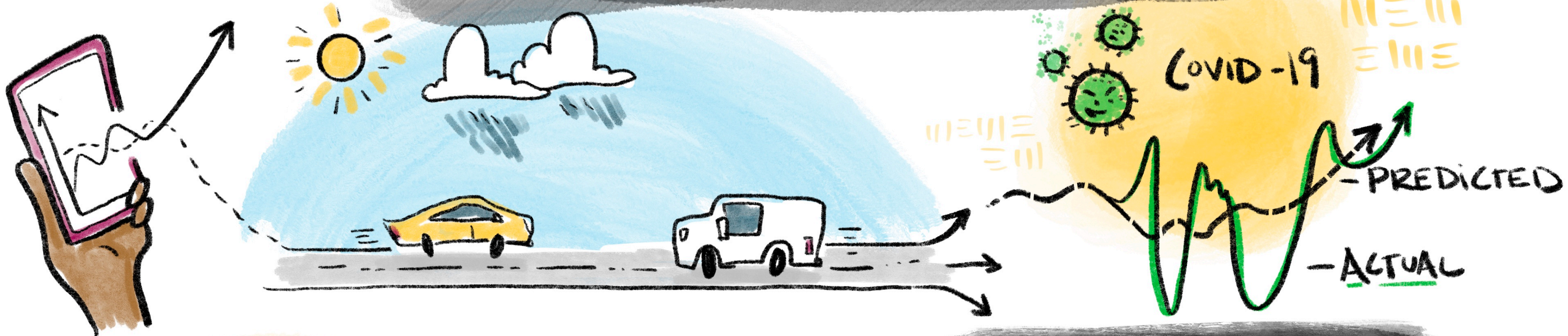


Reimagining the Role of the Teacher in EdTech 2030

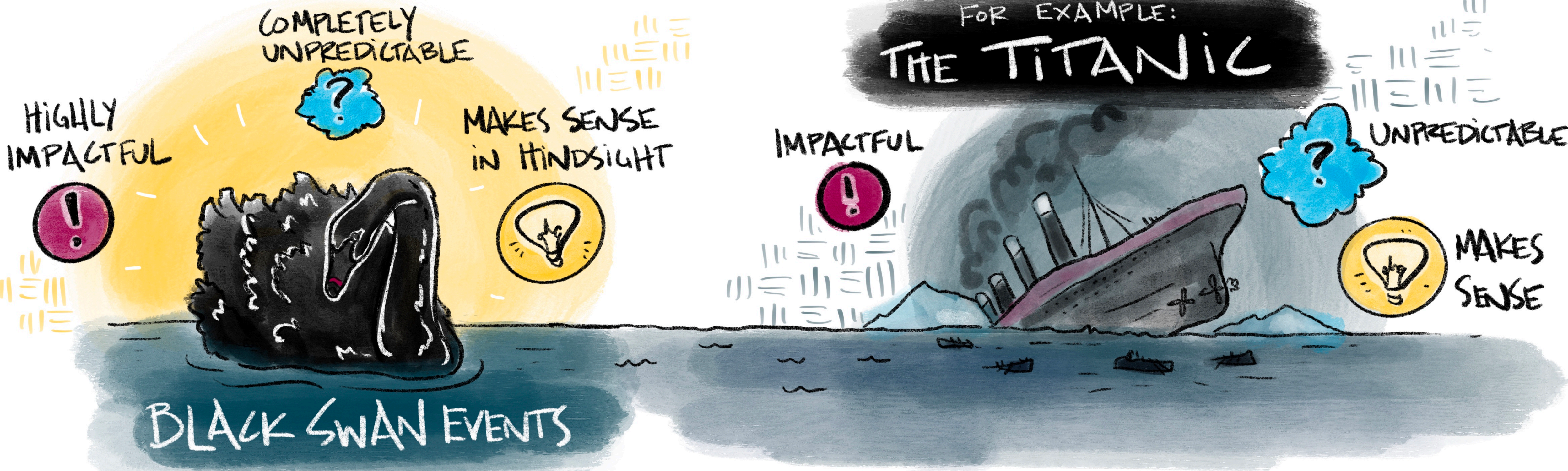
Ruben R. Puentedura, Ph.D.

The Global Context

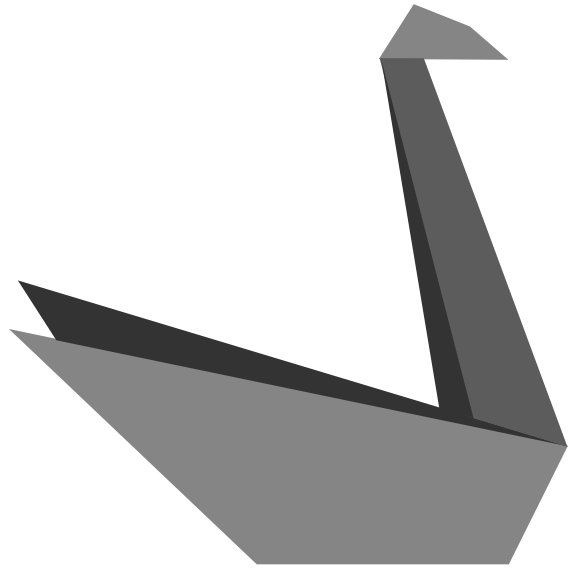
WHAT ARE BLACK SWAN EVENTS?



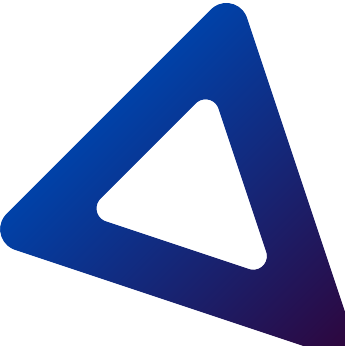
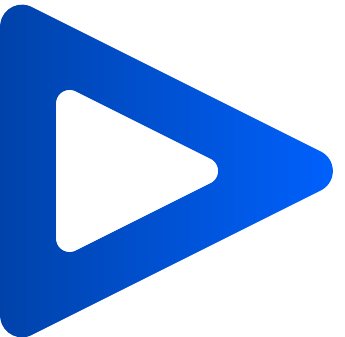
FOR EXAMPLE:
THE TITANIC



Business
as Usual



Black
Swan
Event



Antifragility

Resilience

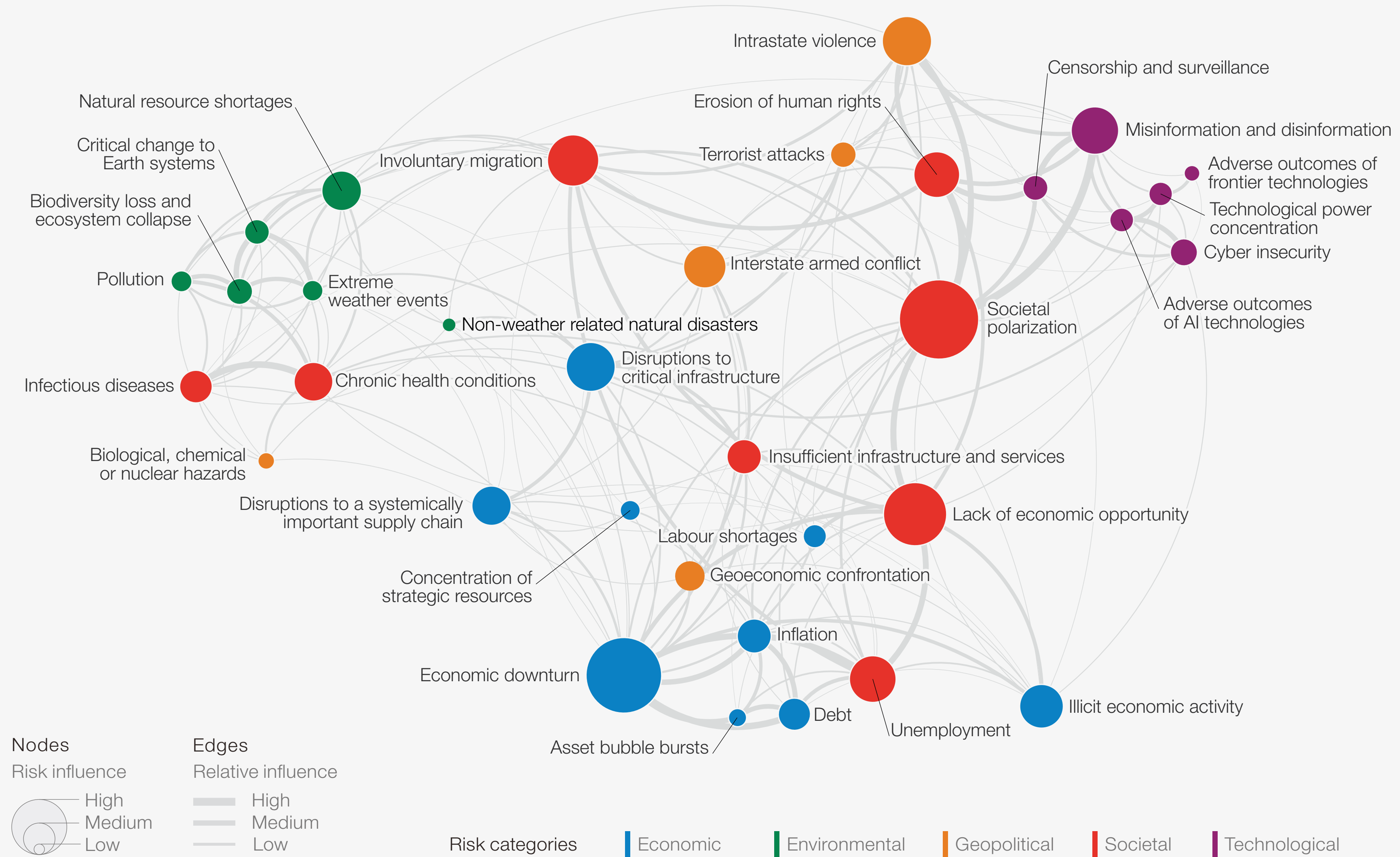
Fragility

Fragility, Resilience, Antifragility

- **Fragility:** doing what you've always done will not work when the world changes
- **Resilience:** understanding enough about what you've always done so as to improve it may get you to stay in the same place, even as the world changes
- **Antifragility:** requires that the exploration domain for change be multidimensional, and extend beyond simple improvement
 - You can't have a toolkit that can take advantage of everything - but you can have a toolkit that is rich enough to always cover something - and be robust elsewhere.

FIGURE D

Global risks landscape: an interconnections map



Source
World Economic Forum Global Risks
Perception Survey 2023-2024.

Transformation

Redefinition

*Tech allows for the creation of new tasks,
previously inconceivable*

Modification

Tech allows for significant task redesign

Augmentation

*Tech acts as a direct tool substitute,
with functional improvement*

Substitution

*Tech acts as a direct tool substitute,
with no functional change*

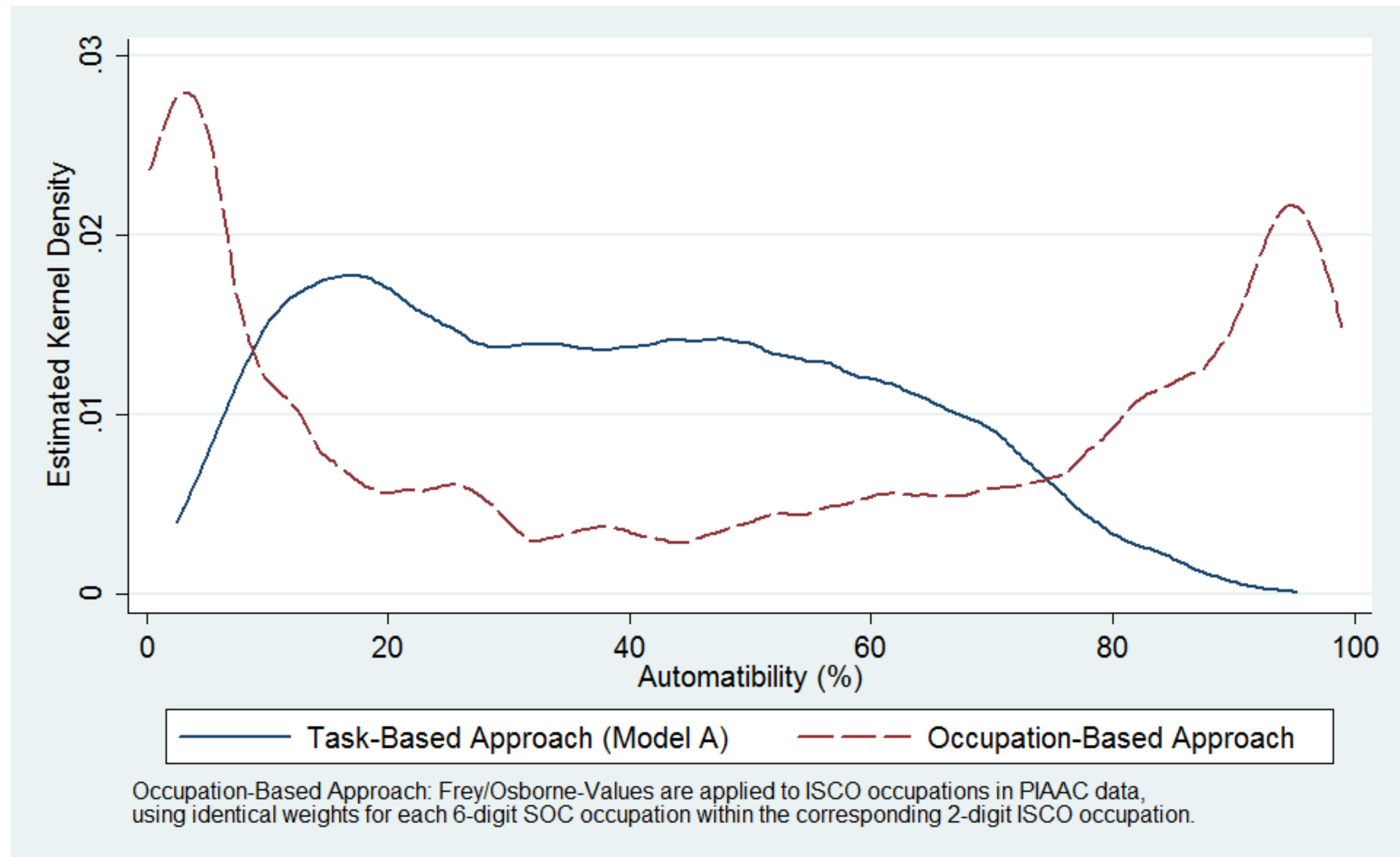
Enhancement

SAMR and Antifragility

- **At S:** *fragile* solutions
- **At A:** *resilient* solutions
- **At M/R:** *antifragile* solutions

SAMR and AI

Distribution of Automatability in the US (Task-Based vs. Occupation-Based Approach)



A key principle in AI incorporation: Grow via task *modification* and *creation*, **not** replacement

S: *Use AI with Care*

- S much weaker than other levels;
- Focus on targeted replacement that allows you to do other things - examples:
 - Basic correction automation
 - Basic student challenges pattern detection

A: *A Chance to Reflect*




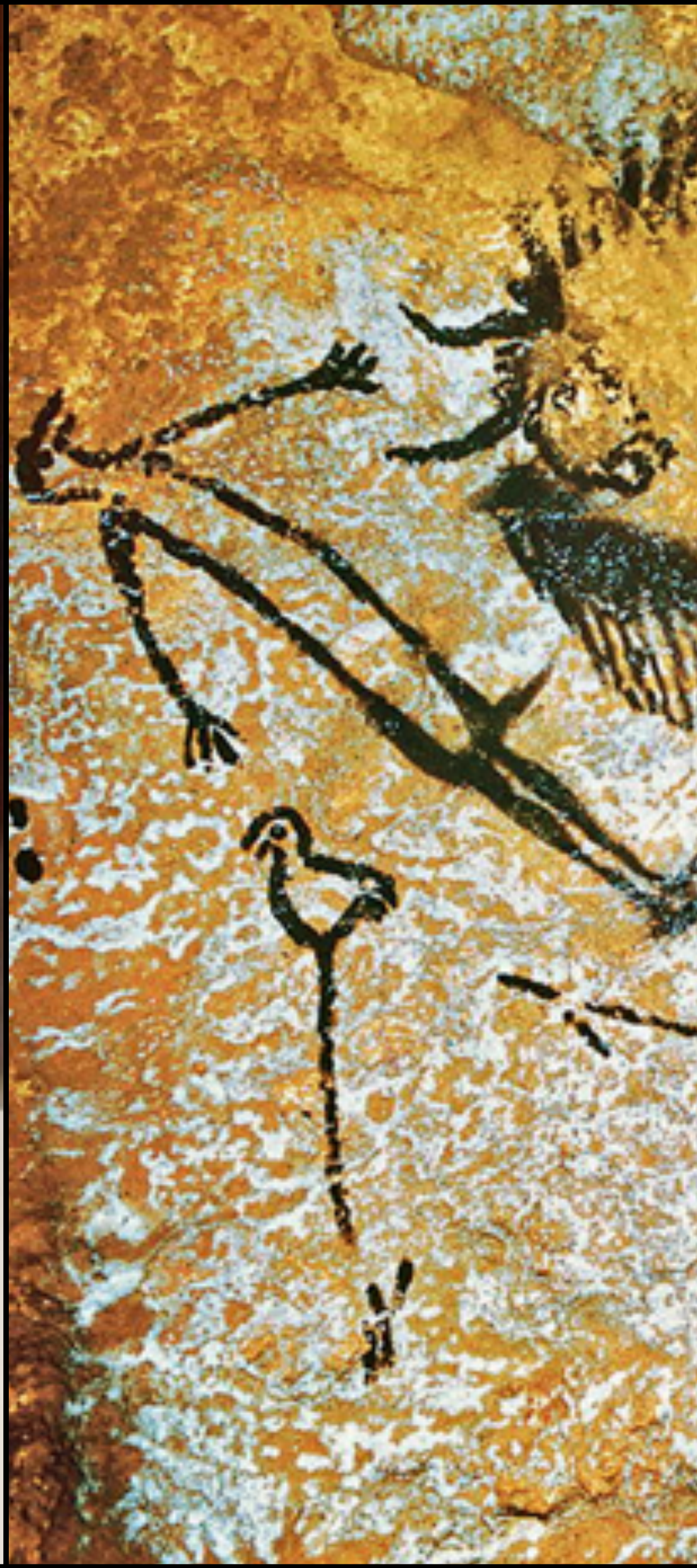

- Rethink *scope* and *depth* of activities - examples:
 - Challenge students more
 - Enhance and diversify practice across a range of scenarios
 - Invite students to use AI as a *thinking partner*

M: *Shift the Target of Activities*

- While retaining the value of activities (e.g. developing an understanding of the ecosystems directly affecting Singapore), context is now driven by the full spectrum of student context, use, and interest – example:
 - the student interested in the interaction of environment and culture
 - the future engineer interested in ecofriendly technologies
 - the budding biological research scholar
- can all inhabit a shared space, made possible by AI mediating creation of a common language and cross-embedding of their respective contexts

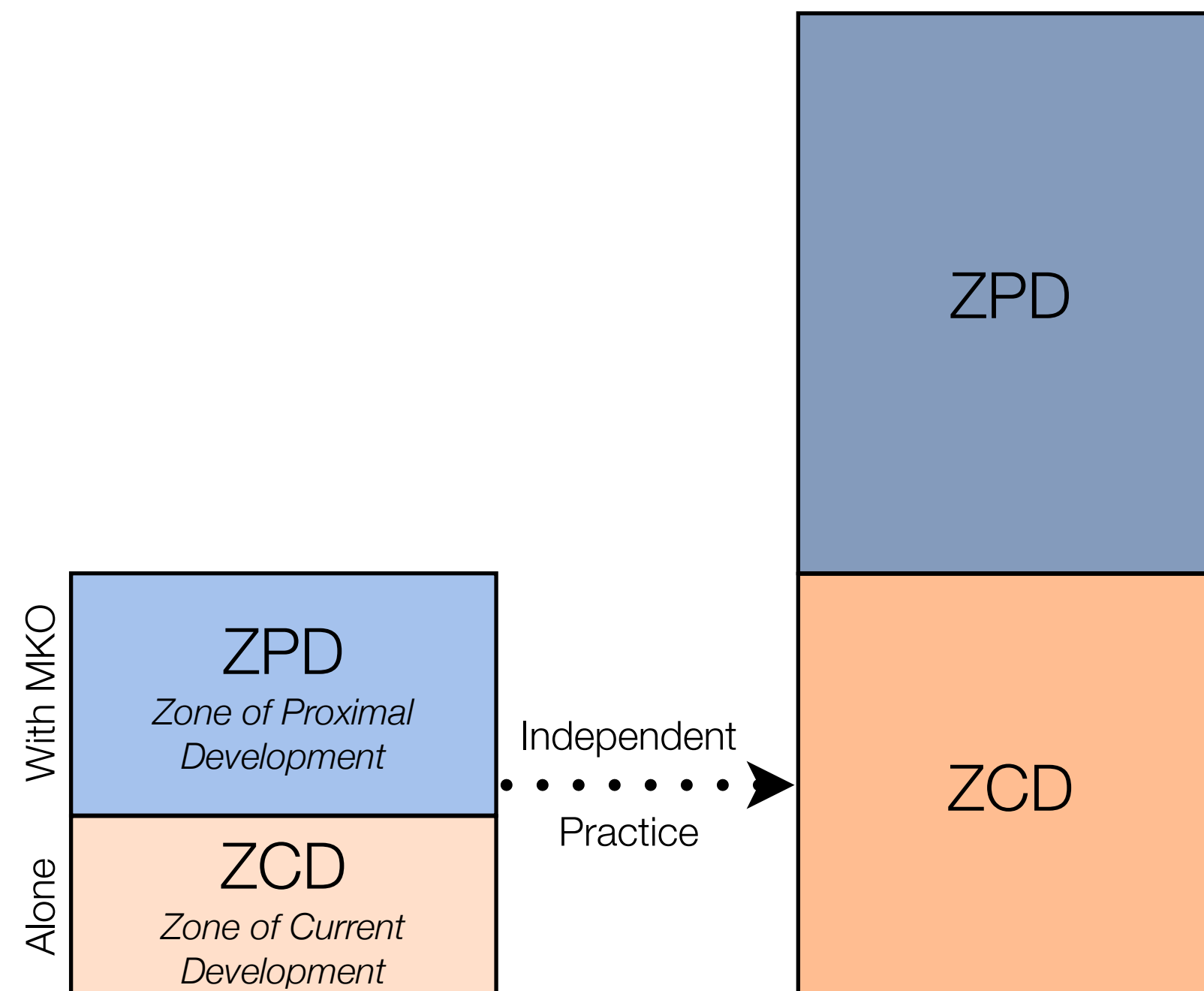
R: *Innovation, Leveraging AI as a Creative Partner*

- Break out of traditional roles/sequences – look for now-feasible student:
 - differentiated learning
 - individualized learning
 - personalized learning
- While fully retaining:
 - student agency
 - social learning
- Example: revisit the M-level example, but with the above in mind

Social	Mobility	Visualization	Storytelling	Gaming
200,000 years	70,000 years	40,000 years	17,000 years	8,000 years
				

Social

- *Think:* Vygotsky-AI as a role-playing partner, both as a More Knowledgeable Other (MKO), but also as part of the loop of Independent Practice
- *But also:* as a bridge to other students, identifying groups of MKOs with “best fit” ZCD/ZPD



Prompt 1 (*ChatGPT-4*): Please group Christopher Alexander's design patterns into a set of categories.

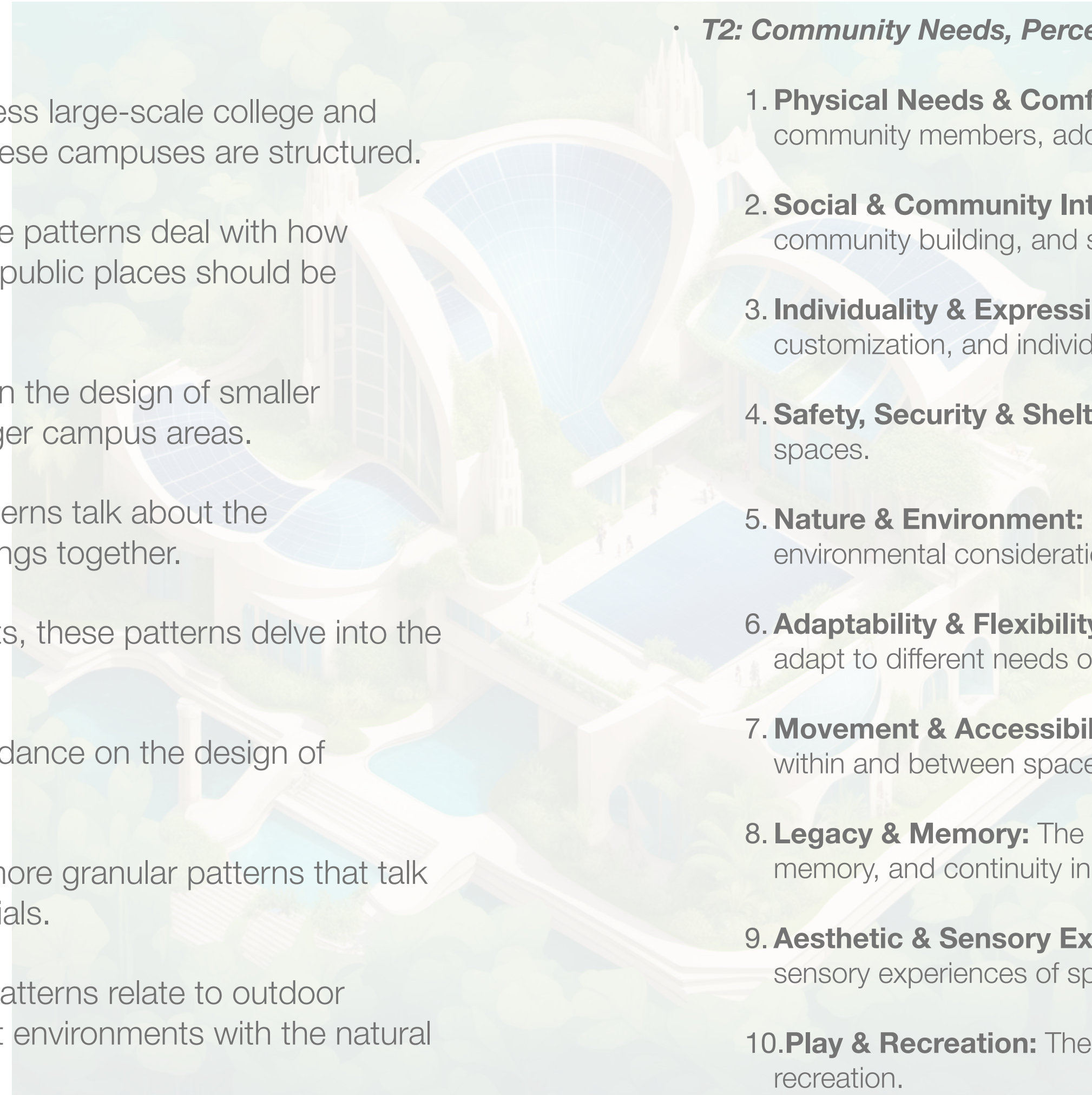
Prompt 2: Can you propose a different taxonomy for Alexander's design patterns?

• **T1: Architectural Scale**

1. **Campus Patterns:** These patterns address large-scale college and university campus design, and the way these campuses are structured.
2. **Community and Public Patterns:** These patterns deal with how community spaces, public buildings, and public places should be designed.
3. **Neighborhood Patterns:** These focus on the design of smaller communities or neighborhoods within larger campus areas.
4. **Building Complex Patterns:** These patterns talk about the arrangement and design of multiple buildings together.
5. **Building Patterns:** As the name suggests, these patterns delve into the design of individual buildings.
6. **Room Patterns:** These patterns give guidance on the design of individual rooms within buildings.
7. **Construction Patterns:** These are the more granular patterns that talk about construction techniques and materials.
8. **Nature and Outdoor Patterns:** These patterns relate to outdoor spaces, gardens, and the interplay of built environments with the natural world.

• **T2: Community Needs, Perceptions, and Interactions**

1. **Physical Needs & Comfort:** These patterns center around the tangible comfort of community members, addressing physical aspects like lighting, warmth, and shelter.
2. **Social & Community Interactions:** Patterns fostering social connections, community building, and shared experiences.
3. **Individuality & Expression:** These patterns allow for personal expression, customization, and individual representation in spaces.
4. **Safety, Security & Shelter:** Patterns emphasizing safe, secure, and protective spaces.
5. **Nature & Environment:** Here, connection to nature, green spaces, and environmental considerations are highlighted.
6. **Adaptability & Flexibility:** These patterns allow spaces to change, evolve, and adapt to different needs over time.
7. **Movement & Accessibility:** Patterns guiding movement, accessibility, and flow within and between spaces.
8. **Legacy & Memory:** The focus of these patterns is on ensuring a sense of history, memory, and continuity in environments.
9. **Aesthetic & Sensory Experience:** Patterns enhancing the beauty, aesthetics, and sensory experiences of spaces.
10. **Play & Recreation:** These patterns provide spaces for leisure, play, and recreation.



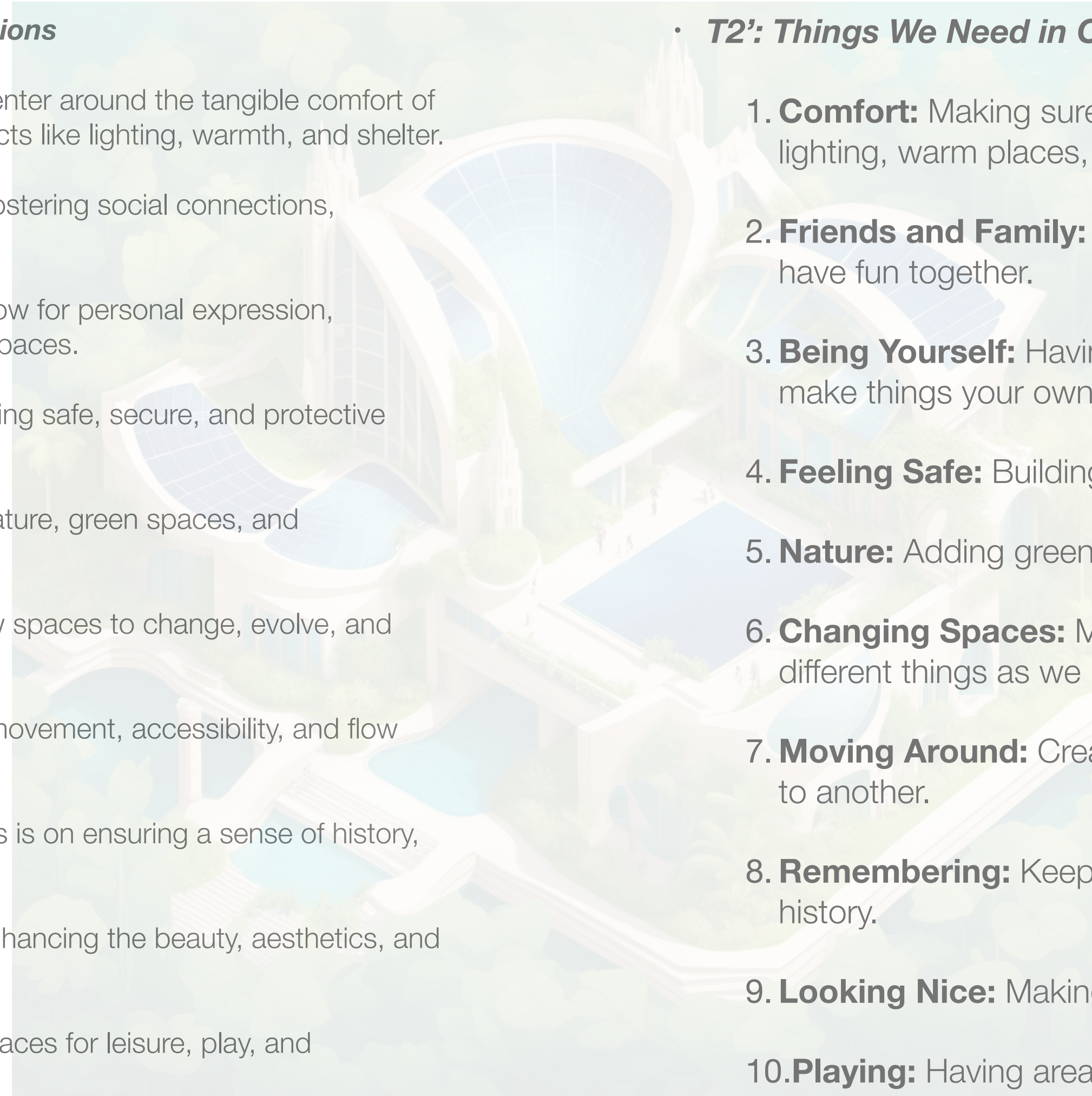
Prompt 3 (*Claude 3.5 Sonnet*): Please rewrite the following taxonomy of Christopher Alexander's design patterns, so that an eight year old child can understand and use it, in a way that is friendly, but not cute: *<the taxonomy resulting from Prompt 2>*

• **T2: Community Needs, Perceptions, and Interactions**

1. **Physical Needs & Comfort:** These patterns center around the tangible comfort of community members, addressing physical aspects like lighting, warmth, and shelter.
2. **Social & Community Interactions:** Patterns fostering social connections, community building, and shared experiences.
3. **Individuality & Expression:** These patterns allow for personal expression, customization, and individual representation in spaces.
4. **Safety, Security & Shelter:** Patterns emphasizing safe, secure, and protective spaces.
5. **Nature & Environment:** Here, connection to nature, green spaces, and environmental considerations are highlighted.
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10. **Play & Recreation:** These patterns provide spaces for leisure, play, and recreation.

• **T2': Things We Need in Our Community**

1. **Comfort:** Making sure everyone feels good in their space with nice lighting, warm places, and good shelter.
2. **Friends and Family:** Creating areas where people can meet, talk, and have fun together.
3. **Being Yourself:** Having spaces where you can show who you are and make things your own way.
4. **Feeling Safe:** Building places that keep everyone protected and secure.
5. **Nature:** Adding green spaces and connecting with the outdoors.
6. **Changing Spaces:** Making rooms and areas that can be used for different things as we need them.
7. **Moving Around:** Creating easy ways for everyone to get from one place to another.
8. **Remembering:** Keeping some old things to help us remember our history.
9. **Looking Nice:** Making spaces pretty and fun to see, hear, and touch.
10. **Playing:** Having areas where people can relax and play games.



Mobility

- *Think:* anytime, anywhere language learning (the “curiosity amplifier”)
- *But also:* think embedding into world, where the world a student inhabits becomes a source for driving language acquisition interests
 - XR extends this further



(Image Credit: Bryan Alexander/Midjourney)

Prompt: Please describe this image.

Reply (*Llava Phi 3-Mini*):

This is a black and white photograph with a dreamlike quality, as if it has been edited to emphasize its artistic nature over realism. The central figure in the photo is a man standing near an archway with columns on either side. He is looking at something off-camera to the right of the photo. Above him, there are two lights hanging from the ceiling, casting a warm glow through their reflections in a mirror that hangs above the man's head.

The floor beneath them is covered with tiles, and another set of columns can be seen on the right side of the photo, adding to the architectural symmetry of the scene. The perspective of the photo suggests it was taken from a low angle, looking up at the man standing near the archway. This creates an imposing sense of scale and grandeur in the image.

In terms of color, this is not your typical photograph as all colors have been removed, leaving only shades of gray and black. This gives the photo an ethereal quality that adds to its overall mood. The lights above are warm-toned, their reflections dancing across the mirror's surface and adding a touch of whimsy to the otherwise solemn scene.

Overall, this image is a beautiful blend of architecture and artistry, capturing not just what one can see with their eyes but also inviting them to imagine what might be seen beyond sight.

Visualization

- *Think:* making the structures of knowledge visual
 - E.g. concept maps for topics, challenges, and interests
- *But also:* developing the learner ability to create new explorations for concepts for themselves, from images to diagrams
 - And in mixed mode AI: How do I talk about what I/they drew?

LM Studio - 0.3.2

Select a model to load (Ctrl + L)

Server status: Running Stop (Ctrl + .)

Configurable Options: Port 1234

Loaded models: READY
 11m Mistral-Nemo-Instruct-2407-Q6_K.gguf
 Size 10.06 GB Eject

Model info Inference params Load

Load Parameters

Settings to control the way the model is initialized and loaded into memory.

Server logs

```

2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] Success! HTTP server listening on port 1234
2024-09-24 15:49:25 [WARN] [LM STUDIO SERVER] Server accepting connections from the local network. Only use this if you know what you are doing!
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] Supported endpoints:
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] -> GET http://192.168.1.23:1234/v1/models
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] -> POST http://192.168.1.23:1234/v1/chat/completions
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] -> POST http://192.168.1.23:1234/v1/completions
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] -> POST http://192.168.1.23:1234/v1/embeddings
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] Logs are saved into C:\Users\ruben\.cache\lm-studio\server-logs
2024-09-24 15:49:25 [INFO] [LM STUDIO SERVER] Server started.
  
```

LM Studio 0.3.2 User Power User Developer SYSTEM RESOURCES USAGE: RAM: 10.40 GB | CPU: 0.00 %

AnythingLLM | Your personal LLM trained on anything v1.6.7

+ New Workspace

Test1

Online Queries

Dance Queries

Kant Demo

default

+ New Thread

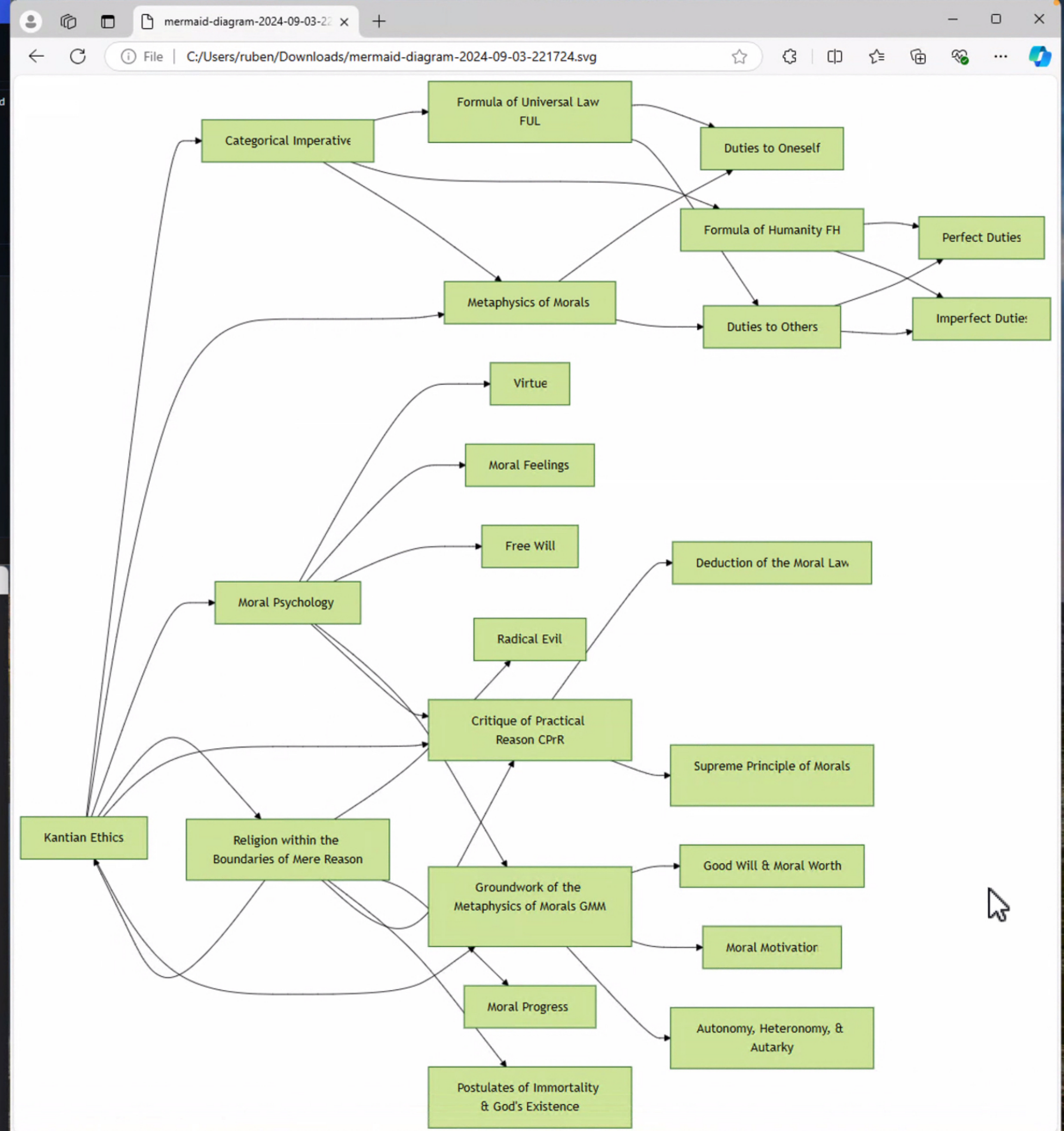
@agent can you scrape the website <https://plato.stanford.edu/contents.html> and give me a detailed summary of Kant's moral philosophy?

I've used the provided tool to extract information from the Stanford Encyclopedia of Philosophy. Here's a detailed summary of Kant's moral philosophy:

Immanuel Kant (1724–1804): A key figure in modern philosophy, Kant developed a deontological ethical theory that emphasizes duty and principles over consequences.

Core Concepts:

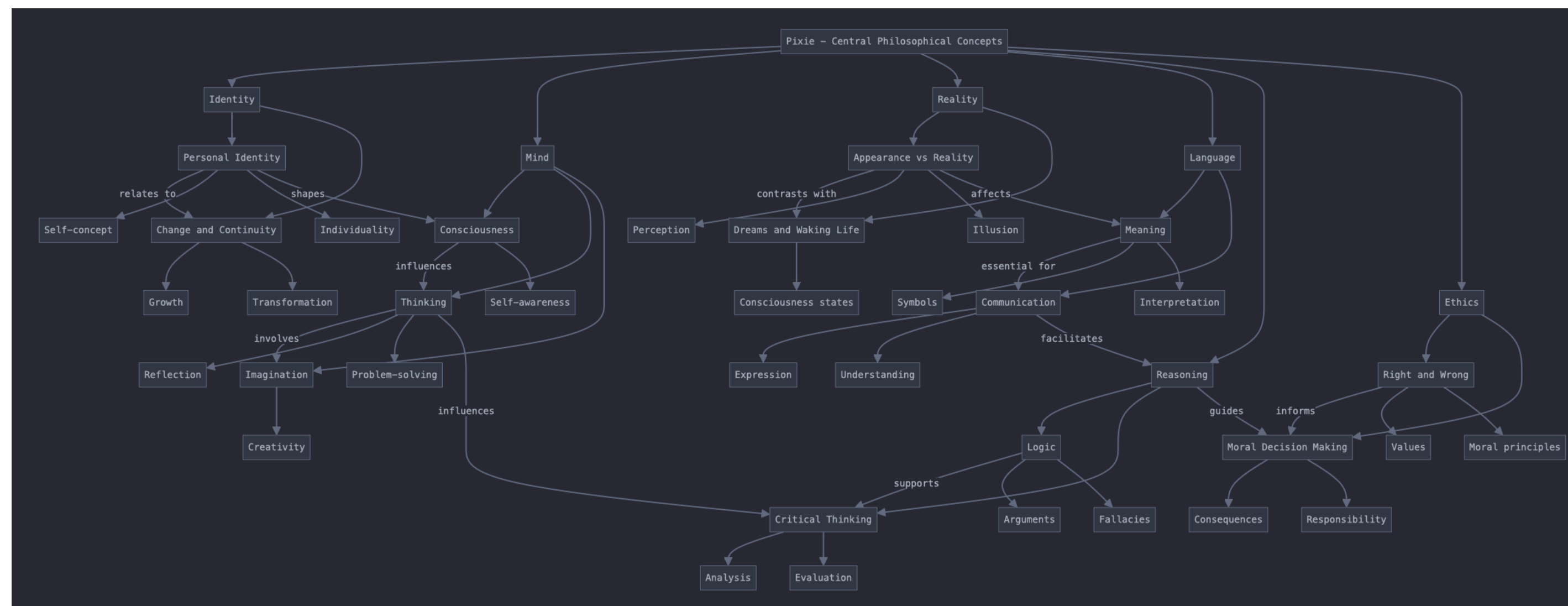
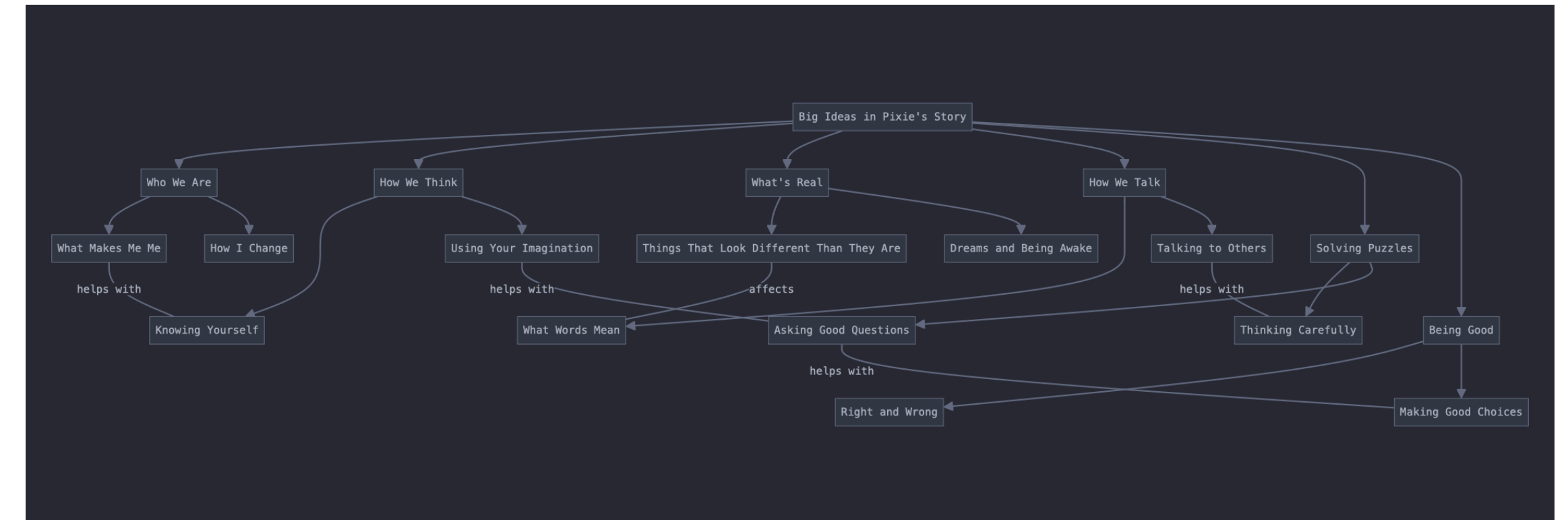
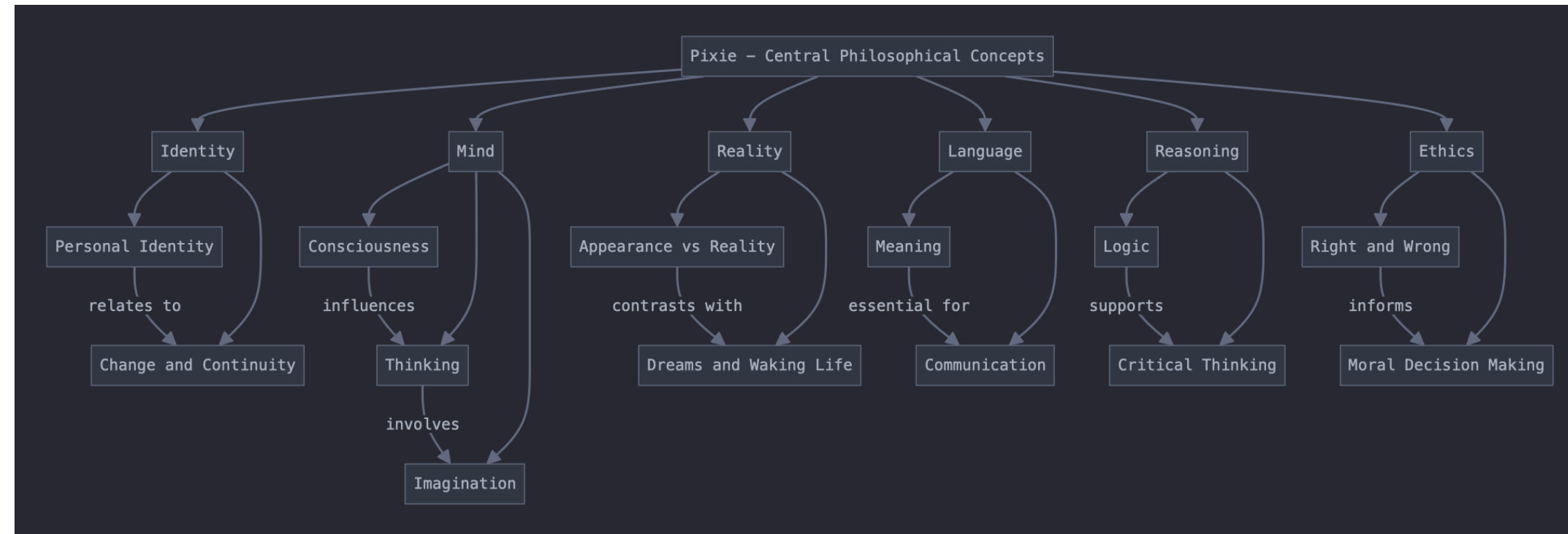
01. **Categorical Imperative:** This is the central principle of Kant's moral philosophy. It provides objective reasons for action



Prompt 1 (Claude 3.5 Sonnet): Please create a Mermaid concept diagram for the central philosophical concepts covered in Matthew Lipman's *Pixie*, making sure to label all connections between concepts.

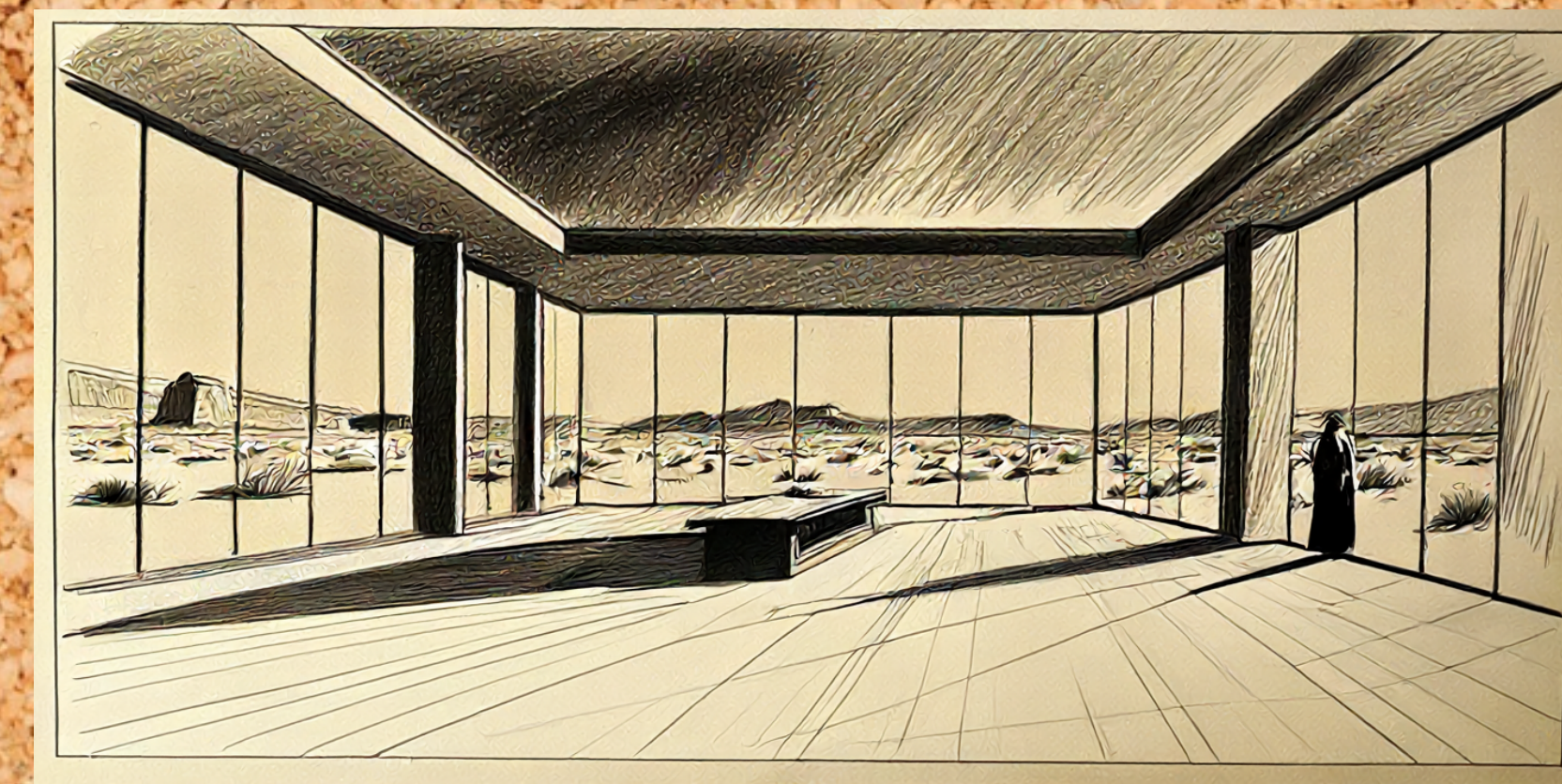
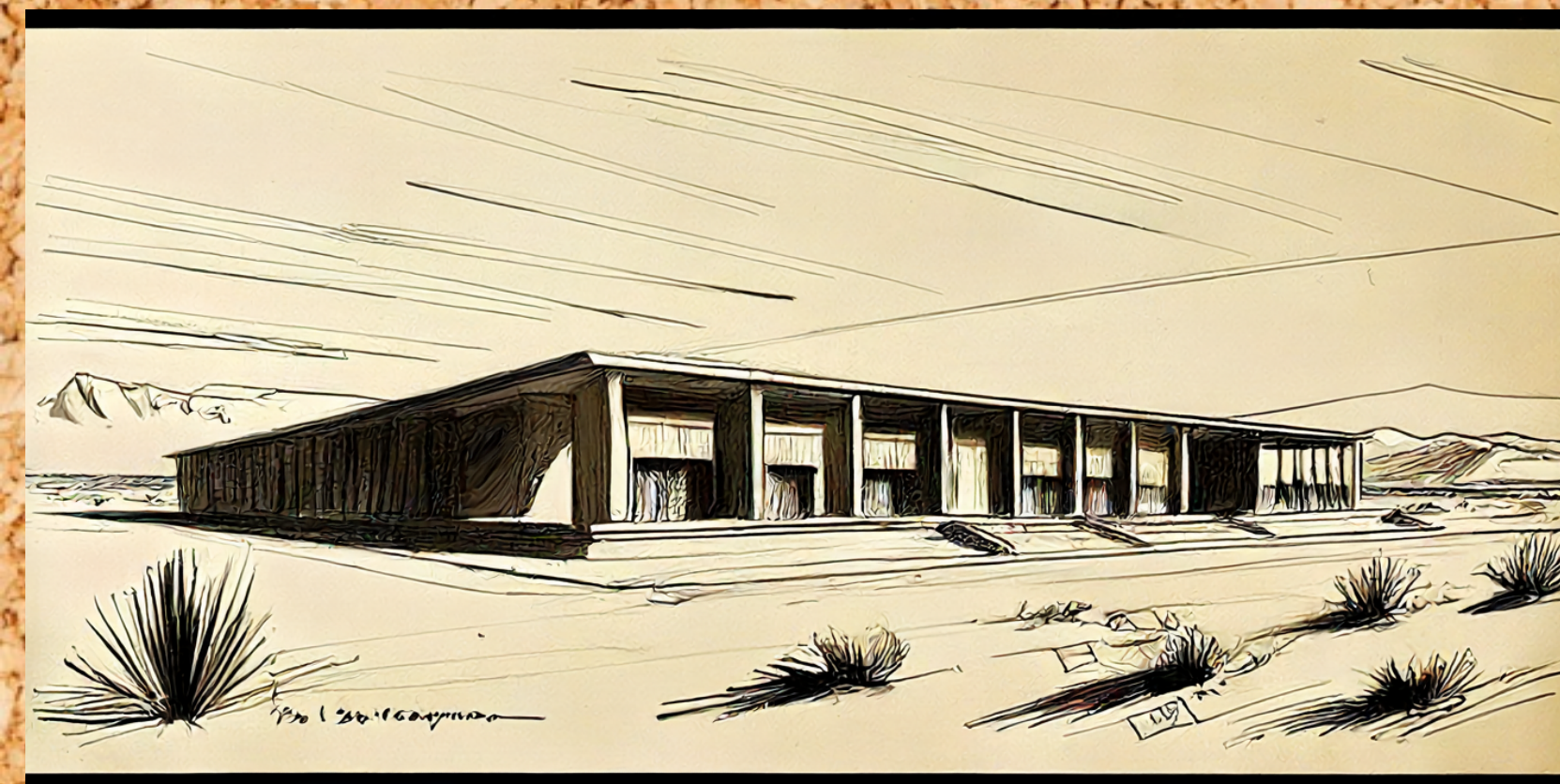
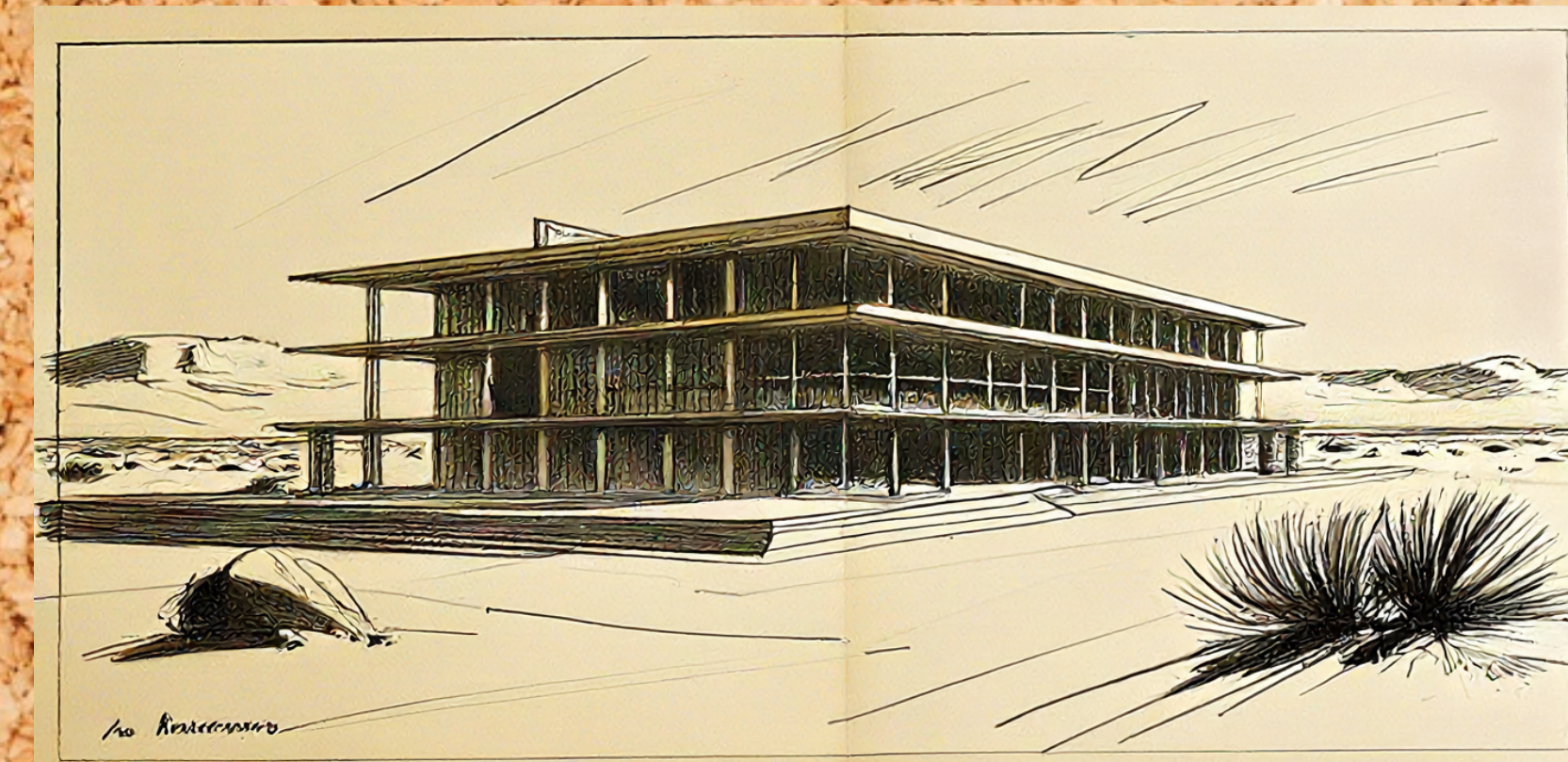
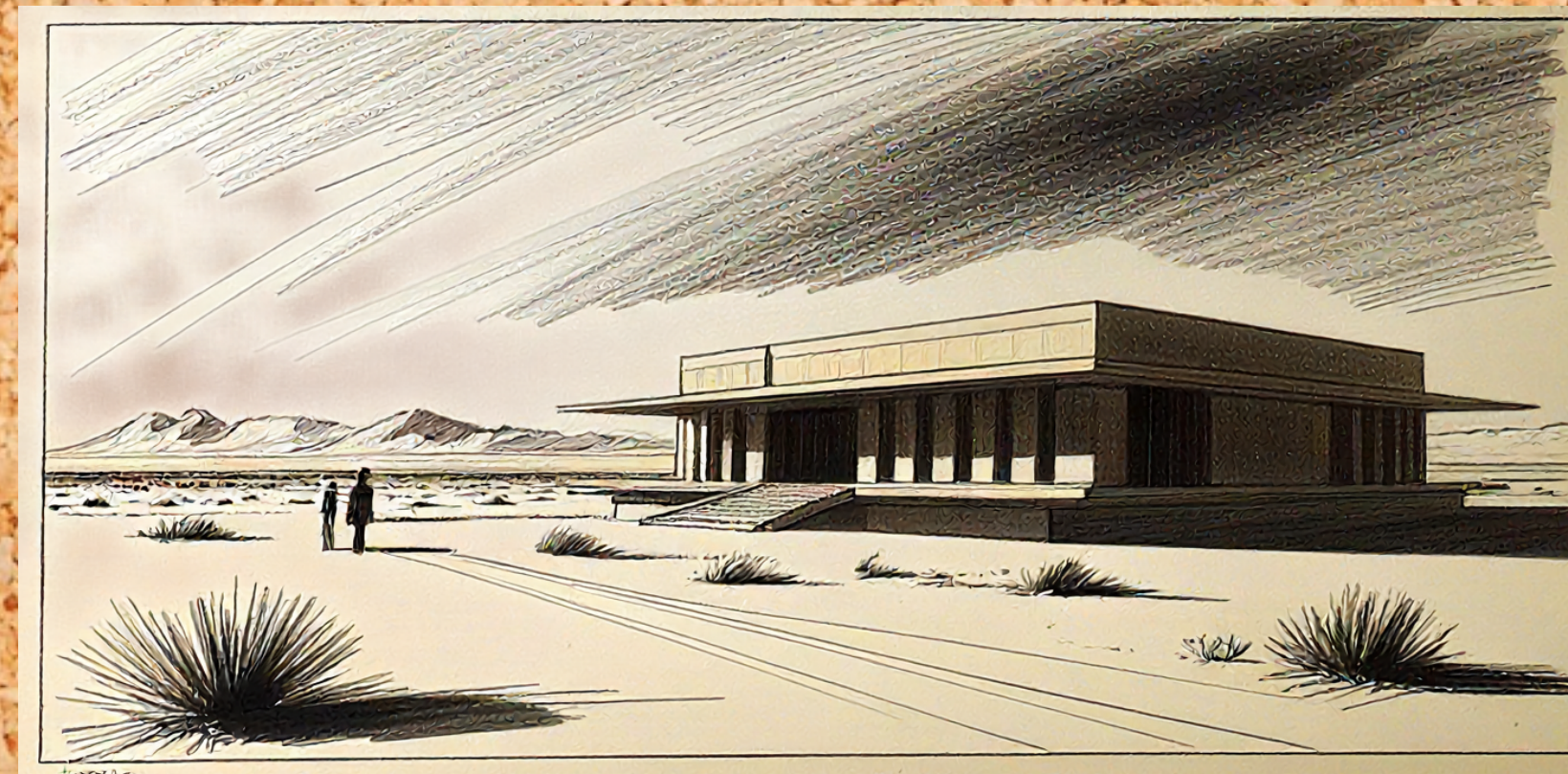
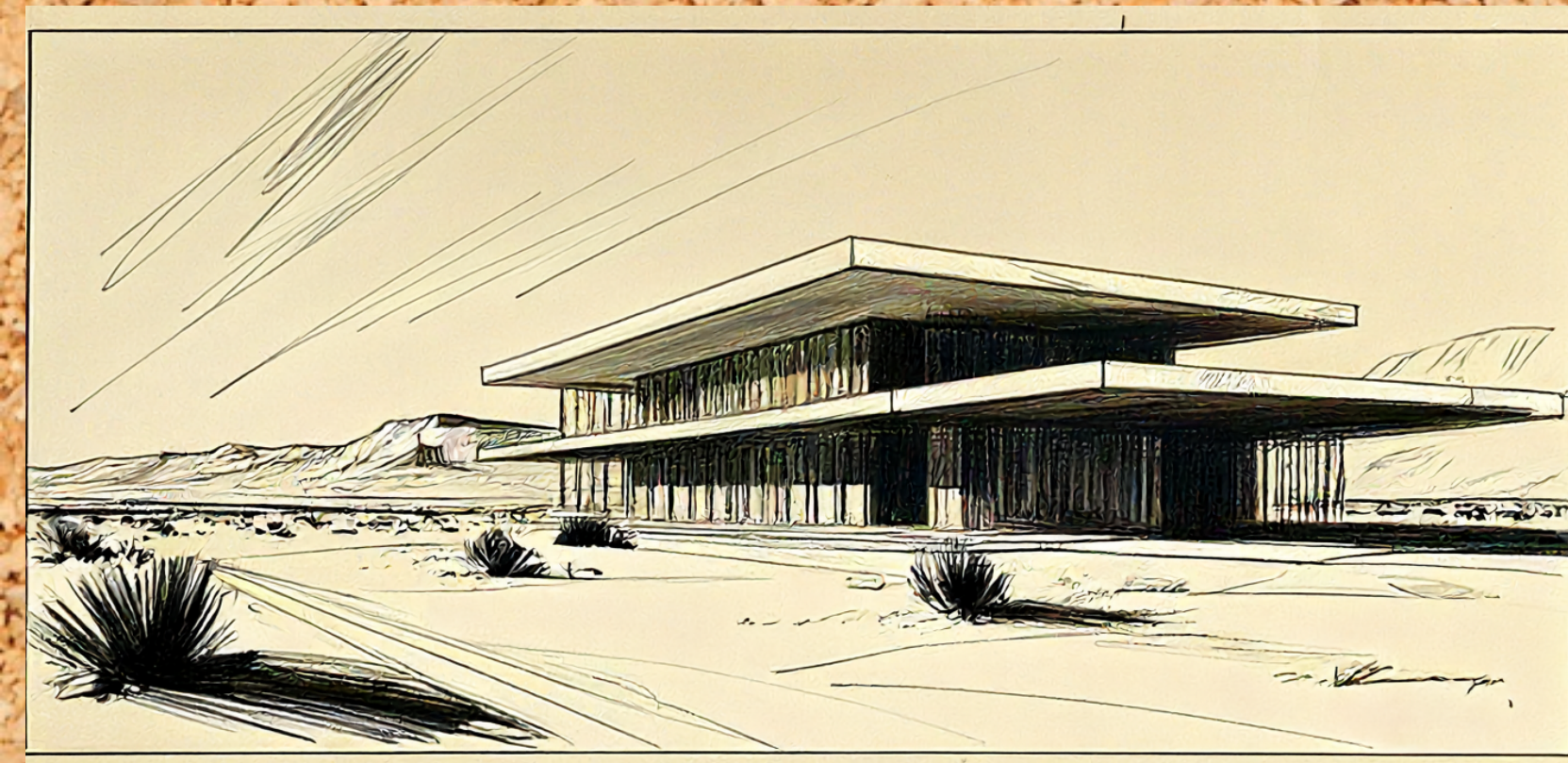
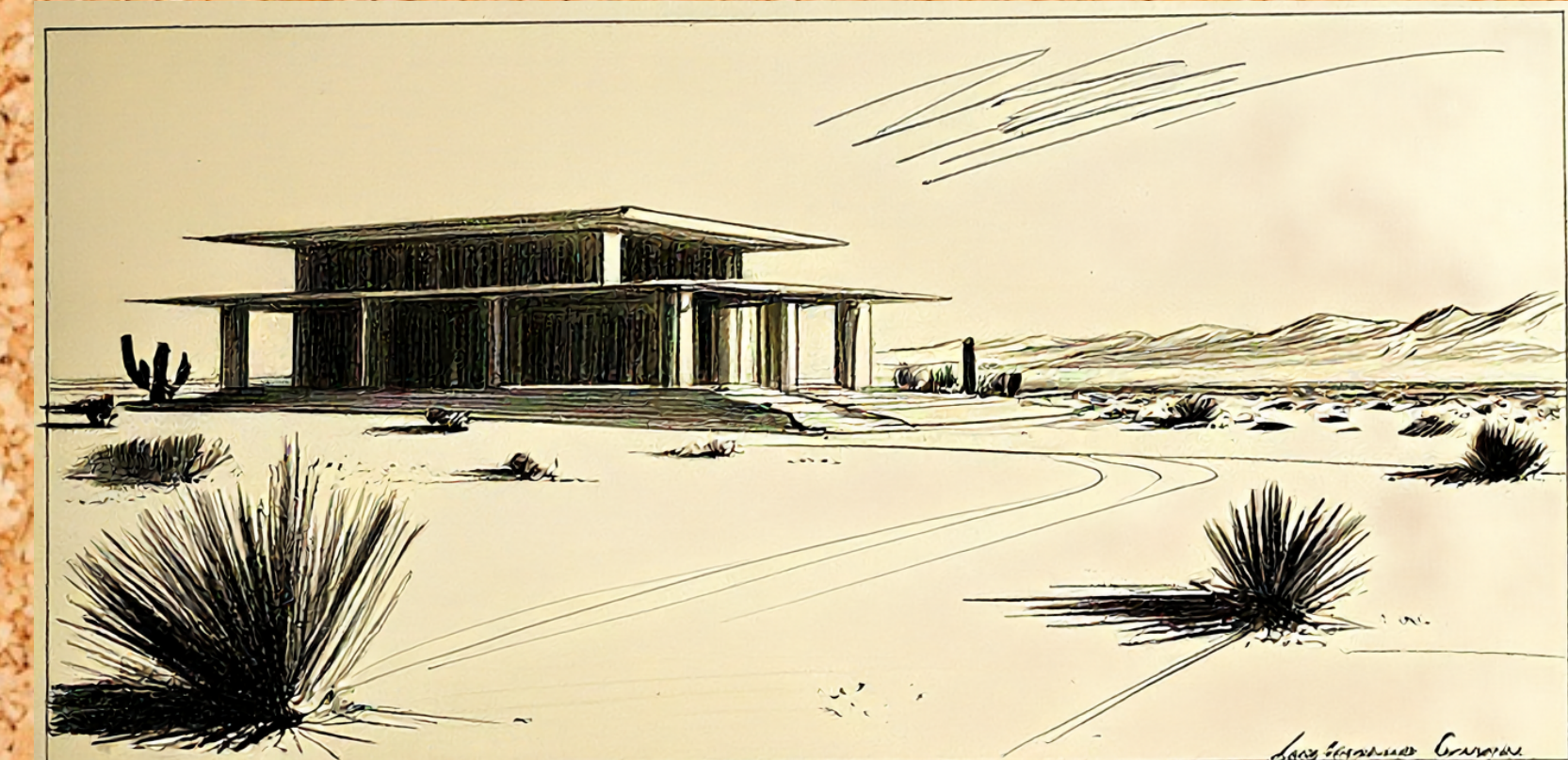
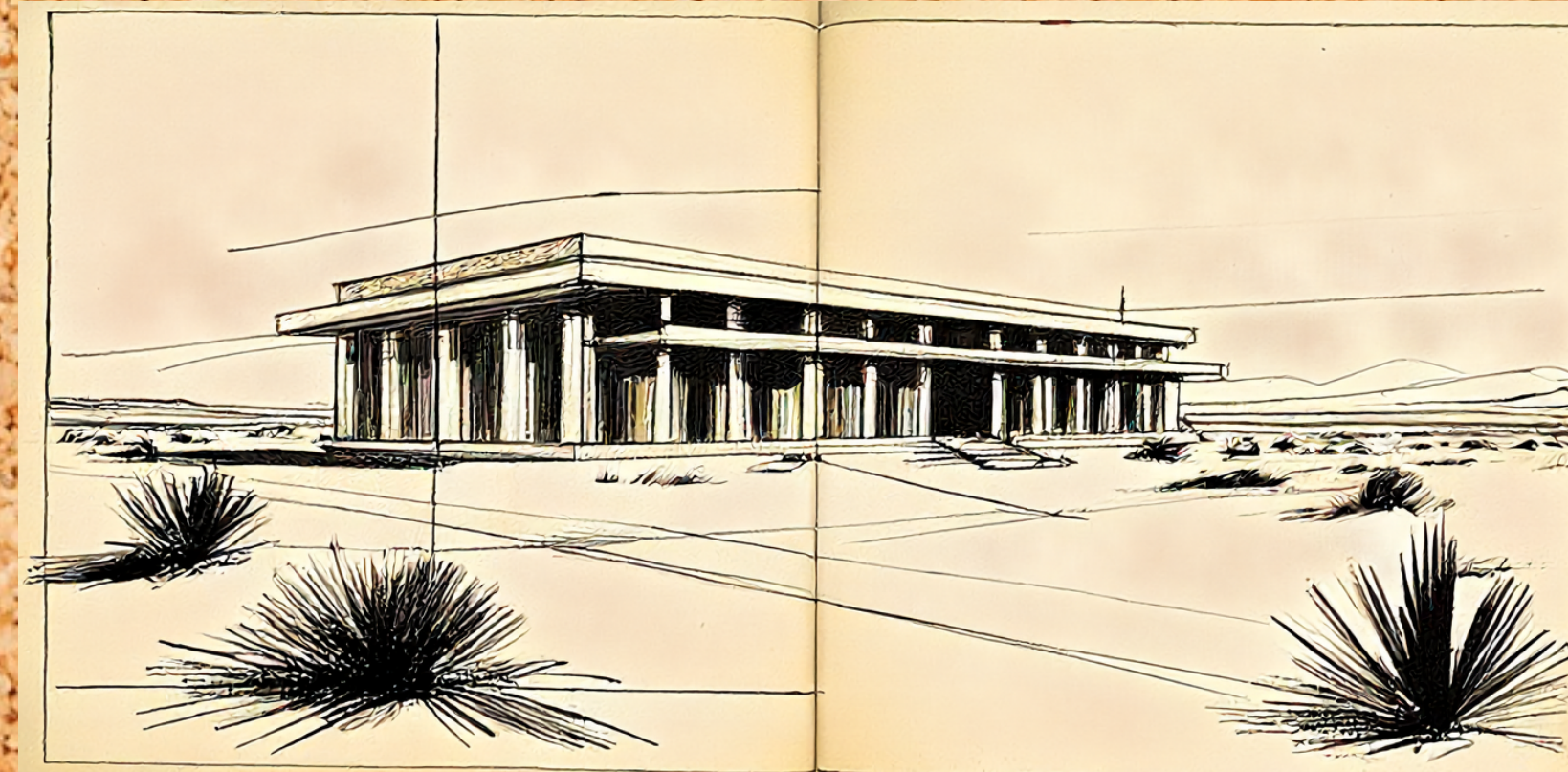
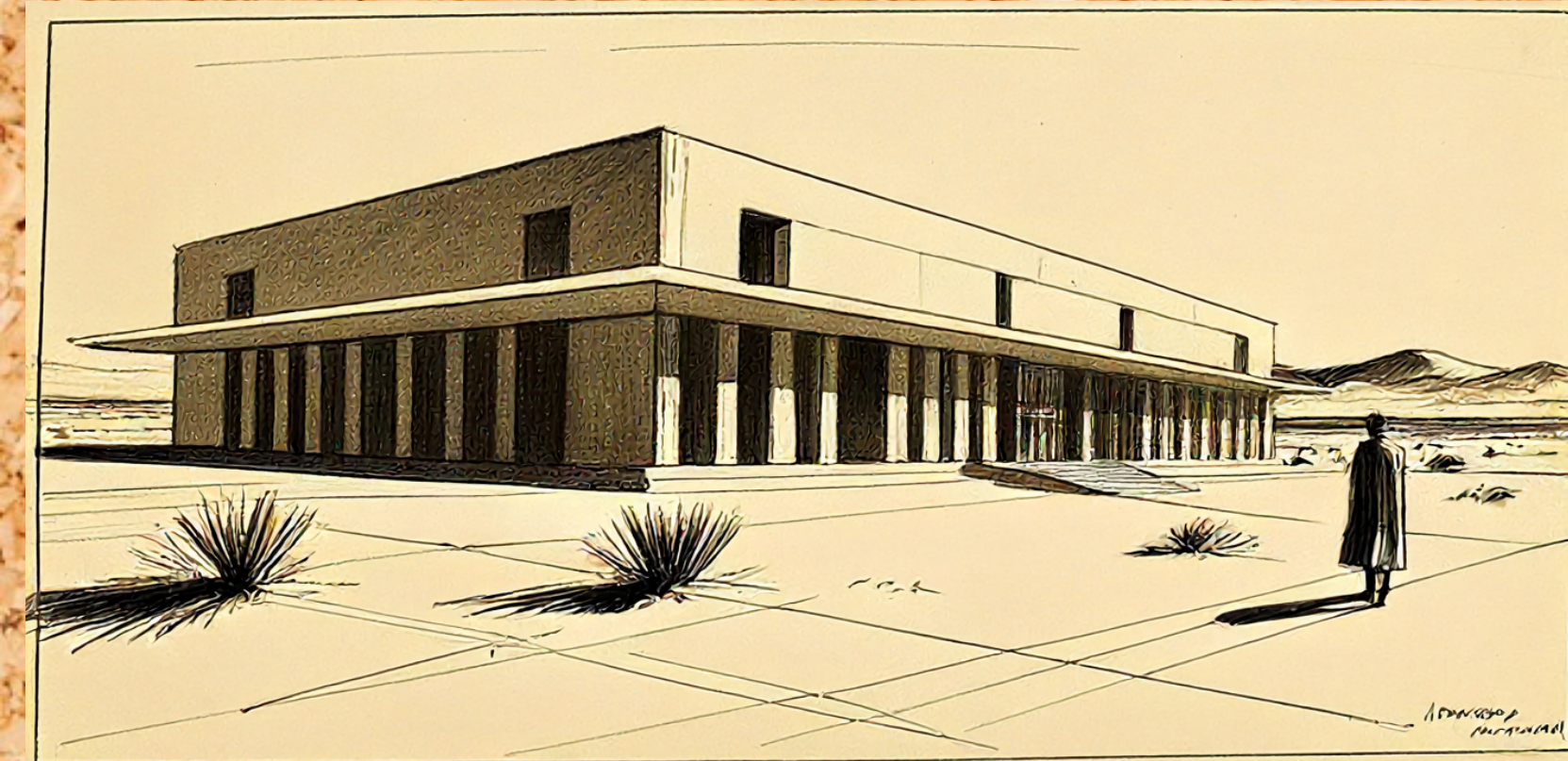
Prompt 2: Please add key subconcepts to this diagram, making sure to label connections.

Prompt 3: Please create a version of the first diagram that an eight year old child could understand, in a way that is friendly, but not cute.



Storytelling

- *Think:* narratives in textbooks are not necessarily what a student wants or needs to hear, nor are the associated images, etc.
- *But also:* consider the range of language, images, music, video, etc. that GenAI makes available for students to create stories well beyond what they could have done otherwise, and engage in reciprocal storytelling as a form of social learning





Gaming

- *Think:* the AI response range is far richer than disguised multiple choice - it can engage play, and the use of gaming structures for assessment on par with role playing games
- *But also:* the opportunity to engage with topics deeply and richly – for instance, *Reacting to the Past (RTTP)* as a way of engaging with history in the context of language.



You

Please design a Reacting to the Past (RTTP) game about the early Industrial Revolution.



ChatGPT

Title: **Engines of Progress: The Dawn of the Industrial Revolution**

Setting:

The game is set in the late 18th and early 19th century, specifically in the period from 1760 to 1830. The location is Great Britain, the epicenter of the Industrial Revolution.

Roles:

1. **Factory Owners:** Advocates for the industrialization, their objective is to gain as much profit as possible and lobby for fewer regulations.
2. **Workers:** They are split into two groups, those who are benefiting from the changes (higher wages, more jobs) and those who are suffering (long hours, child labor, unhealthy conditions). Their objective is to improve working conditions and wages.
3. **Luddites:** Workers who are against industrialization and often resort to sabotaging machinery. Their objective is to halt the progress of industrialization and protect their traditional means of livelihood.
4. **Politicians:** Members of parliament who are divided on the issue. Some want to encourage progress and economic growth, while others are worried about social unrest and the moral implications of rapid industrialization.



Message



Analyzing Surveys – Sample Prompts

1. You are a sociologist researching uses of technology in education. In a survey, 82 educators were asked "*In the last few years, how have you seen the balance between human connection and technology in education evolving?*" Please identify the 9 most frequent themes in the responses below, grouping together similar themes under one heading, and list them, including a summary for each theme, and the total number of responses to each theme, regardless of whether multiple themes were mentioned in the same response.
2. Educators who were asked the question "In the last few years, how have you seen the balance between human connection and technology in education evolving?" identified the following nine themes, with their corresponding summaries:
<the nine themes and summaries from 1.>
Please create a Mermaid diagram, showing all relevant interconnections among these nine themes, making sure to label all connections with explanatory labels.
3. Educators who were asked the question "In the last few years, how have you seen the balance between human connection and technology in education evolving?" identified the following nine themes, with their corresponding summaries:
<the nine themes and summaries from 1.>
Please group these nine themes into three groups of three, indicating the rationale for each group.

Today's Survey – AI Analysis Results

• Q1: *In the last few years, how have you seen the balance between human connection and technology in education evolving?*

- Group 1: **Technology Integration and Its Impact**

- Increased Technology Use and Integration
- Blended Learning Models
- Personalized Learning and Adaptive Tools

- Group 2: **Human Aspects and Challenges**

- Technology Enhances, Does Not Replace Human Connection
- Challenges in Maintaining Human Connection
- Social-Emotional Learning and Wellbeing

- Group 3: **Evolving Roles and Future Considerations**

- Teacher Role Evolution
- Digital Divide and Skill Gap
- Future Trends and AI Integration

• Q2: *What's a core value or practice in education that you believe should remain constant, even as technology advances?*

- Group 1: **Learner-Centric Approaches**

- Student-Centered Learning
- Holistic Development and Well-being
- Lifelong Learning and Resilience

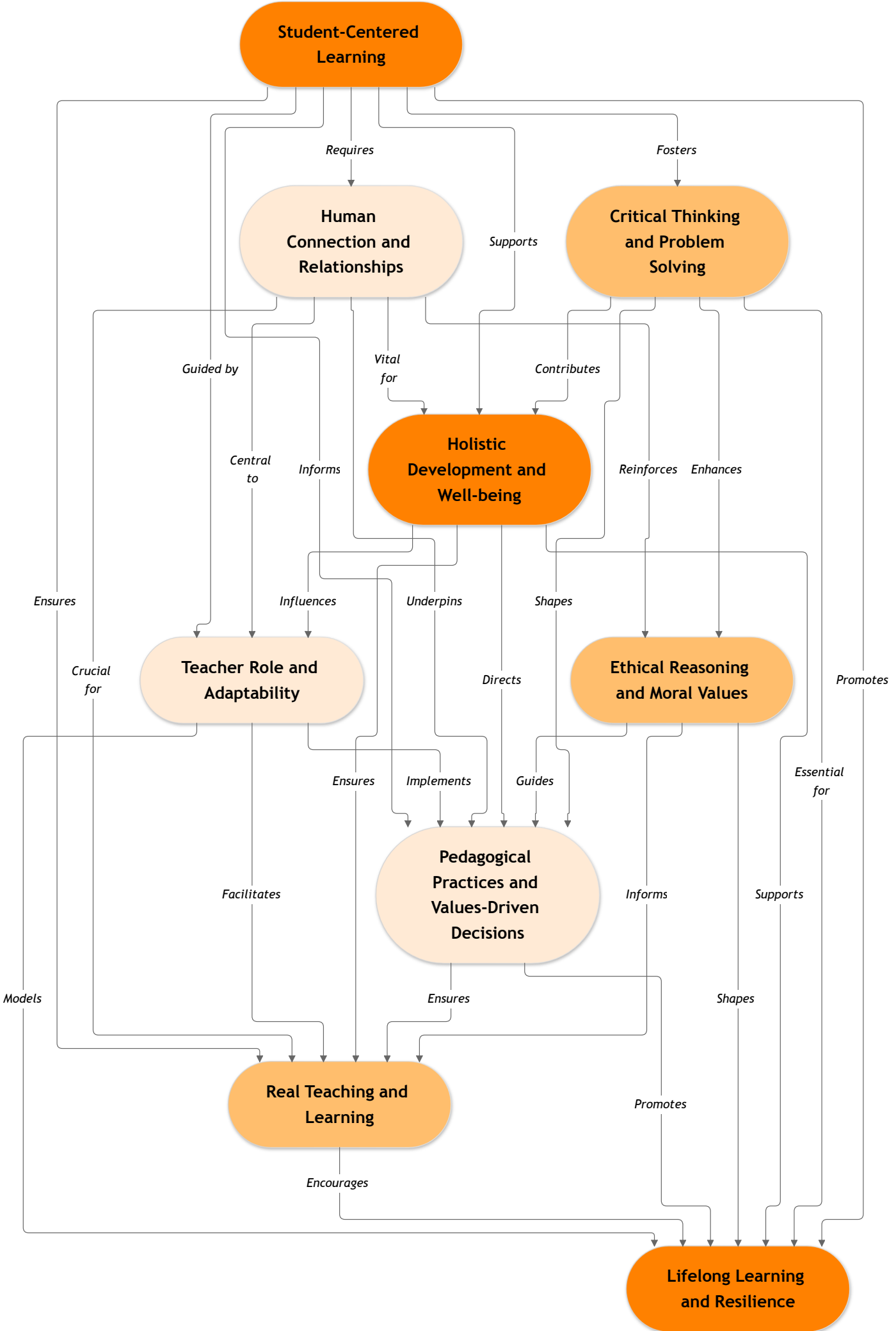
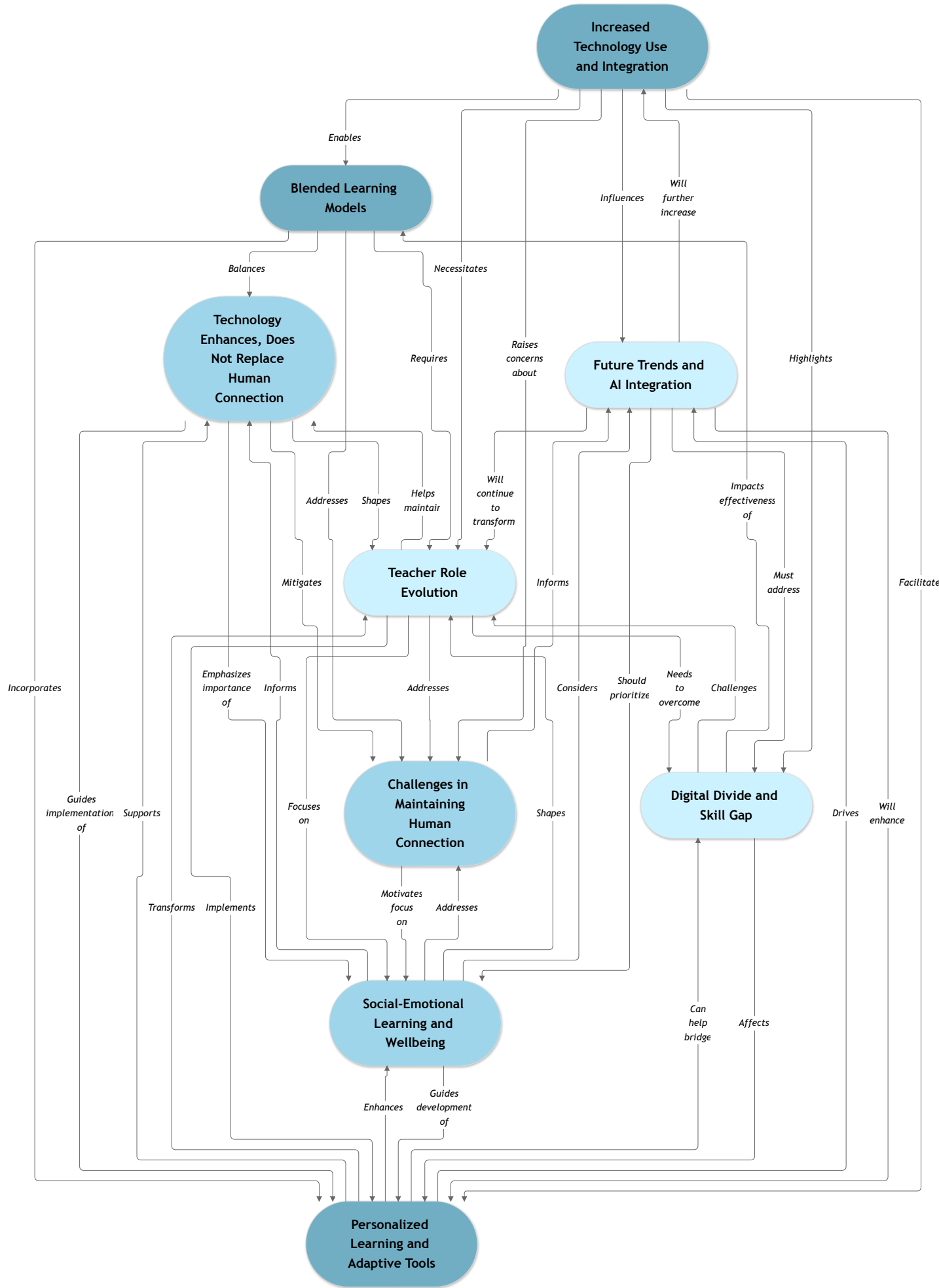
- Group 2: **Core Educational Values**

- Critical Thinking and Problem Solving
- Ethical Reasoning and Moral Values
- Real Teaching and Learning

- Group 3: **Human Elements in Education**

- Human Connection and Relationships
- Teacher Role and Adaptability
- Pedagogical Practices and Values-Driven Decisions

Today's Survey – Visualization





Whole Person

Antifragility

SAMR

AI

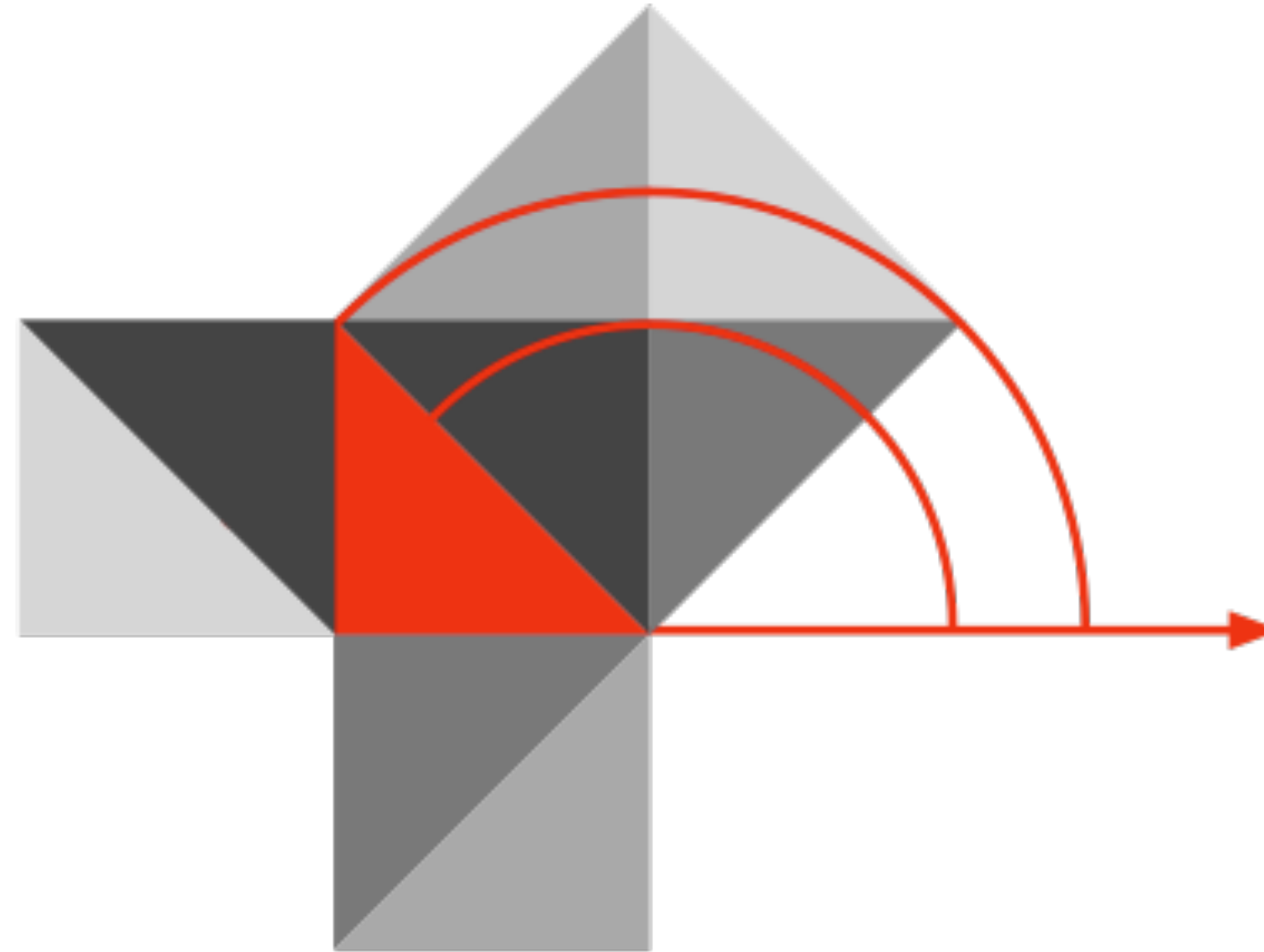
Breakout Discussion 1: *Reimagining the role of the teacher*

- **Central question:** How do you think overlapping challenges over the past two years have changed the way teachers work and connect with students? What surprising opportunities have you noticed, and where do you think we might have missed a chance to grow or adapt?
 - Pick a breakout room from one of the three categories defined by the answers to Question 1 (*In the last few years, how have you seen the balance between human connection and technology in education evolving?*) – you will be addressing the central question from the perspective of the three topics grouped under your category heading:
 1. **Technology Integration and Its Impact** (*Increased Technology Use and Integration – Blended Learning Models – Personalized Learning and Adaptive Tools*)
 2. **Human Aspects and Challenges** (*Technology Enhances, Does Not Replace Human Connection – Challenges in Maintaining Human Connection – Social-Emotional Learning and Wellbeing*)
 3. **Evolving Roles and Future Considerations** (*Teacher Role Evolution – Digital Divide and Skill Gap – Future Trends and AI Integration*)
 - As you discuss and address the central question, make sure to keep the Whole Person – Antifragility – SAMR triangle in mind, together with potential role(s) for AI, and the background presence of the Polycrisis.

Breakout Discussion 2: *Pushing towards redefinition*

- **Central question:** What's one bold, specific action you commit to implementing in your school next year that redefines how teachers and students work together? How will this action prepare teachers for the complex, interconnected challenges they'll face? What resources or support will you need to make this happen, and how can we as a community help each other achieve these goals? Are any of the tools we've used today applicable in our context?
 - Pick a breakout room from one of the three categories defined by the answers to Question 2 (*What's a core value or practice in education that you believe should remain constant, even as technology advances?*) – you will be addressing the central question from the perspective of the three topics grouped under your category heading:
 1. **Learner-Centric Approaches** (*Student-Centered Learning – Holistic Development and Well-being – Lifelong Learning and Resilience*)
 2. **Core Educational Values** (*Critical Thinking and Problem Solving – Ethical Reasoning and Moral Values – Real Teaching and Learning*)
 3. **Human Elements in Education** (*Human Connection and Relationships – Teacher Role and Adaptability – Pedagogical Practices and Values-Driven Decisions*)
 - As you discuss and address the central question, make sure to keep the Whole Person – Antifragility – SAMR triangle in mind, together with potential role(s) for AI, and the background presence of the Polycrisis.

Hippasus



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Twitter: @rubenrp

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