanced Learning:** Supports personalized learning and digital twin projects.

Where and When Can TwinSpace Be Used?

TwinSpace can be integrated into K-12 schools, colleges, and after-school programs, supporting both in-person and online learning environments. Available now, it provides schools a ready path to engage students with AI.

Who are the Users:

- **K-12 Students and Educators:** Core users for advanced learning using immersive virtual spaces to solve real life problems in an engaging way.
- **Curriculum Developers:** To embed digital skills into modern curricula coupled virtual situation to illustrate context and knowledges
- **Self-Motivated Learners:** Seeking to enhance digital literacy especially creativity with 3D building and AI agent development



Pythaverse Integrated Digital Twin Learning Platform

The **Pythaverse Platform** is an **all-in-one, cloud-based digital learning ecosystem** designed to enable **immersive, integrated, and intelligent education** through **Digital Twin** and **AI** technologies. It provides a **hybrid learning environment** that empowers both teachers and students to engage in teaching and learning **24/7** with a **single account**. Pythaverse combines a suite of tools under one platform, including **interactive learning resources**, **creation tools** for coding and AI development, **sharing tools**, and **school management functionalities**. With a focus on **Learning by Doing**, Pythaverse facilitates experiential learning in **STEM**, **robotics**, and **digital skills** while seamlessly integrating **ethical and global competencies**, making it a **next-generation solution for Education 2.0**.

The screenshot displays the Pythaverse Platform's user interface. At the top, there is a navigation bar with links for Home, Contact, About Us, Community, and Trung Student. The main area is divided into several sections:

- Badges:** Shows three circular badges labeled Prototyping, TwinSpace, and Ideation.
- STUDENT WORKSPACE:** A section with a bell icon and a link to the workspace.
- Learning:** Features three cards for PTutor, PLab, and PContest, each with a "Go" button.
- Creating:** Features five cards for Pcode, Pstudio, PBuilder4AI, PAvatar, and PNote, each with a "Go" button. Sub-labels below these cards provide specific tool names: Leanbot C++ IDE, Leanbot Blockly IDE, PMinetest Blockly IDE; TwinSpace Studio, PMineTest Studio; Leanbot AI Model, NPC AI model; TwinSpace Avatar Editor, PMinetest Avatar Editor.
- Sharing:** Features four cards for PGit, PSim, PVr, and PHub, each with a "Go" button. Sub-labels below these cards provide specific sharing options: AI Training Data, Go, Go, Go.
- Side Navigation:** A sidebar on the left contains links for Home, My Courses, My Contests, My Learning Tools (which is currently selected), My Twinspace, My Profile, and Help.

At the bottom, there are footer links for Contact Us, Privacy Policy, Term of Use, and a copyright notice: © 2024 Pythaverse. All Rights Reserved.



Mr. Wisit - Partner

Q: What makes Pythaverse different from other digital learning platforms?

A: Pythaverse stands out for its comprehensive, integrated approach that brings together digital learning, AI, and Digital Twin technologies under one platform. It offers tools not only for traditional learning but also for creating, sharing, and managing content, making it a true end-to-end solution. Its emphasis on hybrid, flexible learning means students and teachers can access it anytime, promoting continuous engagement and interactive, hands-on learning.



Mrs. An - Parent

Q: How can my child benefit from using Pythaverse?

A: Pythaverse equips students with practical skills in robotics, AI, and programming through immersive, hands-on tools. This platform allows students to develop critical thinking, creativity, and technical skills in a real-world context, ensuring they are prepared for future technology-driven careers. The platform also nurtures emotional intelligence and global competencies, helping students become responsible and adaptable global citizens.

Q: How does Pythaverse support teachers in creating engaging lessons?

A: Pythaverse offers a variety of teaching tools like PTutor, PContest, and PLab, which allow educators to create interactive lessons, competitions, and labs. The platform's resources are designed to make it easy for teachers to integrate STEM and digital skills into their curriculum. Additionally, creation tools such as PCourseCreator and PBuilder4AI provide educators with resources to develop custom content that aligns with the learning objectives of Education 2.0.



Mr. Lim - School Head

Q: What is the "Learning by Doing" approach on Pythaverse, and why is it important?

A: "Learning by Doing" on Pythaverse emphasizes experiential learning, where students actively engage in projects and simulations to grasp complex concepts in AI, Digital Twin, and STEM subjects. This approach is essential because it fosters deeper understanding and long-term retention, enabling students to apply knowledge in practical settings rather than passively absorbing information.

Q: Can schools integrate their existing curriculum with Pythaverse?

A: Yes, Pythaverse is designed to be flexible and can seamlessly integrate with existing school curricula. Schools can use Pythaverse's tools to enhance traditional subjects with digital and STEM skills or adopt it as a core component of their curriculum to transition towards a more technology-driven Education 2.0 approach. School management tools like PSchool and PLearn also support administrative needs, simplifying the adoption process.

Advices for Students



Thriving in the Digital Future

As a student, you have the opportunity to become a skilled leader in an AI and technology-driven world. Here's how to prepare yourself:

- 1. Embrace Learning by Doing:** Use platforms and programs like Leanbot and TwinSpace to get hands-on experience with AI and digital twins. Practical engagement will build your confidence and skills.
- 2. Build a Strong Foundation in STEM:** Strengthen your understanding of math, science, and coding. These subjects form the backbone of many advanced technologies, and even a basic knowledge will give you an edge.
- 3. Develop Creativity and Critical Thinking:** AI can process data, but creativity and critical thinking remain uniquely human skills. Work on projects that encourage these qualities, such as designing your own AI agents or solving complex challenges.
- 4. Focus on Ethical Understanding:** Consider the ethical aspects of technology. As a future leader, your role will involve making decisions that could impact society, so understanding issues like data privacy and responsible AI is essential.



Q: What's the best way for me to get started with AI and digital twins?

A: Dive into hands-on projects like building a simple AI bot or exploring digital twin simulations on platforms available to you. Look for challenges, hackathons, or online tutorials that allow you to apply what you learn. Practical experience is key.

Q: How can I stay motivated when learning something complex like AI?

A: Set small, achievable goals for each learning session, and celebrate your progress. Seek out community groups or online forums where you can connect with others and share experiences. Remember, persistence is crucial; learning a bit each day adds up.



Q: What if I make mistakes when working with technology?

A: Mistakes are part of the learning process, especially with technology. Instead of focusing on getting it perfect, concentrate on what each mistake teaches you. This mindset will help you improve and build resilience.

Q: What can I expect to learn on Pythaverse?

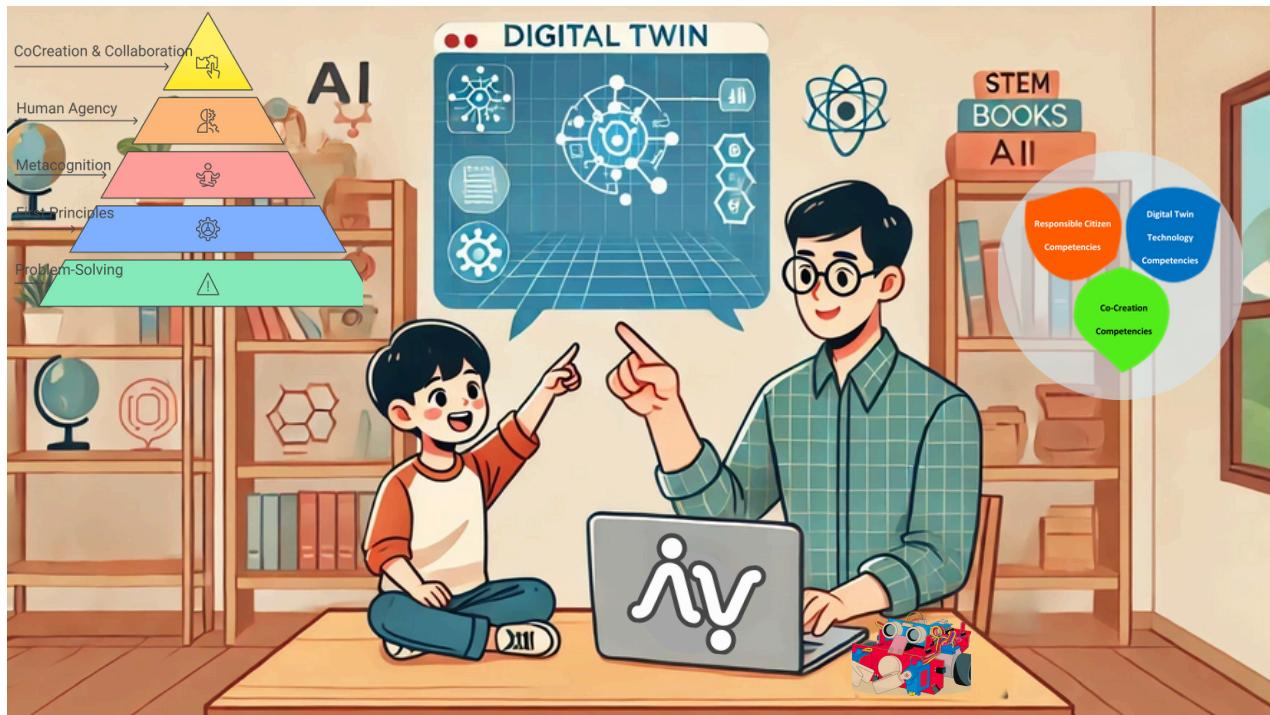
A: On Pythaverse, you'll dive into projects that let you experiment with AI and Digital Twins. You'll learn how these technologies work, why they matter, and how to apply them in solving real-world problems, all while developing creativity, critical thinking, and teamwork skills.

Q: How does Pythaverse's "learning by doing" approach benefit me?

A: By working directly with Digital Twins, AI simulations, and collaborative projects, you'll develop hands-on skills that go beyond the classroom. This approach helps you build confidence and adaptability, which are crucial as technology continues to evolve.



Suggestions for Parents



Empowering Your Child in the AI Era: As technology transforms the job landscape, it's crucial to prepare your child for a future where skills in AI, digital literacy, and critical thinking are essential. Here's how you can support their journey:

- 1. Encourage Curiosity and Experimentation:** Foster a learning environment at home where your child can explore STEM topics. Encourage them to tinker with coding platforms or take part in robotics and AI challenges to build confidence in technology.
- 2. Develop Soft Skills Alongside Technical Abilities:** While digital skills are important, qualities like emotional intelligence, adaptability, and resilience are equally vital. Support activities that promote teamwork, empathy, and problem-solving.
- 3. Stay Informed and Engaged:** As AI and digital twin technologies evolve, staying informed will help you guide your child effectively. Look for resources that explain how these technologies are shaping industries and what skills will be relevant.
- 4. Collaborate with Educators:** Engage with your child's school to understand how they are preparing students for the future. Advocate for AI and digital literacy programs and discuss how you can complement these efforts at home.



Mrs. An-Parent

Q: How can I help my child get comfortable with AI and technology if I'm not tech-savvy myself?

A: Start by encouraging curiosity. Look for beginner-friendly resources like coding apps, STEM kits, or online courses. You don't need to be an expert; just be open to exploring and learning with your child. Your support and encouragement can make a huge difference.

Q: How can I balance screen time while still fostering digital skills?

A: Set boundaries around passive screen time (like entertainment) and encourage active use, such as programming, creating digital art, or problem-solving games. Involve your child in projects that combine hands-on activities with digital learning for a balanced approach.

Q: What skills should I prioritize if my child is still young?

A: Focus on foundational skills like problem-solving, creativity, and teamwork. Encourage curiosity and resilience in facing challenges. These skills will help them adapt to any technological advancements they encounter as they grow.

Q: How does Pythaverse help prepare my child for a technology-driven future?

A: Pythaverse equips students with essential skills in AI, Digital Twin technology, and critical problem-solving. Through hands-on, immersive learning, your child gains real experience with these technologies, fostering adaptability and confidence in a digital-first world.

Q: How can I support my child's learning on Pythaverse?

A: You can encourage exploration and curiosity! Ask your child about their projects, help them find related resources, and discuss what they're learning. Your support reinforces the connection between what they're learning and real-world applications, making their experience even more impactful.



Suggestions for Educators



Preparing Students for the Future with AI and Digital Twin Learning

Educators play a pivotal role in equipping students for an AI-driven world. Here are strategies to integrate AI and digital twin concepts into your teaching:

- 1. Adopt Project-Based Learning:** Incorporate project-based tasks that allow students to explore real-world problems through hands-on experiences with digital twins, AI simulations, and collaborative projects.
- 2. Focus on Foundational and Adaptive Skills:** Emphasize both foundational digital skills (like coding and data analysis) and adaptive skills, such as design thinking and metacognition. These prepare students for complex and evolving technological landscapes.
- 3. Leverage Available Resources and Partnerships:** Use platforms like Pythaverse that offer resources tailored to AI and digital twin education. Partner with local tech organizations for guest lectures or workshops to bring industry insights to your classroom.
- 4. Encourage Ethical Thinking in AI:** Teach students the ethical implications of AI and digital technology. Topics like data privacy, algorithmic bias, and responsible technology use help students consider the broader impact of their innovations.



Q: How can I introduce AI and digital twin concepts without overhauling my curriculum?

A: Start small by incorporating digital simulations and project-based activities within existing lessons. For example, introduce AI-related discussions in science classes or use virtual environments for problem-solving in math. Gradual integration can be both effective and manageable. It's a good idea to upgrade your IT subject with the new technologies.

Q: What if my school lacks resources for advanced technology?

A: Leverage free or low-cost platforms and seek community or industry partnerships to bring additional resources into the classroom. You can also focus on concepts and critical thinking skills that don't require advanced hardware but prepare students for future technological learning.

Q: How can I ensure students are responsible with technology use?

A: Emphasize ethical technology use and digital citizenship. Include discussions on privacy, respectful online behavior, and the impact of AI on society. Engage students in debates and case studies to develop their awareness and responsibility.

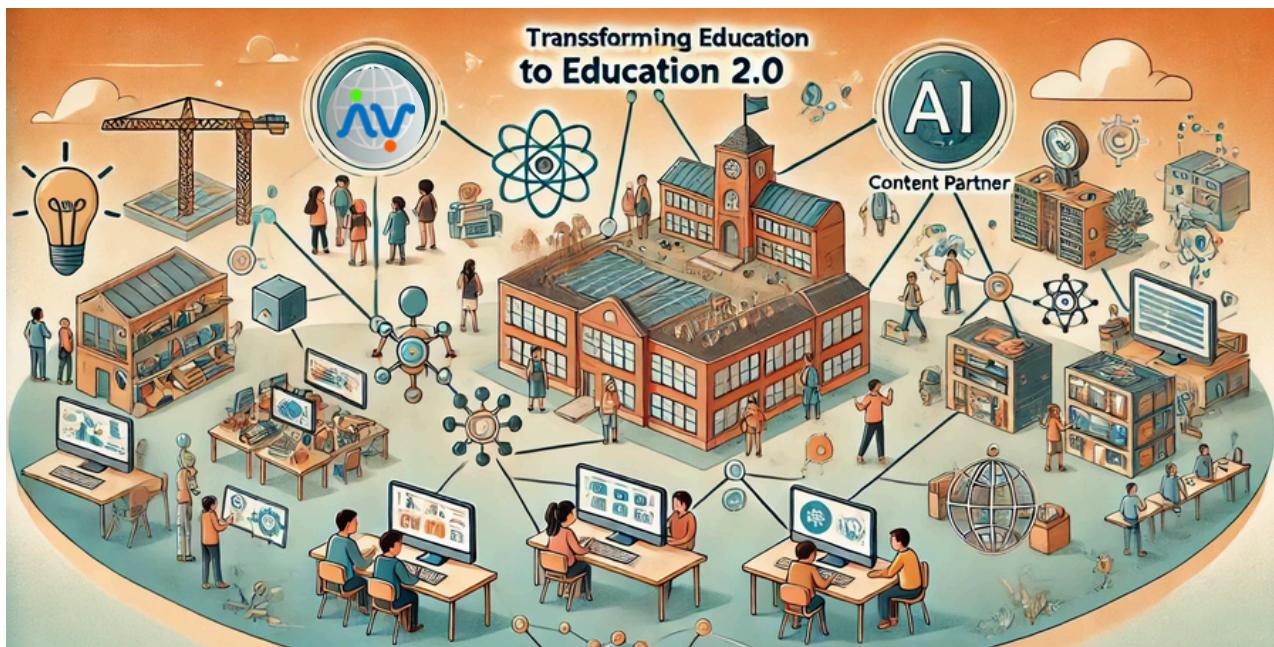
Q: How can Pythaverse support my teaching goals?

A: Pythaverse provides you with immersive tools and resources to integrate AI and Digital Twin technology into your lessons. With interactive simulations and project-based activities, you can make complex subjects accessible and engaging, fostering a practical understanding of technology for your students.

Q: What if I'm new to teaching AI and Digital Twins?

A: Pythaverse offers structured pathways and resources designed for all experience levels. Our educator support tools, including training and pre-built modules, make it easy to start, enabling you to grow along with your students as they explore these technologies.

Suggestions for Partners



Collaborating to Drive Educational Innovation

As a partner, you play a crucial role in advancing digital education by supporting schools and students in adapting to new technologies. Here's how you can contribute:

- 1. Provide Access to Resources and Expertise:** Offer tools, content, and training that make it easier for schools to integrate AI and digital twin technologies. Support educators with accessible training programs and resources.
- 2. Facilitate Real-World Applications:** Partner with schools to offer real-world applications of AI and digital twins, such as internships, project collaborations, and competitions. These opportunities can bridge the gap between classroom learning and industry practices.
- 3. Promote Ethical and Inclusive Practices:** Support efforts that emphasize ethical AI and inclusion in technology. Work with schools to provide equitable access to digital tools, ensuring all students have opportunities to engage with cutting-edge technology.
- 4. Engage in Co-Creation and Continuous Improvement:** Collaborate with educators, students, and other stakeholders to refine educational tools and adapt them to evolving needs. By participating in a co-creation approach, you ensure the content stays relevant and impactful.



Mr. Wisit-Partner

Q: How can we support schools even if we're not directly in the education sector?

A: Consider offering resources like workshops, mentorship programs, or access to technology experts who can collaborate with schools. Any initiative that bridges your industry expertise with educational needs can provide valuable support.

Q: What's the most effective way to engage with educators and students?

A: Build partnerships that involve direct interaction, such as project collaborations, guest lectures, or co-creation sessions. This hands-on engagement helps students and educators see the real-world impact of technology and creates meaningful connections.

Q: How can we ensure our involvement is impactful and aligned with school goals?

A: Work closely with schools to understand their specific needs and tailor your support accordingly. Regular feedback sessions can also ensure your efforts are meeting expectations and evolving with the schools' educational priorities.

Q: How can technology and content partners benefit from joining Pythaverse?

A: As a partner, you become part of a connected ecosystem supporting Education 2.0, contributing to a hands-on, future-focused curriculum. Your tools, content, or expertise can directly shape the way students engage with technology, enhancing both the learning experience and your reach.

Q: How can a school service partner help schools implement Pythaverse successfully?

A: As a school service partner, you play a critical role in bringing Pythaverse products to schools, ensuring a smooth transition to Education 2.0. Your role includes providing hands-on training for teachers, setting up the platform within the school's existing infrastructure, and offering ongoing support to help educators fully utilize Pythaverse's tools and resources. By guiding schools in best practices for "Learning by Doing" with Digital Twin and AI technologies, you help create an engaging, future-ready learning environment. Additionally, your expertise allows schools to customize Pythaverse to meet their specific educational goals, ensuring that every school can leverage the platform effectively to enhance both teaching and learning outcomes.



Join us in shaping the Future



How to Get Involved with Pythaverse

- **For Parents**

Empower your child with future-ready skills. Pythaverse provides engaging, hands-on resources to help your child develop essential competencies in AI, Digital Twin technology, and critical thinking. As a parent, you can:

- Encourage your child's exploration of our interactive platforms.
- Join parent forums to connect with other families and share insights.
- Access guides and tutorials that explain how to support digital learning at home.

- **For Schools**

Join the Pythaverse network and lead the shift to Education 2.0. Our platform is designed for easy integration, offering support for educators, curriculum alignment, and seamless deployment of digital learning tools. Steps to get started:

- Contact us to explore tailored plans for your school.
- Access onboarding support, including webinars, demo sessions, and one-on-one training.
- Become a part of our collaborative network where schools share best practices, resources, and success stories.

- **For Students**

Start your journey into the world of Digital Twin and AI with Pythaverse. Our platform allows you to learn through hands-on activities, explore real-world scenarios, and gain digital skills that are in high demand. To begin:

- Register for a free trial and explore courses that align with your interests.
- Participate in student forums and events to connect with peers.
- Access tutorials and challenges designed to boost your skills and creativity.

- **For Educational Services Partners**

Work with Pythaverse for solutions to schools and students:

- Provide training for seamless adoption.
- Customize programs and expand access to underserved communities.
- Training for seamless adoption.

- **For CoCreate Partners**

Collaborate with Pythaverse to innovate education:

- Develop content, tools, and technologies to enhance learning.
- Partner on global projects to adapt and deliver diverse solutions.

To learn more or get started, visit www.pythaverse.net!

ACKNOWLEDGEMENTS

We express our profound gratitude to all individuals and institutions who have contributed to the realization of this report and the Pythaverse CoCreate Framework. Their collective wisdom and dedication have been instrumental in shaping a globally relevant educational solution.

Special thanks go to our Pythaverse partners, schools, educators, parents, and students who provided critical feedback and posed insightful questions that served as the foundation for this report. Key contributors include:

1. St. Paul College Pasig under the leadership of Sr. Felicitas Bernardo, alongside Dr. Prince Germano and their faculty.
2. ACSI Global and ACSI Philippines.
3. Mapua University, Philippines.
4. National University Hanoi, Vietnam.
5. Kinaryacoop Indonesia.

We also extend our appreciation to our collaborative partners, including 5T3M (Malaysia), VNV (Vietnam), DHCP and Optimus (Philippines), Eduverse and Asaba (Indonesia), Eduspec (Thailand), whose shared vision and support have been invaluable in driving this endeavor forward.

Finally, we honor the distinguished individuals who contributed to the original CoCreate Framework whitepaper:

- Dr. Ton Quang Cuong, Vietnam National University, Hanoi.
- Father Gerardo Ma. de Villa, O.S.B., San Beda College Alabang, The Philippines.
- Dr. Mohamed Yunus Yasin, ASTI, Malaysia.
- Dr. Teguh Trianung Djoko Susanto, Universitas Negeri Jakarta, Indonesia.
- Dr. Sarum Boonmee, Suranaree University of Technology, Thailand.

Their expertise and contributions have been pivotal in creating a framework that bridges educational innovation and global relevance. We are deeply indebted to their efforts and ongoing commitment to educational excellence.

APPENDICES

The Pythaverse COCREATE Framework includes a comprehensive glossary as part of its appendices and references. This glossary provides clear definitions of key terms and concepts that are crucial for understanding the technical and educational aspects of the framework. Here are some highlighted terms and their definitions:

- **Artificial Intelligence (AI):** A branch of computer science dealing with the creation of machines capable of performing tasks that typically require human intelligence. AI encompasses machine learning, natural language processing, and robotics.
- **Internet of Things (IoT):** A network of physical objects ('things') embedded with sensors, software, and other technologies, aimed at connecting and exchanging data with other devices and systems over the internet.
- **Robotics:** The branch of technology that deals with the design, construction, operation, and application of robots, often incorporating computer systems for their control, sensory feedback, and information processing.
- **Metaverse:** A collective virtual shared space, created by the convergence of virtually enhanced physical reality, augmented reality (AR), and internet technology. It's a space where users interact with a computer-generated environment and other users.
- **Pedagogical Methods:** The art or science of teaching and instructional methods. This includes various approaches and techniques used in education, such as inquiry-based learning, collaborative learning, and adaptive learning.
- **Digital Twin:** A virtual representation of a physical object or system across its lifecycle, using real-time data to enable understanding, learning, and reasoning. It is often used for simulation, analysis, and control.
- **STEM (Science, Technology, Engineering, and Mathematics):** An interdisciplinary approach to learning where academic concepts are coupled with real-world lessons, encouraging students to think critically and solve complex problems.
- **Design Thinking:** A non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems, and create innovative solutions to prototype and test.
- **Computational Thinking:** A problem-solving process that includes a number of characteristics and dispositions, such as logically ordering and analyzing data and creating solutions using a series of ordered steps (or algorithms).
- **Sustainable Development Goals (SDGs):** A collection of 17 global goals set by the United Nations General Assembly, intended to be a "blueprint to achieve a better and more sustainable future for all."

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This report is co-created with various AI tools including ChatGPT4, Perplexity.ai, Claude, Gemini

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