

AI in crafts education - balancing tradition and innovation

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

AI Make Slöjd - NordFo conference 2024

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“... All students are guaranteed an AI mentor. Based on your progress, skills and ambition level, the AI mentor will guide you on your next step...”



Utbildningar
2027/2028



Basic CS



2004

Basic CS

IT as a theme





2004

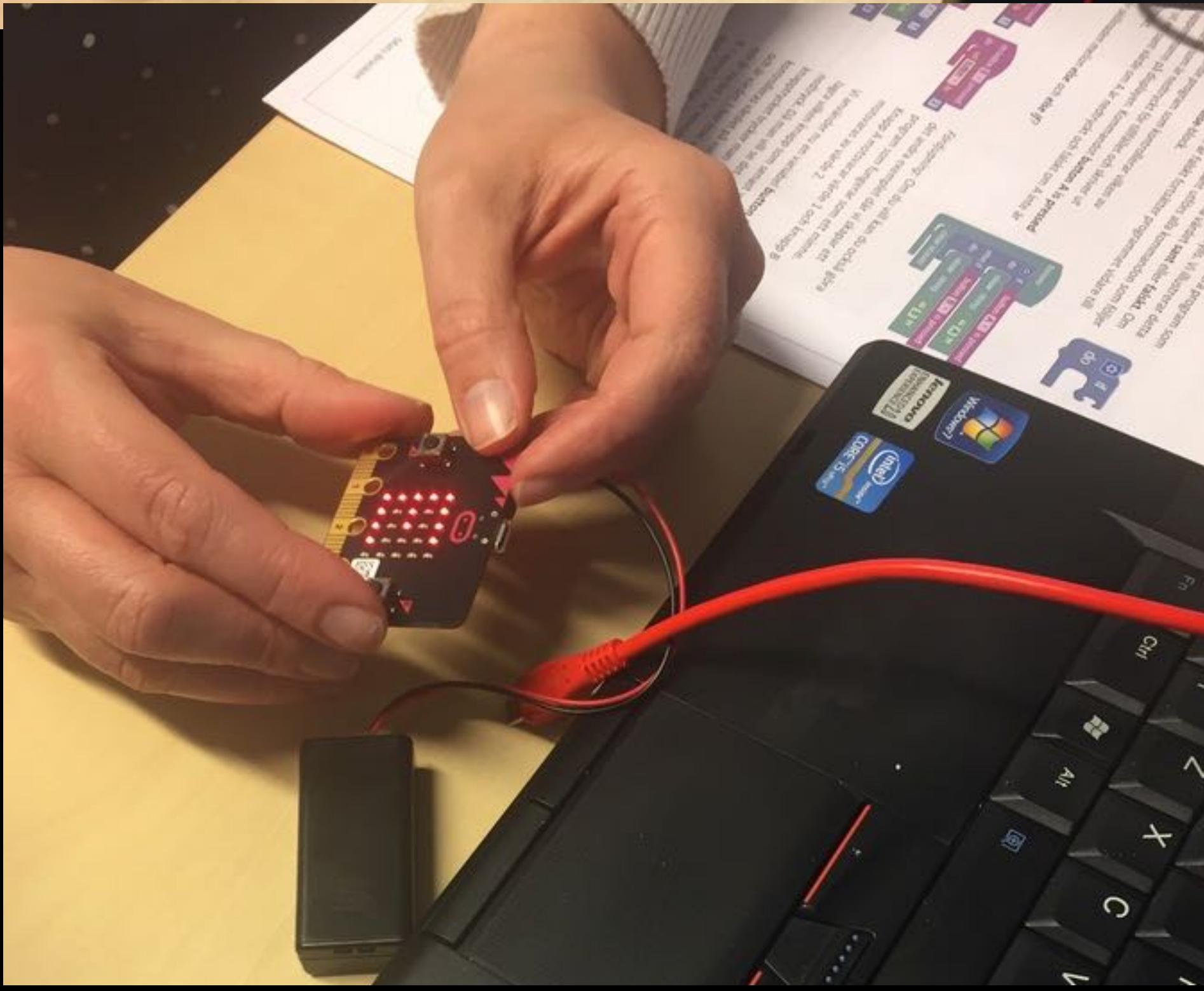
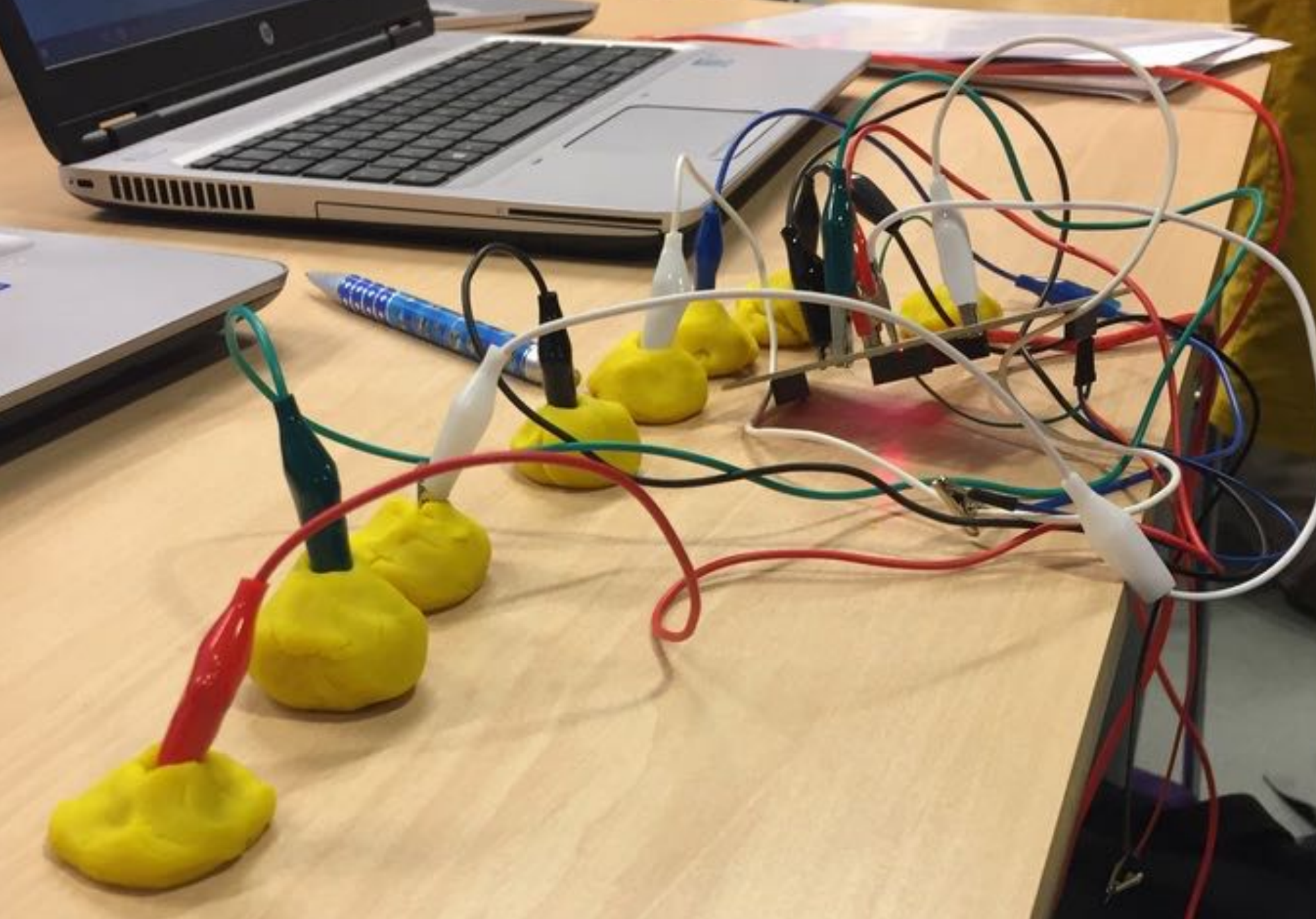
2014

Basic CS

IT as a theme

Programming,
digital competence,
media literacy





Slöjd 2.0



Articles

Makerspaces Across Settings: Didactic Design for Programming in Formal and Informal Teacher Education in the Nordic Countries

Susanne Kjällander , Anna Åkerfeldt , Linda Mannila & Peter Parnes 

Pages 18-30 | Published online: 22 Dec 2017

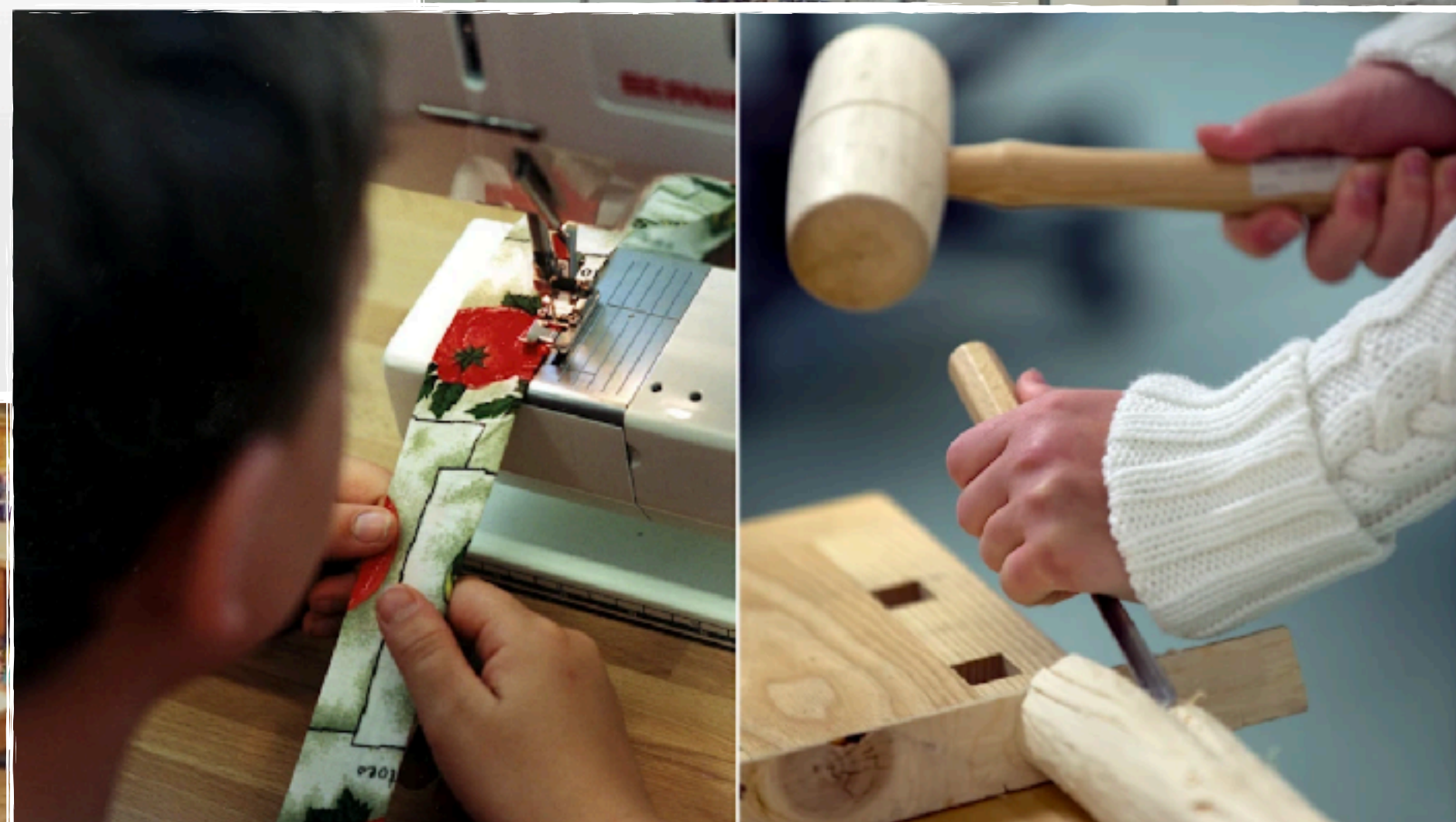
 Cite this article

 <https://doi.org/10.1080/21532974.2017.1387831>

 Check for updates



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Sylslöjd och träslöjd. Foto: TT. Montage: Sveriges Radio

P1-MORGON ONSDAG 13 JANUARI

Skoldebatt: ska slöjd bytas ut mot programmering?

10 min  Dela

Publicerat onsdag 13 januari 2016 kl 05.00

Är det dags att låta skolslöjden backa och istället ge plats för programmering på schemat? I Finland inför man till exempel programmering som en del av slöjden i år. Hör debatten mellan **Karl Alfredsson**, f.d. lärare och rektor, numera konsult i utbildningsfrågor åt kommuner och företag, som tycker det är viktigare med HTML-kunskaper än att kunna göra smörknivar, och **Maria Lantz**, rektor på Konstfack, som menar att slöjden är en förutsättning för innovation och ett hållbart tänkande.



2004

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2023

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AI



Well-defined problems
Predictable situations
Structured data

Rule-based

Complex problems
Unexpected situations
Unstructured data

Data-driven

Predict, adapt and automate

Work buddy 24/7

Generative AI

Generates text, images, programming code, videos, voice, sound, 3D models, whatnot...

Study buddy 24/7

Generative AI

Generates text, images, programming code, videos, voice, sound, 3D models, whatnot...

Cheating buddy 24/7

Generative AI

Generates text, images, programming code, videos, voice, sound, 3D models, whatnot...

Feb 2022

-

Dec 2023



V1



V2



V3



V4



V5



V5.1



V5.2



V6

**Images generated on MidJourney by Henrique Centieiro and Bee Lee*

Feb 2022

-

Dec 2023



V1



V2



V3



V4



V5



V5.1



V5.2



V6

**Images generated on MidJourney by Henrique Centieiro and Bee Lee*

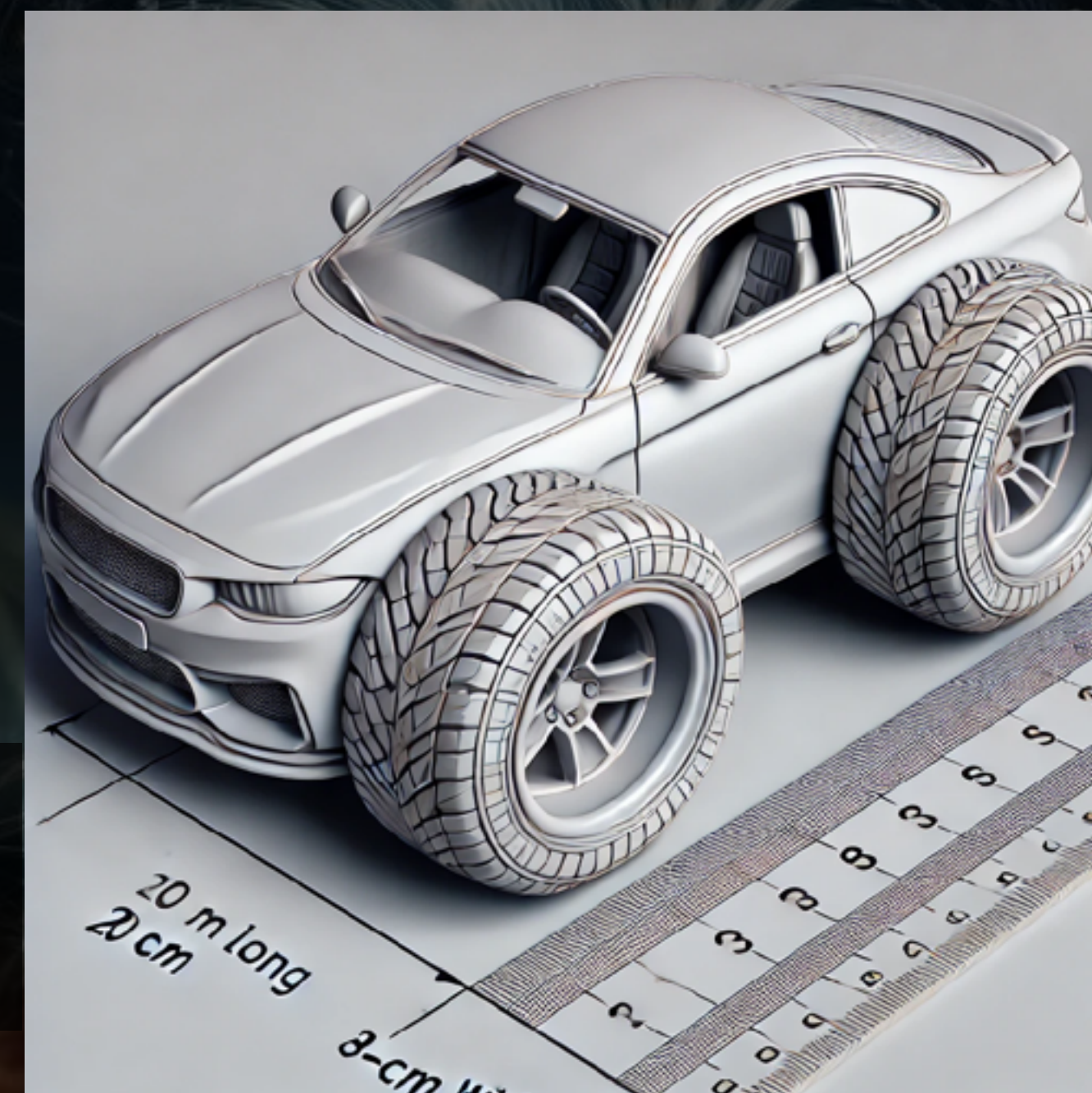
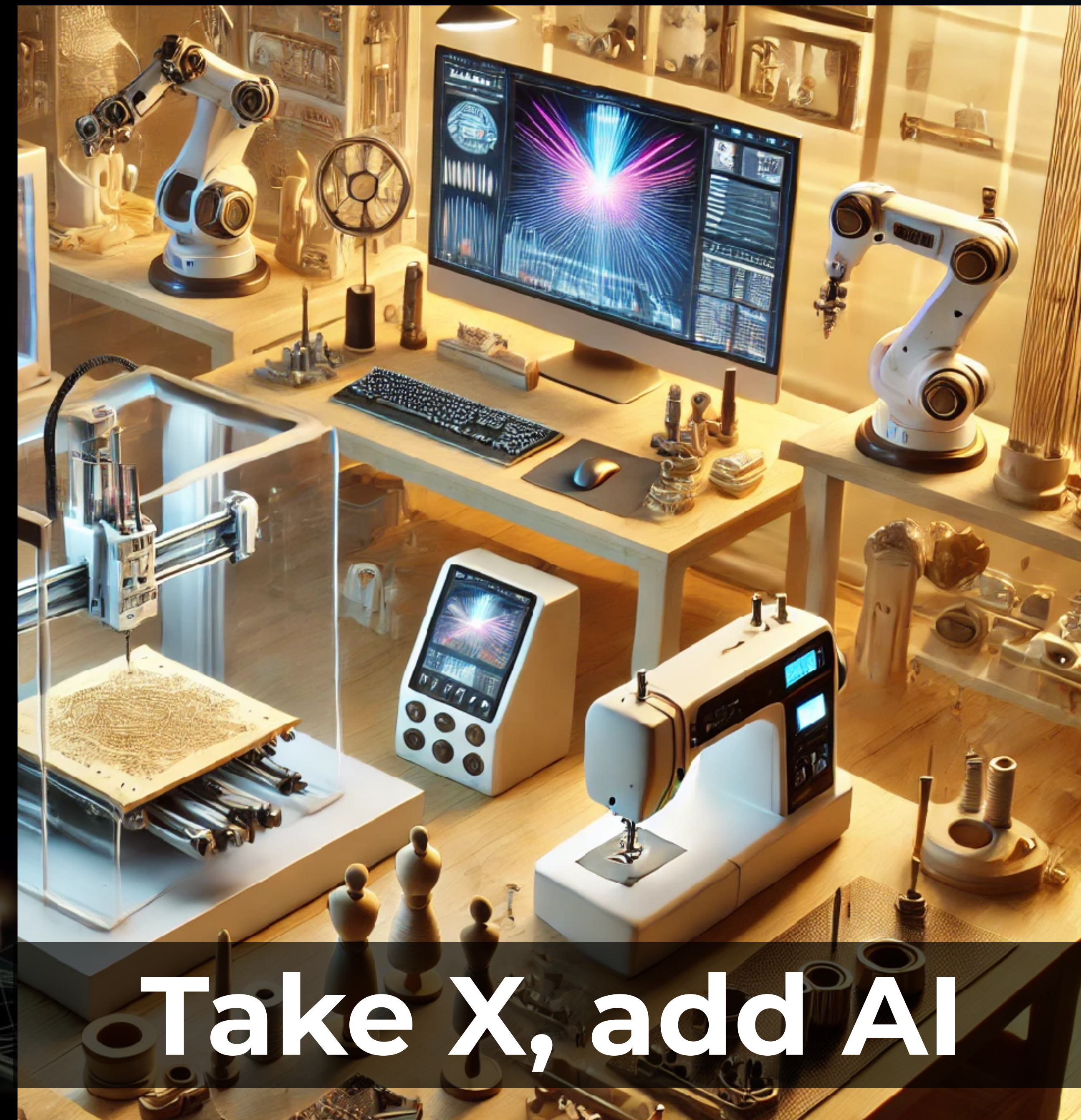
I don't get it...

OK! Let's look at another example...



AI in education





Take X, add AI



I'm building a birdhouse and would like to keep track of what happens inside it once birds start living there. How can I do that using technology?

Can you visualise it for me?



Here are visualizations of your smart birdhouse setup, showcasing the integration of technology such as a camera, sensors, and solar panel for monitoring the birds and environmental conditions inside. Feel free to let me know if you'd like to adjust any details!



To keep track of what happens inside your birdhouse using technology, you can integrate various sensors and devices to monitor the birds' activities, environmental conditions, and even capture photos or videos. Here's how you can do it:

1. Use a Camera for Monitoring

- **Wi-Fi Camera:** Install a small, low-power Wi-Fi-enabled camera inside the birdhouse. Cameras like those used for wildlife monitoring or IP cameras can stream video or take snapshots. Some cameras come with night vision, which is useful if you want to monitor activity at night or in low light.
- **Raspberry Pi + Camera Module:** A Raspberry Pi with a camera module can be an affordable option. It allows you to customize image capture, livestreaming, or motion-triggered recording. You can program it to take photos or videos at set intervals or when motion is detected.
- **GoPro or Action Cameras:** Another option is using small action cameras with wide-angle lenses, though they will need a power source and a storage device for recording.

2. Install Motion Sensors

- **PIR Sensors (Passive Infrared):** These sensors detect movement based on body heat. You can place a PIR sensor at the entrance of the birdhouse to detect when a bird enters or exits. This sensor can trigger a camera to record, snap a picture, or send you a notification.
- **Ultrasonic or Radar Sensors:** These can detect motion inside the birdhouse without the need for visible light, allowing you to track activity even when the camera isn't active.

3. Environmental Sensors

- **Temperature and Humidity Sensors:** Monitoring the environment inside the birdhouse can give insights into the comfort levels for the birds and alert you to any potentially harmful conditions. Sensors like the DHT11/DHT22 can measure both temperature and humidity and can be connected to microcontrollers like an Arduino or Raspberry Pi.
- **Light Sensors:** A light sensor can help monitor the amount of daylight the birds are exposed to or detect when the birds are active based on the light inside the house.

4. Microcontroller and Data Logging

Can you create a list of things I need to have in order to make it?



Here's a detailed list of things you'll need to build your smart birdhouse with sensors and monitoring capabilities:

1. Birdhouse Materials

- **Wood:** Durable, weather-resistant wood like cedar or pine for constructing the birdhouse.
- **Screws/Nails:** To assemble the birdhouse.
- **Weatherproof Coating:** To protect the wood from the elements.
- **Hinges:** For making the roof or one side of the birdhouse accessible for maintenance and inspection.

2. Power Supply

- **Solar Panel:** Small solar panel (5V or 12V) to power your electronics.
- **Rechargeable Battery:** A battery (like a 18650 or LiPo battery) for storing solar energy and providing power when sunlight isn't available.
- **Voltage Regulator:** To ensure the correct voltage output for your electronics.
- **Battery Holder:** For organizing the battery inside the birdhouse.
- **Charge Controller:** To regulate charging from the solar panel to the battery.

3. Microcontroller and Connectivity

- **Raspberry Pi (with Wi-Fi) or ESP32:** For processing data and controlling sensors. Raspberry Pi also supports cameras for video streaming or image capturing.
- **MicroSD Card:** For storing data or media if using a Raspberry Pi.
- **USB Cables:** For connecting power to the Raspberry Pi or other microcontrollers.

4. Camera

- **Raspberry Pi Camera Module:** A small, high-resolution camera for live video streaming or time-lapse photography inside the birdhouse.
- **Mounting Bracket:** For securely attaching the camera inside the birdhouse.

5. Sensors

- **PIR Motion Sensor:** For detecting when birds enter or exit the birdhouse and triggering cameras or notifications.
- **Temperature and Humidity Sensor (DHT11/DHT22):** To monitor the internal environment and ensure suitable conditions for the birds.
- **Light Sensor (optional):** To detect lighting changes or bird activity based on daylight.

6. Wiring and Connectors

- **Jumper Wires:** For connecting sensors and components to the microcontroller.
- **Breadboard:** For prototyping your circuit before finalizing.
- **Soldering Kit:** If you want more secure connections.
- **Heat Shrink Tubing or Electrical Tape:** For insulating and protecting wires.
- **Waterproof Cable Grommets:** To keep cables waterproof where they enter and exit the birdhouse.

7. Enclosures and Waterproofing

- **Waterproof Box (IP65 rated):** To house sensitive electronics like the Raspberry Pi or ESP32.
- **Silicone Sealant:** For sealing edges and gaps to make the birdhouse weatherproof.
- **Ventilation Vents:** To ensure airflow and prevent overheating of electronics.

8. Mounting and Positioning

- **Mounting Bracket/Straps:** For securely attaching the birdhouse to a tree or post.
- **Cable Ties:** To keep cables organized inside the birdhouse.

9. Software and Tools

- **Raspberry Pi OS:** If using a Raspberry Pi, you'll need the operating system to set up your project.
- **Python or C++:** For programming the sensors, camera, and microcontroller.
- **IFTTT or Blynk:** To set up notifications or alerts triggered by sensors.
- **Home Assistant (optional):** For managing all devices and sensors from a single interface.
- **SD Card Reader:** For setting up the Raspberry Pi.
- **Screwdriver/Drill:** For assembling and mounting the birdhouse and components.

10. Monitoring and Cloud Storage

- **Wi-Fi Connection:** Make sure your location has Wi-Fi coverage to connect your birdhouse for remote monitoring.
- **Cloud Storage:** Services like Google Drive, Dropbox, or custom servers for storing images, videos, and sensor data.
- **Mobile App/Notification Setup:** For receiving real-time updates about bird activity or environmental changes.

Optional:

- **Microphone:** To capture bird sounds.
- **SD Card (for local storage):** If you want to store media locally without relying on the cloud.

Could it use something like facial recognition?



Yes, you can implement a form of facial recognition in your birdhouse project to identify specific bird species or even individual birds. While the term "facial recognition" is typically used for human faces, in this case, you can use **image recognition** or **object detection** to differentiate between bird species or track recurring visitors.

Here's how you can integrate this:

1. Use a Camera with Image Processing Capabilities

- **Raspberry Pi with Camera:** A Raspberry Pi combined with a camera module is capable of capturing images or video, which can then be analyzed for bird recognition.
- **Edge Computing Devices:** Devices like the **Google Coral** or **NVIDIA Jetson Nano** can handle more powerful image processing tasks, allowing for faster and more efficient bird recognition on the edge (locally) without needing constant internet access.

2. Bird Recognition with Machine Learning Models

- **Pre-trained Models:** You can use pre-trained machine learning models specifically designed for wildlife identification. Several open-source models (e.g., TensorFlow or PyTorch) can be used to recognize different species of birds based on their appearance.
 - Example models include **Google's AutoML Vision** or custom TensorFlow models trained for wildlife or bird species identification.
- **Custom Training:** If you want to identify specific birds in your area, you could train a machine learning model using bird images from datasets like **Cornell Lab of Ornithology's Macaulay Library** or your own image database.
- **YOLO (You Only Look Once):** An object detection framework that can identify objects (in this case, birds) in real-time, even on devices like Raspberry Pi.

3. Running Image Recognition on Raspberry Pi

- **OpenCV:** You can use the OpenCV library for image processing and identification of birds. It can detect objects, compare features, and even be combined with pre-trained machine learning models.
- **TensorFlow Lite:** Use TensorFlow Lite to run machine learning models directly on Raspberry Pi for bird recognition. It's optimized for lightweight, low-power devices like the Raspberry Pi.
- **Google Coral:** Google Coral can run image recognition tasks much faster than the Raspberry Pi alone because of its onboard TPU (Tensor Processing Unit) for handling machine learning tasks.



4. Tracking Specific Birds

- **Tagging Birds:** If you have recurring birds visiting your birdhouse, the system can identify unique markings, colors, or even specific patterns on their faces or feathers. Over time, the system could potentially "recognize" returning birds by their appearance.
- **Logging Activity:** Every time a bird is recognized, you can log its visit, species, and other details such as the time of day or weather conditions.

5. Real-Time Notifications

- You can set up a system to notify you whenever a specific bird species or individual bird is detected. This could be done through a service like IFTTT, **Blynk**, or custom notifications via email or SMS.

6. Challenges

- **Lighting Conditions:** Since birdhouses can be in low-light areas, you'll need to ensure that the camera has adequate lighting (such as infrared or low-light capable cameras).
- **Accuracy:** While recognizing common species may be easier, differentiating between individual birds is more complex, and the accuracy may depend on the quality of the camera and the trained model.

7. Cloud-Based Image Recognition

- If local processing is too resource-intensive, you can send images to cloud-based image recognition services such as:
 - **Google Cloud Vision API**
 - **Microsoft Azure Computer Vision**
 - **Amazon Rekognition** These services can process the images, identify birds, and return results with species information.

Example Setup for Bird Recognition:

- **Raspberry Pi** with a **camera module**.
- **TensorFlow Lite** running on the Raspberry Pi to identify bird species.
- Use **OpenCV** for capturing images, and **YOLO** or another model for real-time detection.
- If more processing power is needed, connect a **Google Coral USB Accelerator** for machine learning tasks.
- Notifications through IFTTT or custom mobile apps like **Blynk** to inform you when a bird is recognized.

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- **Edge Computing** handle more powerful bird recognition

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 - Example model trained for wild
- **Custom Training** machine learning Ornithology's Ma
- **YOLO (You Only)** (in this case, bird

3. Running Image

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Training a Bird Recognition Model:

If you want to recognize specific bird species, you could gather bird images and train a custom model using tools like:

- **TensorFlow:** Use the TensorFlow framework to train a bird recognition model, either using transfer learning (pre-trained models) or from scratch.
- **Google AutoML Vision:** An easy-to-use platform where you upload images and it automatically trains an image classification model for bird recognition.

Applications:

- **Identify Different Bird Species:** Automatically log which species of birds visit the birdhouse.
- **Track Individual Birds:** Recognize specific birds and study their behavior.
- **Birdwatching Insights:** Analyze bird visits over time, recording their patterns and habits.

With a bit of technical setup, you can effectively turn your birdhouse into a smart monitoring station that uses image recognition to identify and log bird activity!

4. Tracking Specific Birds

- **Tagging Birds:** If you have recurring birds visiting your birdhouse, the system can identify unique markings, colors, or even specific patterns on their faces or feathers. Over time, the system could potentially "recognize" returning birds by their appearance.
- **Logging Activity:** Every time a bird is recognized, you can log its visit, species, and conditions.

How difficult would this project be for me? I'm 12.



That's awesome that you're interested in such a cool project at 12! The difficulty level of this birdhouse project with facial recognition depends on how comfortable you are with some technical areas. But don't worry — it's definitely possible, and you can learn a lot along the way!

Here's a breakdown of the different parts of the project, from easiest to more challenging, with suggestions to help you get started:

1. Building the Birdhouse (Easy)

- **Difficulty Level:** ● Easy
- If you're comfortable with basic tools (hammer, nails, screwdriver), building the birdhouse itself can be a straightforward task. There are many simple tutorials online, and you can even get help from an adult if needed. You can use a pre-made birdhouse as a base too!

2. Installing a Camera and Sensors (Moderate)

- **Difficulty Level:** ● Medium
- If you're familiar with plugging things in and using electronics, adding a small camera like a **Raspberry Pi camera** and basic sensors (like motion sensors or temperature sensors) should be manageable. You might need some guidance from online tutorials or videos, but this part is mostly about connecting the right wires and components. No major programming is required for this step.

3. Programming the Microcontroller (Moderate to Challenging)

- **Difficulty Level:** ●● Medium to Hard
- This is where things get a little more complex. If you're using a **Raspberry Pi** or an **Arduino** with an **ESP32**, you'll need to write simple programs that can read data from the sensors and control the camera. If you've done some programming (in languages like **Python** or **Scratch**), this step will be easier. Many tutorials are available, and you can copy and modify code from them.

Recommendation: Start with simple coding projects first if you're not already familiar with programming. Try making an LED blink or reading data from a sensor to build your confidence.

4. Adding Facial (Bird) Recognition (Challenging)

- **Difficulty Level:** ●●● Hard
- This is the most advanced part. Bird recognition uses machine learning, which is complex. You'll be working with pre-trained models and software like **TensorFlow Lite** or **OpenCV**. But here's the good news: you don't have to understand every detail about how machine learning works! You can follow tutorials that explain how to set it up, and many provide sample code you can use.

Recommendation: You might need some extra help from an adult or an experienced programmer for this step. Start with basic bird recognition by identifying general shapes or movement, and you can work up to more advanced species recognition.

5. Connecting to the Internet for Notifications (Moderate)

- **Difficulty Level:** ● Medium
- If you're setting up notifications to your phone when a bird is detected, you'll need to learn about services like **IFTTT** or **Blynk**. This isn't too hard but does require a basic understanding of how to set up devices on Wi-Fi and use cloud services.



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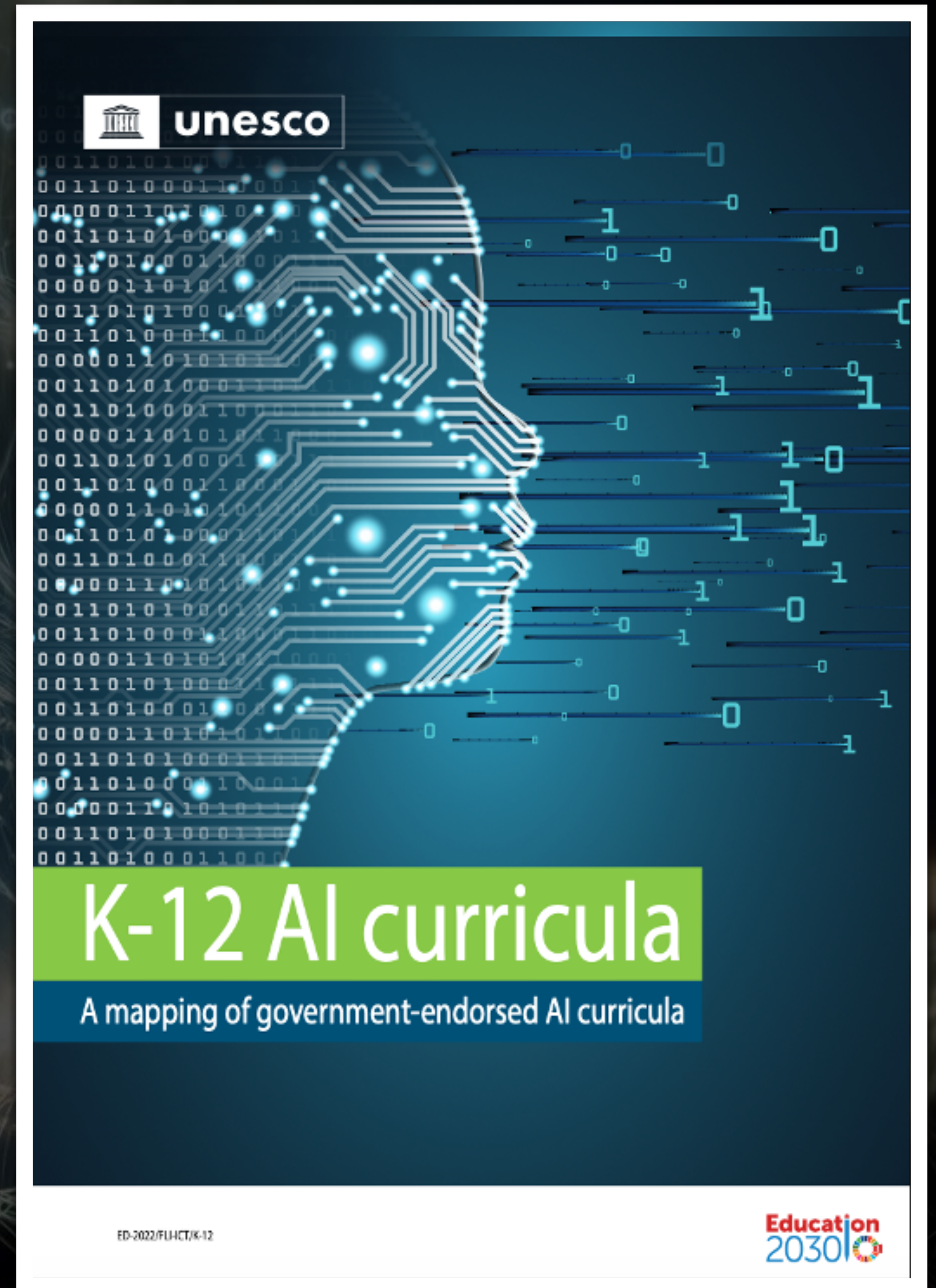
How to Make It Easier:

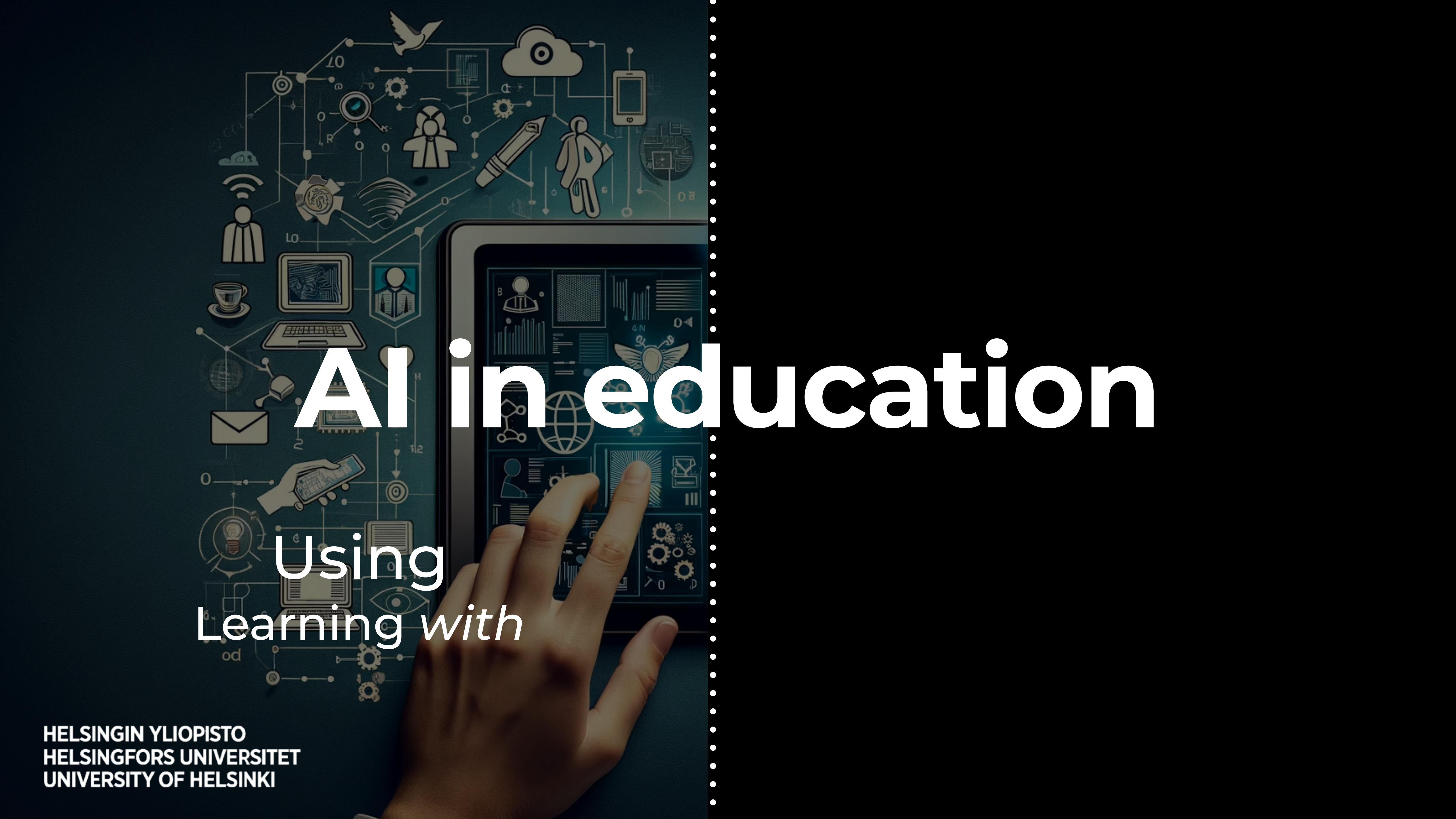
1. **Break the Project into Steps:** Don't try to do everything at once! Start by building the birdhouse and then move on to adding the camera. You can add sensors later.
2. **Get Help When You Need It:** Ask for help from a parent, a teacher, or look for online communities (like Reddit or Raspberry Pi forums) where you can ask questions.
3. **Use Online Resources:** There are **tons of tutorials** that explain how to use Raspberry Pi, cameras, and sensors step by step. Sites like **Instructables** and **YouTube** have projects geared toward beginners.
4. **Simplify the Project First:** You don't have to implement facial recognition immediately. Start with simpler goals like:
 - Tracking when birds come and go using motion sensors.
 - Taking pictures whenever a bird enters the birdhouse.

Did you try something that worked / didn't work?
Do you have ideas that you'd like to try out?
Share with the ones sitting next to you!



Learning with AI
Learning about AI
Learning to live and work with AI





AI in education

Using
Learning *with*

AI in education

Using
Learning *with*

Understanding
Learning *about*

What do we need to
know about AI?

Understanding

What you need to know about UNESCO's new AI competency frameworks for students and teachers

Artificial Intelligence (AI) is rapidly transforming our world and changing the way we live, work and learn. To help education systems keep pace, UNESCO is launching two new AI competency frameworks - one for students and one for teachers.



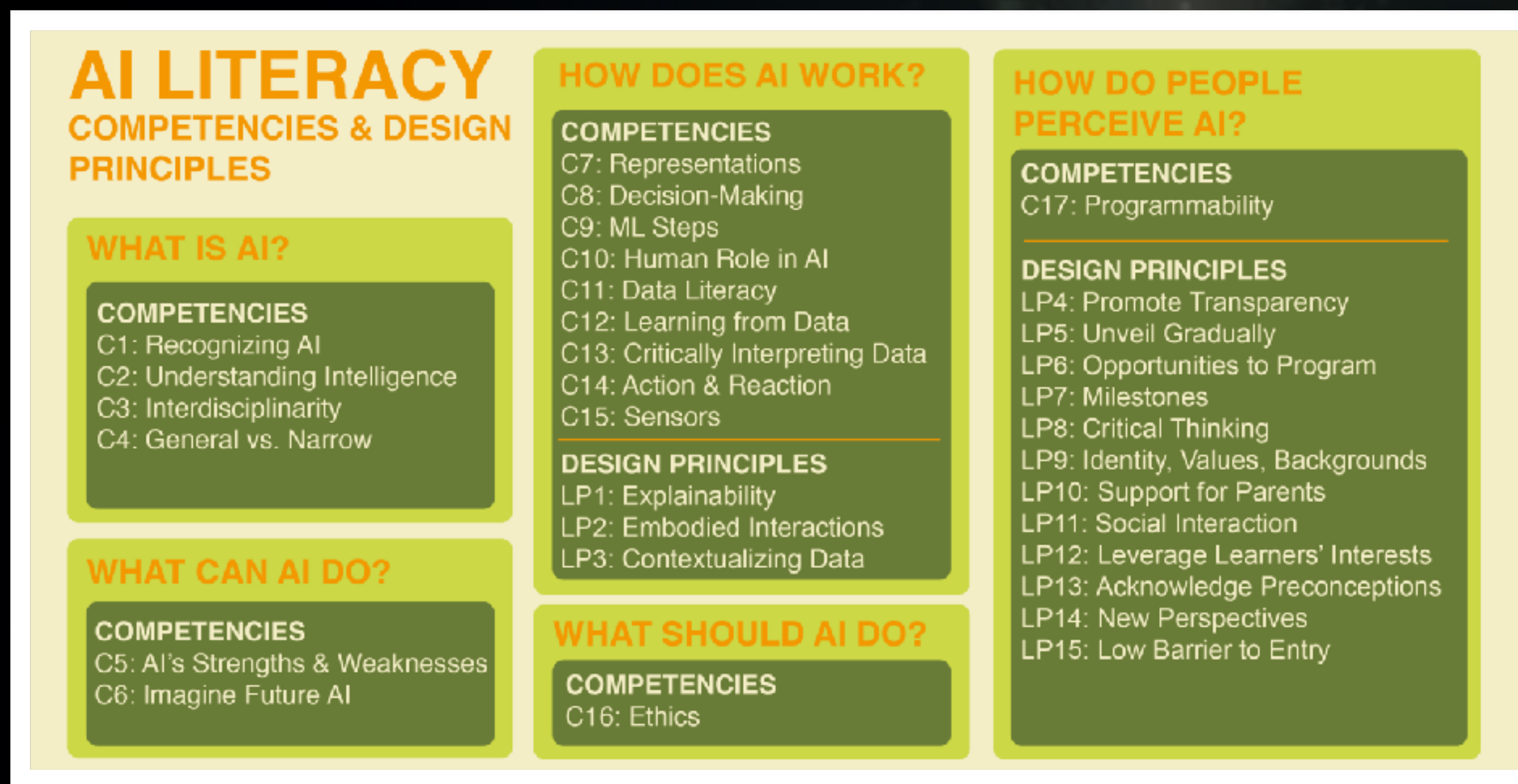
GOALLORD-CREATIVITY/Shutterstock.com

3 September 2024 - Last update: 5 September 2024

By 2022, only 15 countries had included AI learning objectives in their national curricula

Competency aspects	Progression levels		
	Understand	Apply	Create
• Human-centred mindset	• Human agency	• Human accountability	• Citizenship in the era of AI
• Ethics of AI	• Embodied ethics	• Safe and responsible use	• Ethics by design
• AI techniques and applications	• AI foundations	• Application skills	• Creating AI tools
• AI system design	• Problem scoping	• Architecture design	• Iteration and feedback loops

Aspects	Progression		
	Acquire	Deepen	Create
1. Human-centred mindset	Human agency	Human accountability	Social responsibility
2. Ethics of AI	Ethical principles	Safe and responsible use	Co-creating ethical rules
3. AI foundations and applications	Basic AI techniques and applications	Application skills	Creating with AI
4. AI pedagogy	AI-assisted teaching	AI-pedagogy integration	AI-enhanced pedagogical transformation
5. AI for professional development	AI enabling lifelong professional learning	AI to enhance organizational learning	AI to support professional transformation



... a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace (Long & Magerko, 2020)

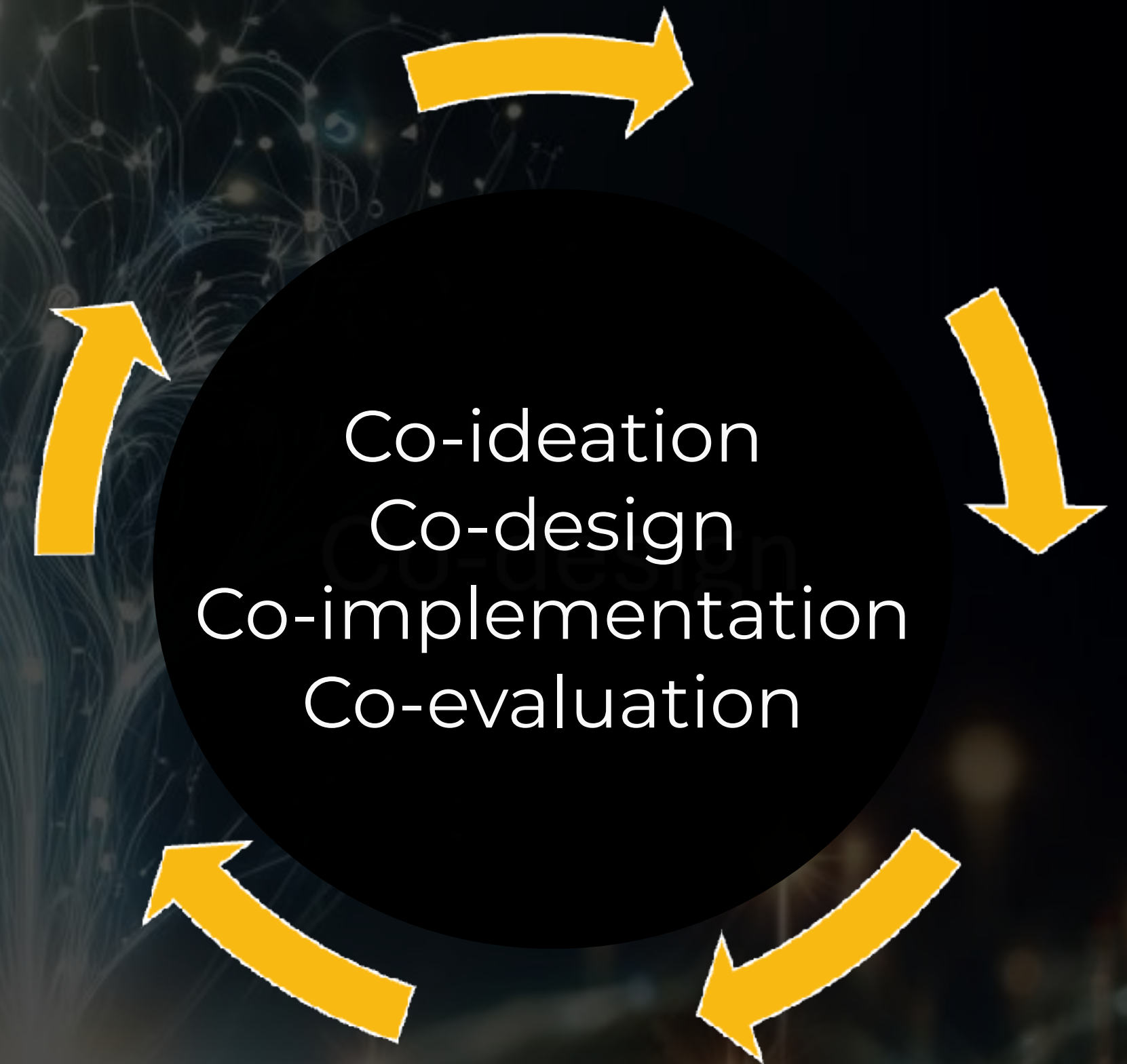
AILIT

Participatory process

Students, teachers, IT educators,
teacher trainers (grades 1-6)

Three lessons

- What is AI? What can it do/not do?
- How does AI work?
- What should AI do?





Using

How can and should AI be used in teaching, learning, assessment, administration, ...?

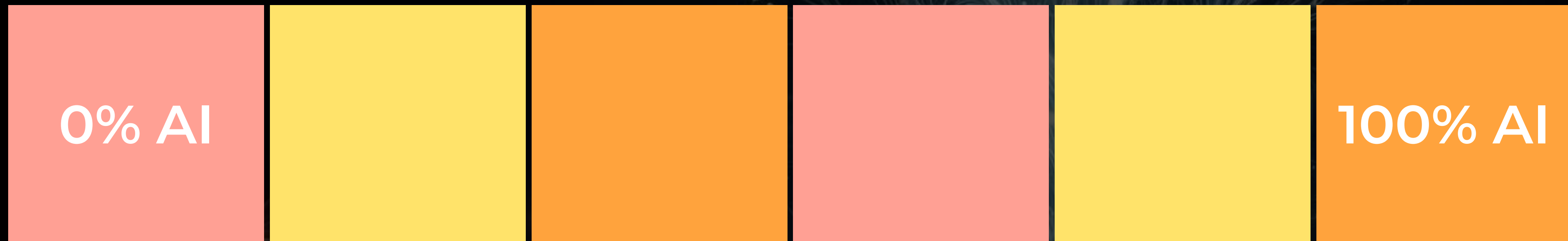


Using

How can and should AI *not* be used in teaching, learning, assessment, administration, ...?

Why?
When?
How?





AIAS - AI Assessment Scale (Leon Furze)

A backlash against technology in schools

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IN FOCUS Israel-Hamas war Ukraine Extreme weather

Latest videos

Latest audio

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POLITICS | SWEDEN

Back to basics: Sweden aims to de-digitalize youth

Teri Schultz
1 hour ago

The Swedish government says excessive screen time is causing a severe health crisis for youth, both mentally and physically. New legislation is in the works to require schools to ban access to digital devices.

SOCIETY EDUCATION

We Don't Need No Digital Education? Tech-Savvy Sweden Leads Push To Remove Screens From Schools

Sweden recently announced that the country's schools will remove digital technology from classrooms because of poor student performance. Some ask how useful is digital learning. But it also poses the question: is "digital de-escalation" even possible?



Switching off: Sweden says back-to-basics schooling works on paper

Schools minister Lotta Edholm moves students off digital devices and on to books and handwriting, with teachers and experts debating the pros and cons



A child practises handwriting at the Djurgardsskolan elementary school in Stockholm, Sweden. Photograph: David Keyton/AP

Associated Press in Stockholm

Amazon ditched AI recruiting tool that favored men for technical jobs

Specialists had been building computer programs since 2014 to review résumés in an effort to automate the search process

Dutch scandal serves as a warning for Europe over risks of using algorithms

The Dutch tax authority ruined thousands of lives after using an algorithm to spot suspected benefits fraud — and critics say there is little stopping it from happening again.



UNMASKING AI

MY MISSION TO PROTECT WHAT IS HUMAN IN A WORLD OF MACHINES



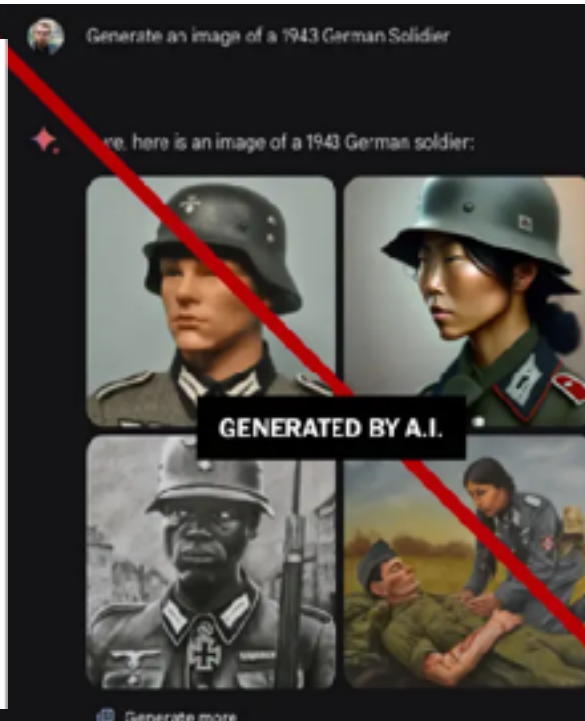
JOY BUOLAMWINI

Taylor Swift AI images prompt US bill to tackle nonconsensual, sexual deepfakes

Bipartisan measure introduced in US Senate will allow victims in 'digital forgeries' to seek civil penalty against perpetrators

Google Chatbot's A.I. Images Put People of Color in Nazi-Era Uniforms

The company has suspended Gemini's ability to generate human images while it vowed to fix the issue.

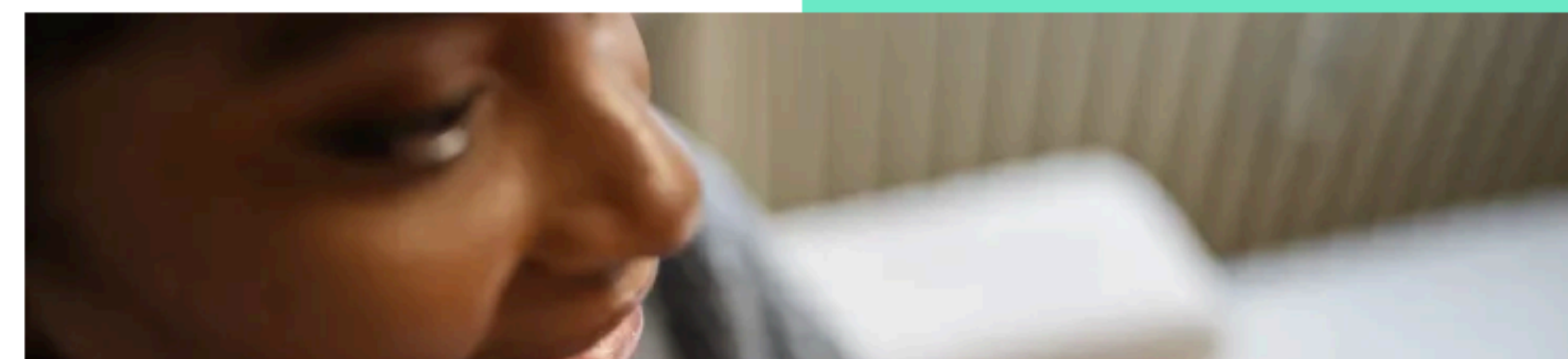


Scammers can use AI tools to clone the voices of you and your family—how to protect yourself

Published Wed, Jan 24 2024 10:14 AM EST

Cheyenne DeVon

SHARE    



1+1 > 1





**What does
it mean to
be human?
5 ECTS**

What is unique for us?

What kind of technology do we want?

What do we want to automate?

What do we want to keep?



Polished and perfect



<https://www.naturskyddsforeningen.se>

Imperfect and authentic



Syslöjd och träslöjd. Foto: TT. Montage: Sveriges Radio

P1-MORGON ONSDAG 13 JANUARI

▶ Skoldebatt: ska slöjd bytas ut mot programmering?

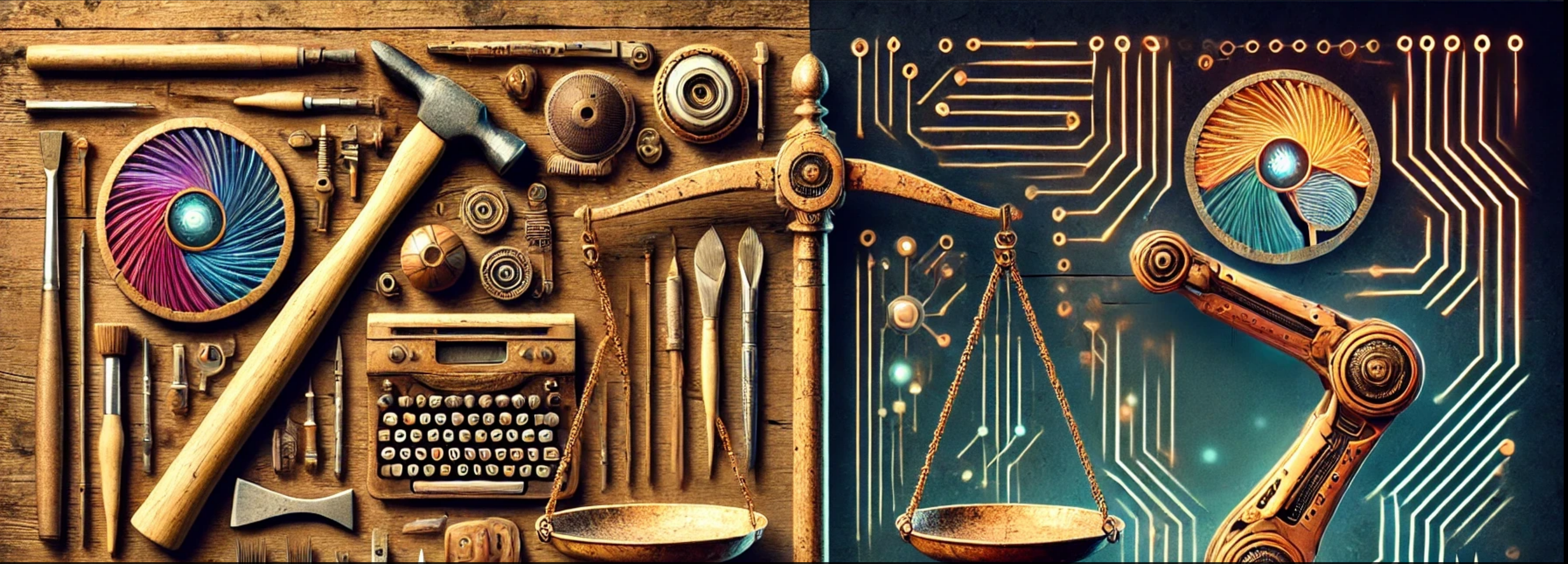
10 min [Dela](#)

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Är det dags att låta skolslöjden backa och istället ge plats för programmering på schemat? I Finland inför man till exempel programmering som en del av slöjden i år. Hör debatten mellan **Karl Häfvenstam**, lärare och rektor, numera konsult i utbildningsfrågor åt kommuner och företag, som tycker det är viktigare med HTML-kunskaper än att kunna göra smörknivar, och **Maria Lantz**, rektor på Konstfack, som menar att slöjden är en förutsättning för innovation och ett hållbart tänkande.

The fast AI development highlights the relevance of the creative subjects

Slöjd 3.0?



Thank you!

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