

# L'IA au service du développement des compétences disciplinaires et transversales

*Cas des cours de Développement Web éducatif et de Conception de formations digitales*

Mercredi 20 mai 2026

**Gilbert Sawma – Université Libanaise**

# Plan

- Introduction et contexte général
- Modalité de la pratique
- Retours d'Expériences Etudiantes
- Défis et bénéfices
- Conclusion


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# Brainstorming

➤ <https://curi.live/join/997420>

Join at **curi.live**

with pin: **997 420**



A large QR code is centered on a green background. The QR code is black and white, with a white border. It is intended to be scanned by a mobile device to access the online brainstorming session.

# Enjeu pédagogique avec l'IA

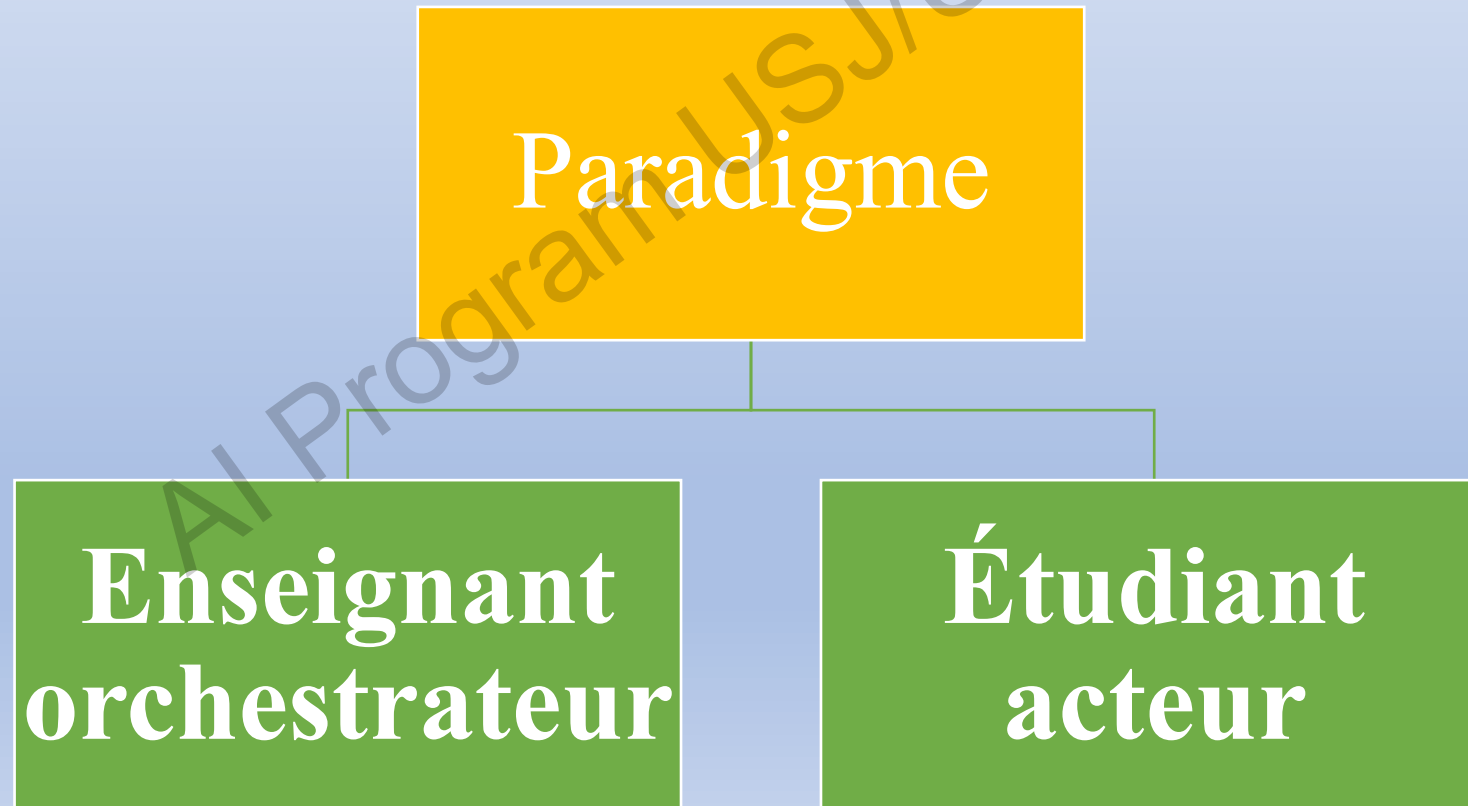
Difficilement remplaçable	Plus facilement automatisable
Créativité	Tâches répétitives
Esprit critique	Calcul
Collaboration	Recherche simple
Autonomie	Résumé
Communication	Rédaction basique



L'enjeu pédagogique n'est plus uniquement d'enseigner des contenus, mais de développer ce qui reste profondément **humain**

# Changement de paradigme pédagogique

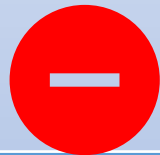
Les étudiants utilisent déjà l'IA souvent  
**sans cadre pédagogique**



# Changement de paradigme pédagogique

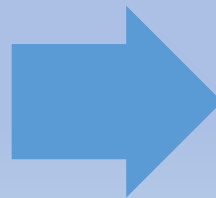
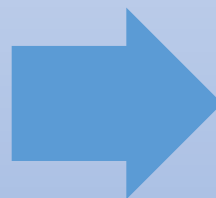
Les étudiants utilisent déjà l'IA souvent  
**sans cadre pédagogique**

**Enseignant orchestrateur**



Transmettre le savoir

Interdire l'outil



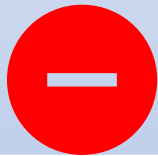
Orchestrer l'apprentissage

Encadrer la pratique

# Changement de paradigme pédagogique

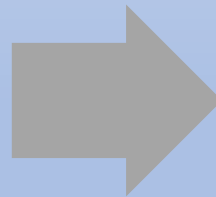
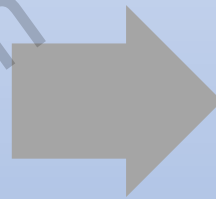
Les étudiants utilisent déjà l'IA souvent  
**sans cadre pédagogique**

**Étudiant acteur**



Utiliser l'IA comme un  
outil de triche

Être de simples  
producteurs



Analyser, Adapter et  
Justifier

Faire des critiques éclairés

Comment intégrer l'IA  
**sans perdre les compétences fondamentales ?**

# Triple objectif de développement

Apprentissage augmenté

HTML,  
CSS,  
JavaScript,  
Formation digitale

Compétences  
disciplinaires

Esprit critique,  
Créativité,  
Collaboration,  
Autonomie

Compétences  
transversales

Ingénierie des  
prompts,  
Compréhension  
des limites

Compétences  
liées à l'IA

L'IA ne remplace pas les compétences fondamentales,  
elle exige des compétences plus élevées



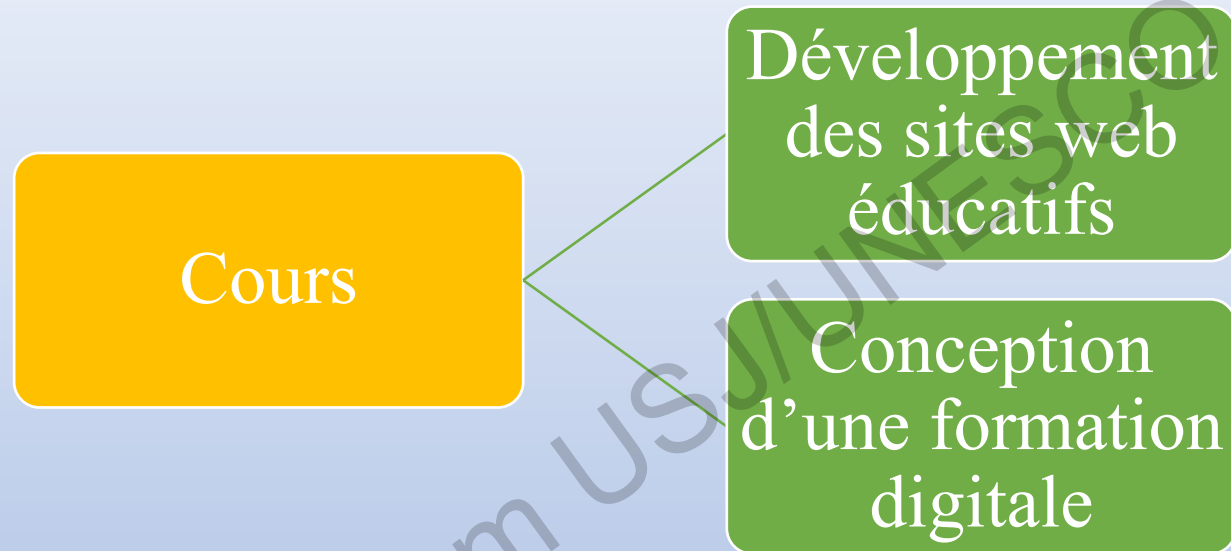
Danger de copier  
sans comprendre

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# Modalité de la pratique



## ➤ Les étudiants ont été amenés à :

- utiliser l'IA pour générer du contenu ou du code ;
- analyser de manière critique les réponses générées ;
- corriger les erreurs produites par l'IA ;
- améliorer et personnaliser les productions ;
- collaborer en groupe autour d'un projet intégrant l'IA.

# Fiche de suivi pédagogique de l'IA (Exemple)

Élément	Description
<b>Nom et Rôle</b> : Indiquer le nom et le rôle de chaque étudiant ? (Étudiant A : utilise l'IA ; Étudiant B : analyse et critique ; Étudiant C : améliore et finalise)	
<b>Utilisation de l'IA</b> : Quels prompts ont été utilisés ?	
<b>Problèmes rencontrés</b> : Quelles erreurs ou limites avez-vous trouvées ?	
<b>Améliorations</b> : Qu'avez-vous ajouté ou modifié ?	
<b>Collaboration</b> : Comment avez-vous collaboré ?	
<b>Réflexion finale</b> : L'IA a-t-elle aidé ou freiné votre travail ?	

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# Outils IA : Tuteurs & Échafaudages

ChatGPT

Google  
Gemini

Microsoft  
Copilot

Z.ai

Claude.ai

NotebookLM

# Cours 1: Développement des sites web éducatifs

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# Processus réflexif d'utilisation de l'IA

## 1- Analyse critique

- Générer un code par l'IA contenant des erreurs et les corriger

## 2- Créativité

- Transformer et améliorer un site généré par l'IA

## 3- Mini-projet collaboratif

- Travailler en groupes avec des rôles répartis

# Code - Concept du mouvement

**Prompt:** Créer une simulation interactive HTML/CSS/JS expliquant le concept du mouvement en physique niveau lycée

```
File Share Copy
256 }
257 Preview Code
258 /* responsive */
259 @media (max-width: 768px) {
260     main { flex-direction: column; }
261     #controls-panel { width: 100%; height: 40%; border-left: none; border-top:
262     #simulation-container { height: 60%; }
263 }
264 </style>
265 </head>
266 <body>
267
268 <header>
269 <h1>
270     <svg width="24" height="24" viewBox="0 0 24 24" fill="none" stroke="curren
271     <path d="M2 12h20"></path>
272     <path d="M12 2v20"></path>
273     <path d="m4.93 4.93 14.14 14.14"></path>
274     <circle cx="12" cy="12" r="10"></circle>
275 </svg>
276     PhysiqueSim <span class="tag">Lycée</span>
277 </h1>
```

# Version IA vs. Correction humaine

IA	Type	Correction Humaine	Explication
Balise <code>&lt;h1&gt;</code> fermée avec <code>&lt;/h2&gt;</code>	HTML	Utiliser <code>&lt;/h1&gt;</code>	Les balises doivent être correctement fermées
<code>;</code> manquant après <code>padding : 10px</code>	CSS	Ajouter <code>;</code>	Evite des erreurs d'interprétation du style
<code>;</code> manquant après <code>innerHTML</code>	JS	Ajouter <code>;</code>	Bonne pratique JavaScript

# Résultat – Concept du mouvement

PhysiqueSim Lycée Mouvement Parabolique

Temps ( $t$ ): 1.82 s  
Position X: 18.62 m  
Position Y: 3.59 m  
Vitesse ( $V$ ): 12.32 m/s  
État: En pause

Vitesse Initiale ( $v_0$ ) 15 m/s  
Angle de tir ( $\theta$ ) 47°  
Gravité ( $g$ ) 9.80 m/s<sup>2</sup>  
Hauteur initiale ( $h$ ) 0 m

Affichage & Outils  
 Vecteur Vitesse  Vecteur Force  
 Trajectoire  Ralenti

Énergie (Joules)  
Ec   
Ep   
Em

Reset Reprendre

# Code: Concept de trigonométrie

Prompt : Créer une simulation interactive HTML/CSS/JS expliquant la notion de trigonométrie en math niveau lycée, puis donner une activité et une évaluation

```
File Share | X
340 flex-direction: column;
341 align-items: stretch;
342
343 nav {
344 justify-content: center;
345 }
346 .controls {
347 flex-direction: column;
348 align-items: stretch;
349 }
350 }
351 </style>
352 </head>
353 <body>
354
355 <header>
356 <h1>
357 <svg width="24" height="24" viewBox="0 0 24 24" fill="none" stroke="currentCo]
```

# Résultat - Concept de trigonométrie (Simulation)

Trigonométrie Visuelle

Simulation    Activité    Évaluation

## Le Cercle Trigonométrique

Observez la relation entre l'angle et les coordonnées (cosinus, sinus).

cos: 1.00  
sin: 0.00

● Sinus (ordonnée)    ● Cosinus (abscisse)    ● Angle (rad ou °)

Angle :  $\theta^\circ$

Afficher en Radians ( $\pi$ )    Animation    Réinitialiser

# Résultat - Concept de trigonométrie (Activité)

## Activité Guidée : Valeurs Remarquables

Utilisez la simulation (ou vos connaissances) pour trouver les valeurs.

### Défi 1 : Le Quart de Tour

Placez l'angle sur  $90^\circ$  (ou  $\pi/2$ ). Que valent cosinus et sinus ?

Votre réponse pour  $\cos(90^\circ)$  :

Votre réponse pour  $\sin(90^\circ)$  :

Vérier


### Défi 2 : L'Angle à $45^\circ$

Placez l'angle sur  $45^\circ$  ( $\pi/4$ ). Quelle est la relation entre cosinus et sinus ?

Relation :

Vérier

# Résultat - Concept de trigonométrie (Evaluation)

 **Trigonométrie Visuelle** Simulation Activité Évaluation

## Évaluation Finale

Testez votre compréhension de la trigonométrie.

**Question 1 :** Dans le cercle trigonométrique, le cosinus d'un angle correspond à :

- L'ordonnée du point sur le cercle
- L'abscisse du point sur le cercle
- La longueur de l'arc

**Question 2 :** Quelle est la valeur de  $\cos(180^\circ)$  ?

- 1

# Cours 2: Conception de formation digitale

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# Processus réflexif d'utilisation de l'IA

## 1- Analyse critique

- Générer une conception de formation digitale avec des activités et des contenus de formation

## 2- Créativité

- Améliorer les scénarios pédagogiques et les activités afin de les rendre interactives et personnalisés

## 3- Mini-projet collaboratif

- Travailler en groupes avec des rôles répartis

# Résultat - Scénario Pédagogique

**Prompt:** Proposer un scénario pédagogique sur la Photosynthèse

- **Public cible :** Classes de 5ème, 6ème ou 7ème (10-13 ans).
- **Durée totale :** 60 minutes.
- **Modalité :** En ligne, asynchrone (Autonomie accompagnée).
- **Outils numériques utilisés :** PowerPoint, Vidéo, Mentimeter, Padlet, Google Docs (Formulaires/Feuilles).
- **Objectifs d'apprentissage**
  - Lister les composants nécessaires et les produits de la photosynthèse.
  - Expliquer le processus global de la photosynthèse.

# Résultat - Déroulement du Scénario Pédagogique

- 1. Introduction & Engagement (10 minutes)
- Activité 1 : Observation interactive (5 min) - Acquisition
  - Action de l'élève : Ouvrir le diaporama PowerPoint et observer la slide interactive : "De quoi une plante a-t-elle besoin pour grandir ?"
- Activité 2 : Remue-méninges visuel (5 min) - Investigation
  - Action de l'élève : Analyser une planche de bande dessinée (Comic) sur la photosynthèse. L'élève partage ensuite ses premières idées et devine le sujet exact du cours sur un nuage de mots interactif (Mentimeter).
- 2. Exploration & Apprentissage (35 minutes)
  - ...
  - ...

# Résultat - Storyboard

**Prompt:** Concevoir un storyboard et une description des écrans à développer sur la photosynthèse

- **Écran 1 : Titre et Introduction**
  - **Contenu** : Un visuel de plante en pleine croissance.
  - **Instruction** : "Bienvenue dans ce module interactif sur la photosynthèse" 1 .
- **Écran 2 : Menu des Objectifs**
  - **Contenu** : Trois icônes cliquables présentant les objectifs : 1. Processus, 2. Composants, 3. Produits 3 .
- **Écran 3 : Déclencheur (Warming up)**
  - **Contenu** : Une image interactive montrant une plante avec des zones cliquables (soleil, eau, terre).
  - **Action** : L'étudiant doit cliquer sur les éléments nécessaires à la croissance 2 5 .

# Résultat - Infographie

## Prompt: Concevoir une infographie



# Version IA vs. Correction humaine

Compétence	IA	Correction Humaine
Esprit Critique	Formule brute de la réaction chimique et QCM de mémorisation.	<b>Ajustement</b> : Retrait des notions trop abstraites.
Créativité	Visionnage d'une vidéo (apprentissage passif).	<b>Innovation</b> : Exploration active via un simulateur.
Collaboration	Parcours d'exercices strictement individuel en ligne.	<b>Co-construction</b> : Mutualisation des compétences pour inventer une tâche complexe et motivante.

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# Les Défis : Difficultés rencontrées

## ➤ Difficultés liées aux étudiants

- Tendance initiale à faire confiance automatiquement aux réponses de l'IA.
- Prompts parfois imprécis ou trop généraux.

## ➤ Difficultés pédagogiques

- Évaluer la contribution réelle de l'étudiant.
- Tendance à l'acceptation passive sans vérification initiale.
- Encadrer l'usage éthique et responsable de l'IA.

# Bénéfices : Une Valeur Démultipliée

## ➤ Développement des compétences disciplinaires

- Meilleure compréhension du HTML, CSS et JavaScript.
- Renforcement des compétences en conception pédagogique digitale.

## ➤ Développement des compétences transversales

- Esprit critique face aux réponses de l'IA.
- Créativité et personnalisation des projets.
- Collaboration & Synergie de Groupe
- Autonomie et réflexion.

## ➤ Effets pédagogiques observés

- Participation plus active des étudiants.
- Apprentissage plus interactif et réflexif.
- Gain de temps dans certaines tâches techniques.
- Meilleure implication dans les projets.

# Conclusion

Question pédagogique essentielle:  
Comment **éviter que l'IA** remplace la réflexion au lieu de la développer ?



## Évaluation

Ne plus noter le livrable seul, mais le processus (prompts, itérations et audit critique).

## Éthique

Instaurer une règle de transparence absolue : déclaration obligatoire de l'usage de l'IA.

## Accompagnement

Développer des activités hybrides où l'IA est un levier nécessaire mais insuffisant pour valider.

# L'IA au service du développement des compétences disciplinaires et transversales

*Cas des cours de Développement Web éducatif et de Conception de formations digitales*

Q&A

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**Greetings**



**AI-Integrated Translation Pedagogy:**

**Developing Critical, Ethical, and Audience-**

**Aware Language Competence**

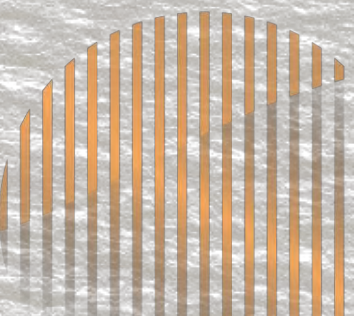
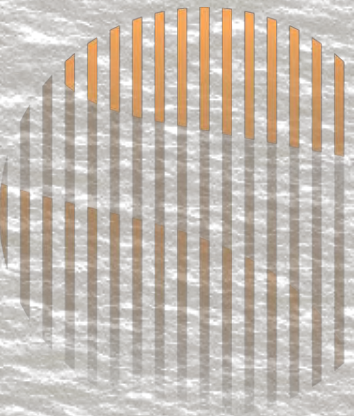
Patricia Zaylah, Assistant Professor – Holy Spirit University of Kaslik (USEK)

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- Key Takeaways
- Recommendations

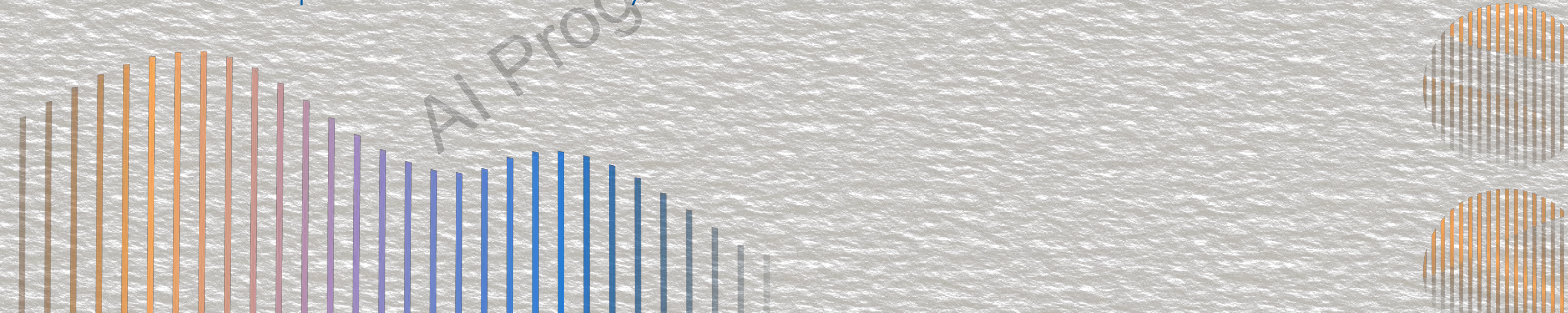
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# Introduction to AI-Integrated Translation Pedagogy

This pedagogical approach combines human translation expertise with AI-generated drafts and comparative analysis. The focus is on developing critical, ethical, and audience-aware language competence through reflective use of AI tools, not blind reliance. Students learn to leverage technology while maintaining human judgment, preparing them for contemporary translation environments where technology and expertise must work in harmony.



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# Context and Rationale

The rapid advancement of artificial intelligence has fundamentally transformed the translation profession, creating both unprecedented opportunities and significant challenges.

As AI tools become increasingly sophisticated, translation educators must prepare students not merely to use these technologies, but to engage with them critically, ethically, and with full awareness of audience needs.



# The Challenges We Observed

Our pedagogical question: How can AI become a tool for developing critical translation competence rather than replacing it?

Students increasingly

Copy AI translations without reflection

Assume AI is always correct

Focus only on the final answer

Ignore audience, tone, and context

Struggle with justification of choices

Question AI output

Compare alternatives

Detect weaknesses

Improve the translation

Adapt the text to audience and context

Explain their decisions

Students must



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# Expected Learning Outcomes

Critical thinking and autonomy

Reflective and ethical AI use

Comparative evaluation skills

Justification of translation choices

Awareness of AI strengths and weaknesses

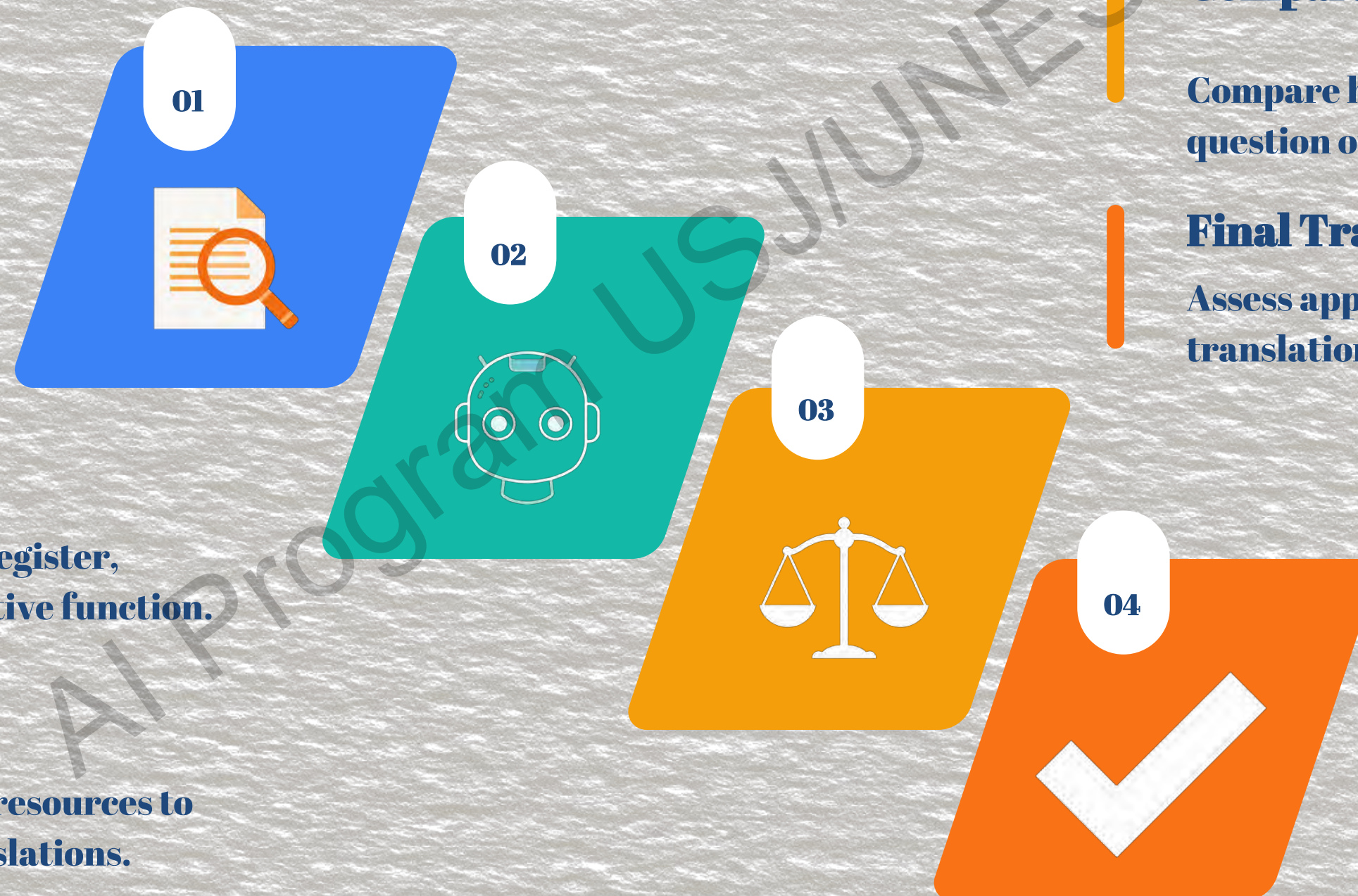
Adaptation to context

Creativity and flexibility

Professional responsibility

# Structured Learning Process

A four-stage approach combining human expertise with AI-assisted translation.



## Textual Analysis

Identify text type, genre, register, audience, and communicative function.

## AI Draft Generation

Use AI tools as supporting resources to generate initial draft translations.

## Comparative Evaluation

Compare human and AI translations, question outputs, and justify choices.

## Final Translation

Assess appropriateness and produce translation faithful to source function.

# Stage 1: Textual Analysis

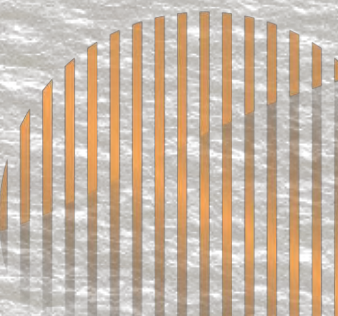
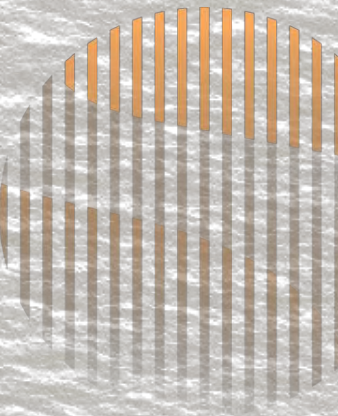
Students receive the source text and conduct thorough preliminary examination before engaging with AI tools. This foundational stage involves identifying the text type, genre, register, and intended audience. Students reflect on the communicative function and anticipate potential translation challenges. This analytical groundwork establishes critical awareness and prepares students to evaluate AI-generated translations with informed judgment.

---

# Stage 2 – AI Draft Generation

In this exploratory stage, students generate draft translations using AI tools such as DeepL and ChatGPT. The AI is explicitly framed as a supportive tool rather than an authoritative final source. Students are encouraged to experiment with different prompts, instructions, and parameters to understand how AI responds to varied inputs. This hands-on experimentation helps develop awareness of AI capabilities while maintaining critical distance from machine-generated output.

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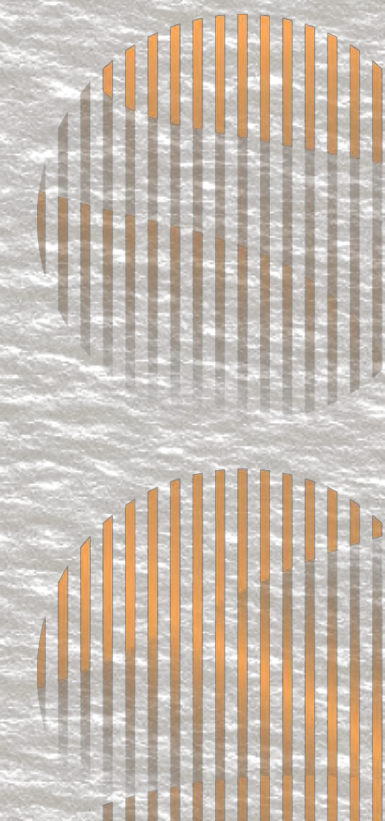


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## Stage 3 – Comparative Analysis

This critical evaluation phase examines differences in meaning, tone, accuracy, and cultural adaptation between human and AI translations. Students justify which version better suits the communicative purpose and target audience. Key focus areas include identifying AI limitations in handling register variations, cultural nuances, and specialized language domains such as legal, economic, or technical terminology.

This stage encourages metacognitive awareness and ethical AI use. This process fosters transparency in the translation workflow and promotes critical engagement with technology. By reflecting on their choices, students develop responsibility in AI use and gain deeper understanding of their own translation competence and decision-making processes.



# Stage 4 – PE and Adaptation

This stage focuses on producing final, polished translations by integrating linguistic and cultural insights gained from comparative analysis. Students revise AI-generated drafts, correcting errors in meaning, tone, and cultural appropriateness. Where relevant, they create multiple versions tailored for different audiences, demonstrating flexibility and audience awareness in their translation practice.

# Example Activity 1: Student Reflection

Students explain their choices using reflective prompts:

- Why did you reject the AI version?
- Which term better fits the target audience?
- Which version sounds more persuasive?
- Which expression is more natural culturally?
- Did AI preserve the communicative function?

This approach shifts focus from "finding equivalents" to "making justified decisions."

# Example Activity 2: Audience Adaptation Task

Students translate this single text for different audiences:

- Children
- Professionals
- Social media users
- Formal institutional communication (NGO, Government, Teen campaign)

Key Learning Outcome:

Highlights the critical importance of audience-aware translation. The same message requires different linguistic choices, tone, and register depending on who will receive it.

# Example Activity 3: Cultural Adaptation

Focus areas for cultural adaptation analysis:

- Idioms, humor, politeness markers
- Slogans and emotionally loaded words

Example: "Feel at home" (AI literal translation may sound awkward or unnatural).

Student discussion points:

- Emotional effect on target audience
- Cultural expectations and norms
- Target audience perception differences
- Why literal accuracy  $\neq$  communicative effectiveness

# Example Activity 4: Spot the Bias

Students analyze different texts, ads, images, news headlines, or AI-generated responses to identify hidden bias:

Gender bias

- Cultural bias
- Political bias
- Media bias
- AI-generated bias or stereotypes
- Biased word choice and framing

Key Learning Outcome:

Develops students' critical thinking and media literacy skills by helping them recognize how language, and AI-generated content can subtly influence perceptions, reinforce stereotypes, or shape public opinion.

# What Changed in Students?

Students became:

- less passive toward AI
- more analytical
- more audience-aware
- more attentive to nuance
- more reflective in decision-making

**Most important shift:**

From: “AI gave me the answer.”

To: “I evaluated whether the AI answer works.”



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# Challenges Encountered

## 1. Over-trust in AI

Students initially assumed AI was always correct.

## 2. Product-oriented mindset

Students focused only on the final translation.

## 3. Digital literacy differences

Some students knew prompting strategies better than others.

## 4. Need for constant ethical framing

Students needed reminders that: **AI assists, it does not replace judgment!**



# Skills Developed

Key competencies students gain through AI-integrated translation practice.

## Critical Thinking

Students learn to question AI output, justify translation choices, and evaluate appropriateness.



## Cultural Awareness

Developing sensitivity to cultural nuances, register, and audience expectations in translation.



## Professional Competence

Building skills in textual analysis, genre identification, and communicative function assessment.



## AI Literacy

Learning to use AI ethically as a supporting tool while understanding its limitations and biases.



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# Key Takeaways

These principles guide effective AI-integrated translation learning.



## AI as a Tool, Not Authority

Use AI to support translation work, but always question and evaluate its output critically.

## Comparative Analysis Matters

Compare human and AI translations to identify strengths, weaknesses, and contextual appropriateness.

## Communicative Fidelity

Ensure translations remain faithful to the source text's purpose, function, and intended audience.

## Justified Decision-Making

Always justify translation choices with clear reasoning based on textual analysis and context.

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# Practical Recommendations for Teachers

## Recommendations Based on Experience

### 1. Start with analysis before AI

Never begin directly with AI output.

### 2. Make students justify decisions

Reflection is essential.

### 3. Use AI comparatively

Not as a final authority.

### 4. Teach prompt engineering pedagogically

Students should understand how instructions shape output.

### 5. Focus on audience and communication

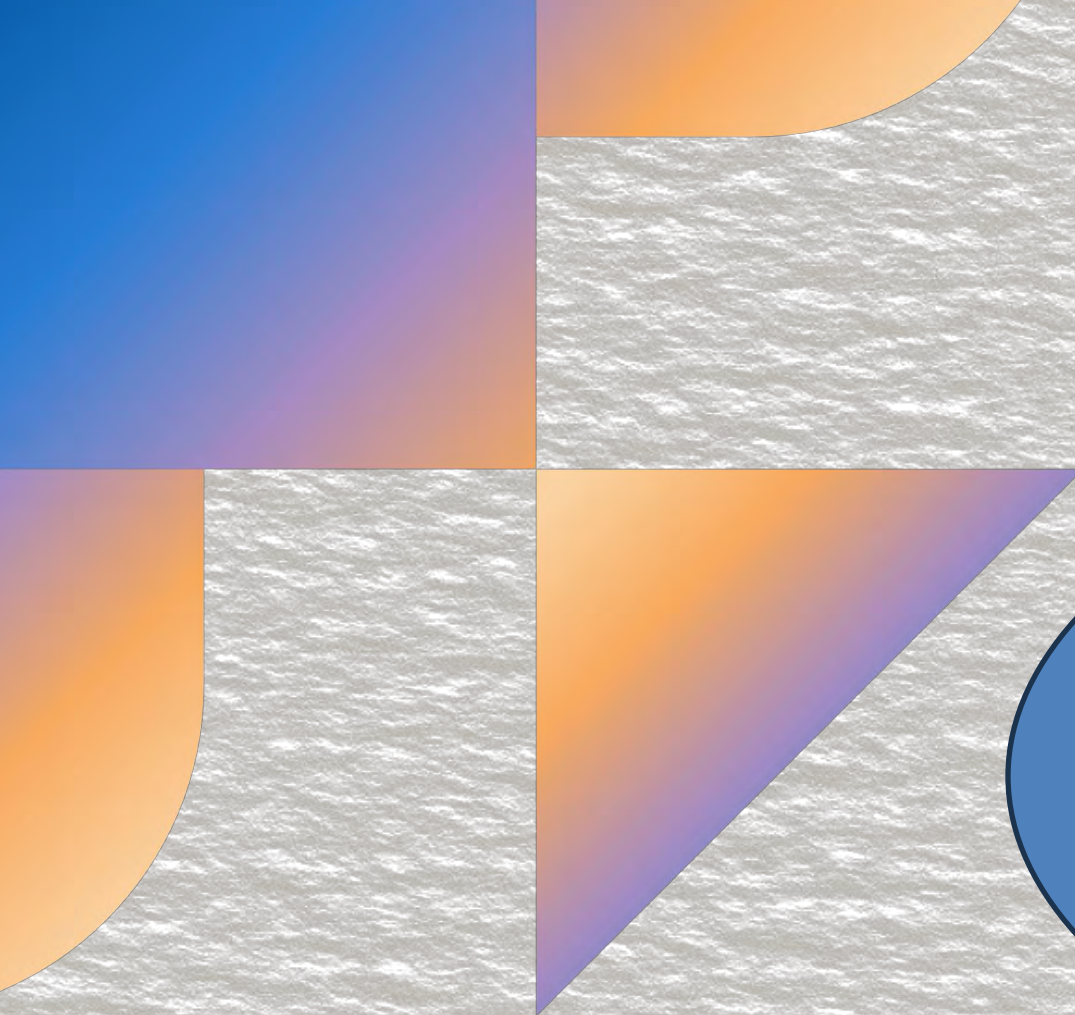
Not only linguistic accuracy.



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# Recommendations for Effective Integration

- Gradual and structured introduction of AI tools into the curriculum
- Explicit training in critical and ethical AI use for students
- Emphasize translation process over product in assessment criteria
- Encourage collaboration and peer discussion on AI outputs
- Reinforce that AI is a support tool, not a substitute for human judgment
- Align AI use with core pedagogical goals of autonomy and critical thinking



AI should not simplify thinking. It should deepen it.

The goal is not faster translation but more reflective translators.

**Thank you for your  
attention.**

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# AI as a Critical Co-Pilot

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A good practice for developing judgment, creativity, collaboration, and accountability in AI-enabled learning

**Prof. Mariette Awad**



**AMERICAN  
UNIVERSITY  
OF BEIRUT**



# Disclaimer

I don't have any fundings or grants from any High Tech company.

# Education 1.0 to 4.0

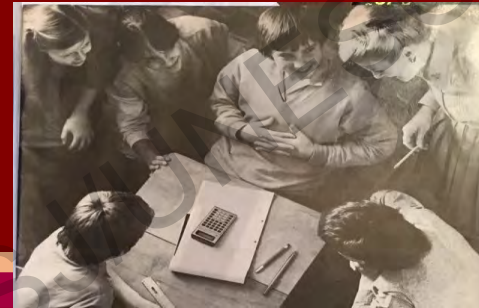
## Education 1.0

Teacher Late 18th century centered learning



## Education 2.0

First Half 20th century  
Teacher centered, some distance learning



## Education 3.0

Second Half 20th century  
Teacher centered, some active learning

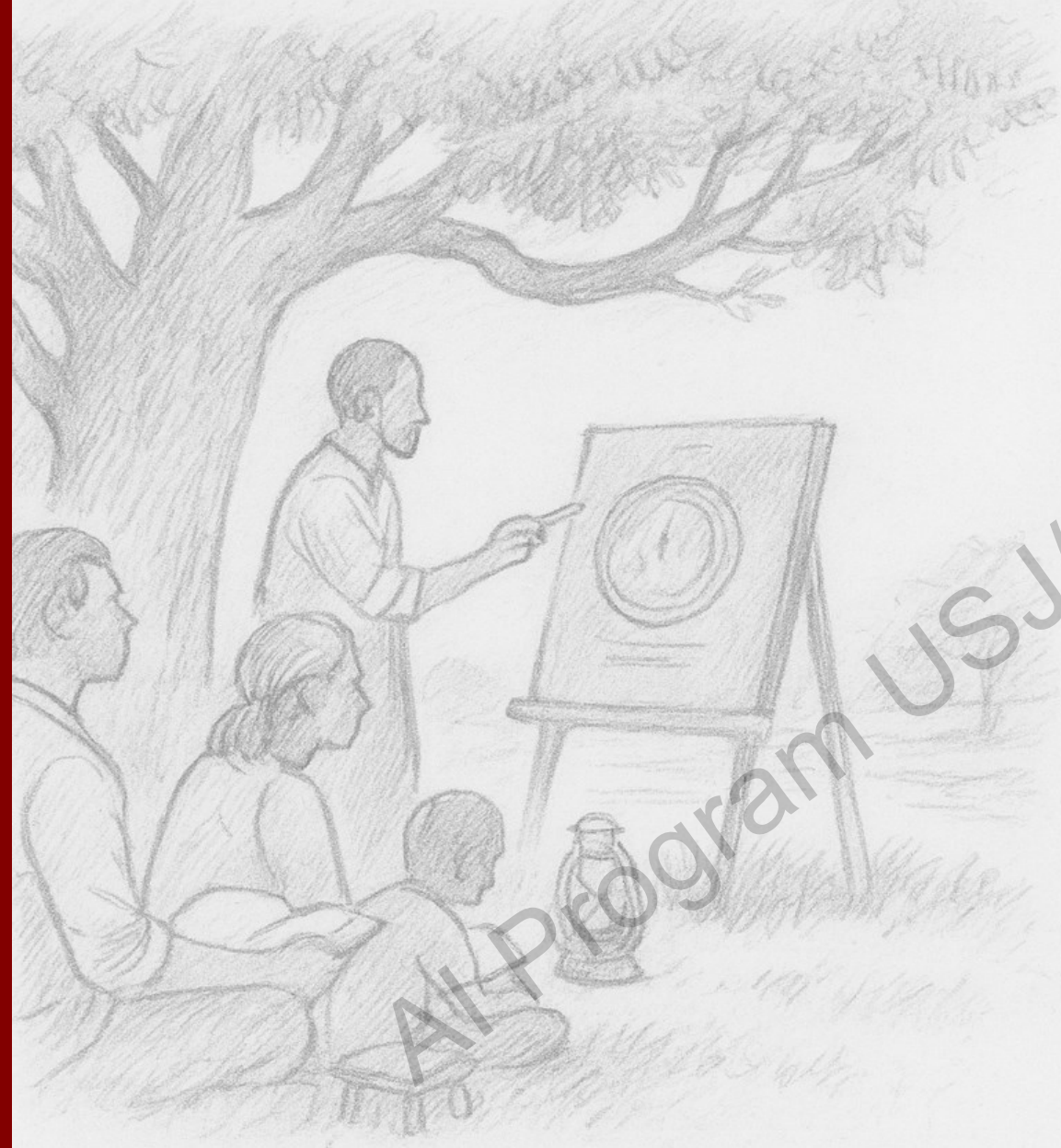


## Education 4.0

21th century  
Student-centered, technology based, competency/Skills focused and active learning



Under the Tree: Then and Now



THEN: LEARNING UNDER A TREE

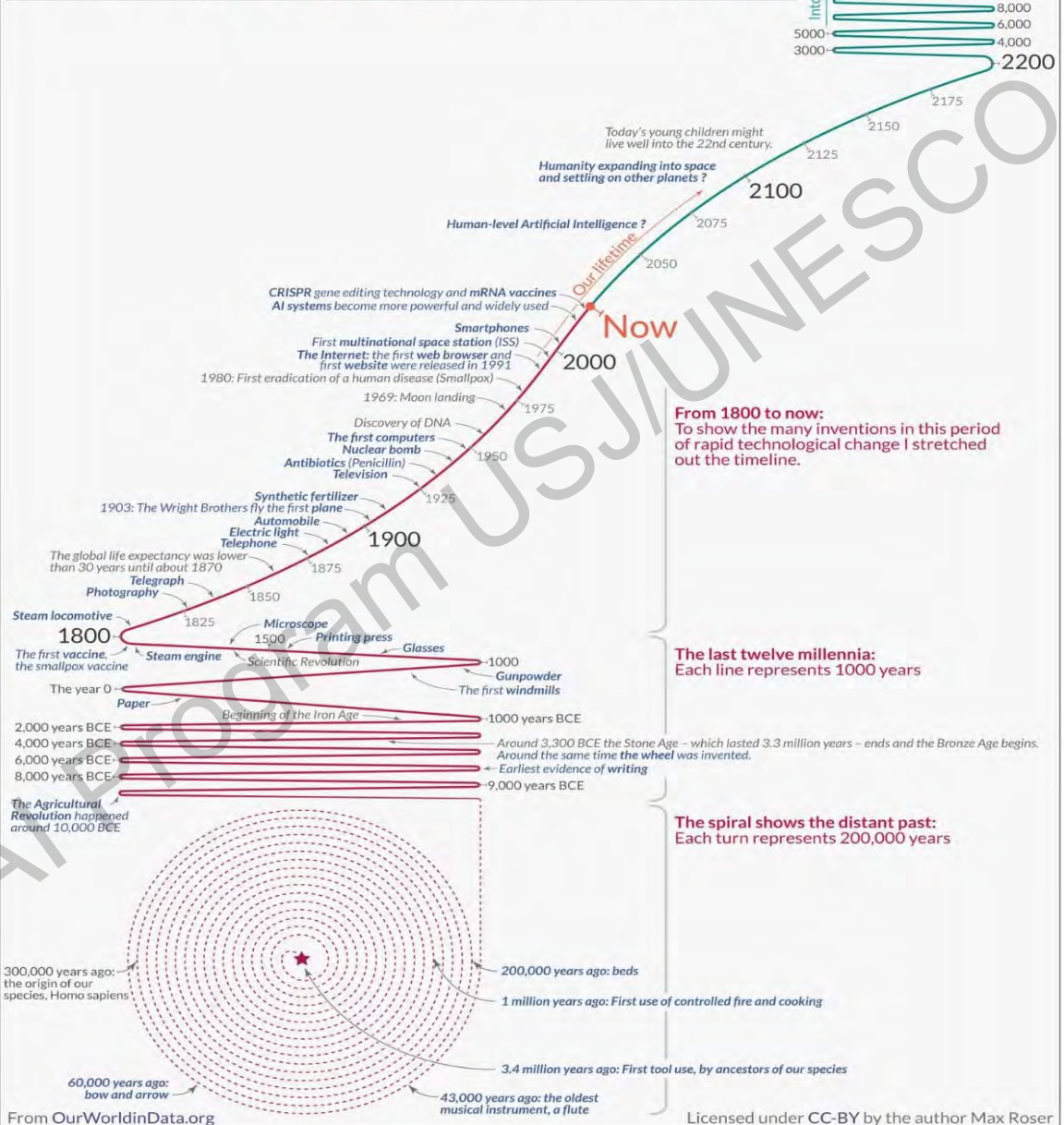


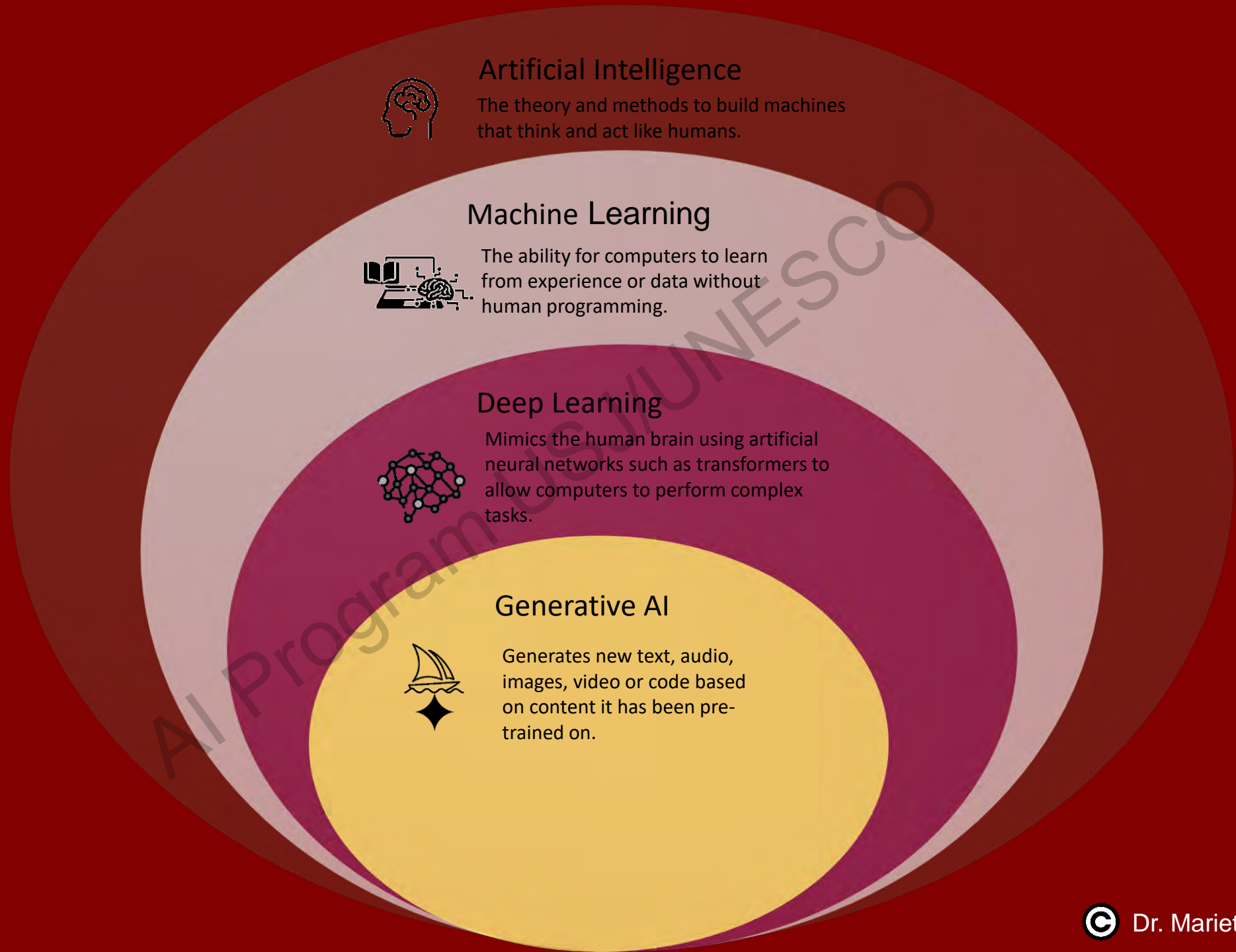
NOW: LEARNING ANYWHERE — EVEN UNDER A TREE

# A long-term timeline of technology



From the distant past, to our lifetime, and into the distant future.





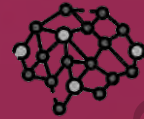
## Artificial Intelligence

The theory and methods to build machines that think and act like humans.



## Machine Learning

The ability for computers to learn from experience or data without human programming.



## Deep Learning

Mimics the human brain using artificial neural networks such as transformers to allow computers to perform complex tasks.



## Generative AI

Generates new text, audio, images, video or code based on content it has been pre-trained on.

## Emerging Trends and Innovative Methodologies

### Generative AI in Teaching and Learning Design

Course content,  
learning experiences  
and assessment  
generation



### AI for Collaborative Learning

Smart forums, AI  
moderation, and  
feedback



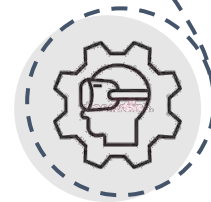
### Learning Analytics for Impact

AI for predictive  
analytics to identify  
students at risk of  
dropping out

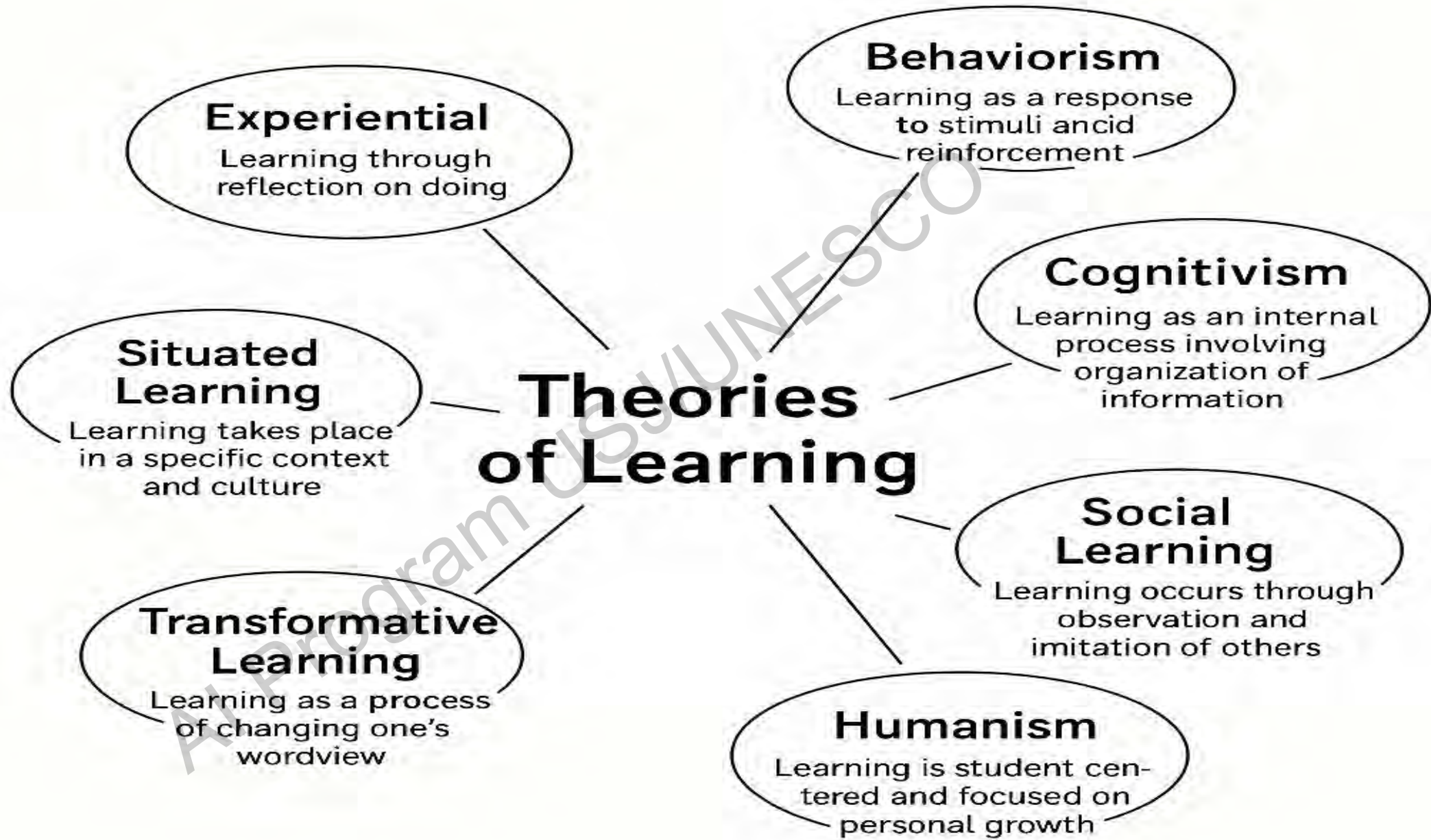


### Immersive AI Learning

AI in simulations and  
scenario-based  
learning



# Theories of Learning



# Bloom Taxonomy



## Pedagogical Theories and AI Reflections



### Constructivism

AI simulates environments for experiential learning; adapts to learner inputs

### Connectivism

AI enables knowledge networks, semantic search, and collaborative filtering

### Social Learning Theory

AI-driven avatars and virtual agents allow modeling of behaviors; AI curated content reflects diverse experiences

### Bloom's Taxonomy

AI assesses lower-order tasks and supports higher-order tasks through feedback and co-creation tools

### Zone of Proximal Development

AI adjusts difficulty levels dynamically, acting as a digital scaffold.

## Psychological Theories and AI's Influence

### Cognitive Load Theory

AI manages information overload



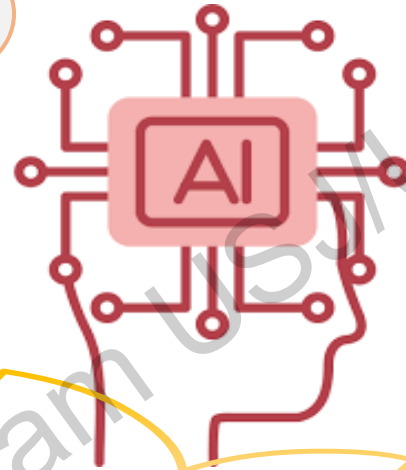
### Motivation Theories

AI enhances intrinsic motivation



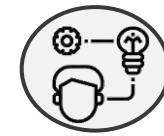
### Metacognition

AI fosters self-reflection and self-assessment



### Behaviorism

Gamified AI environments provide rewards



### Flow Theory

AI adjusts challenge levels

# Novel Perspectives on the Value Created by Learning Organizations in the AI Era

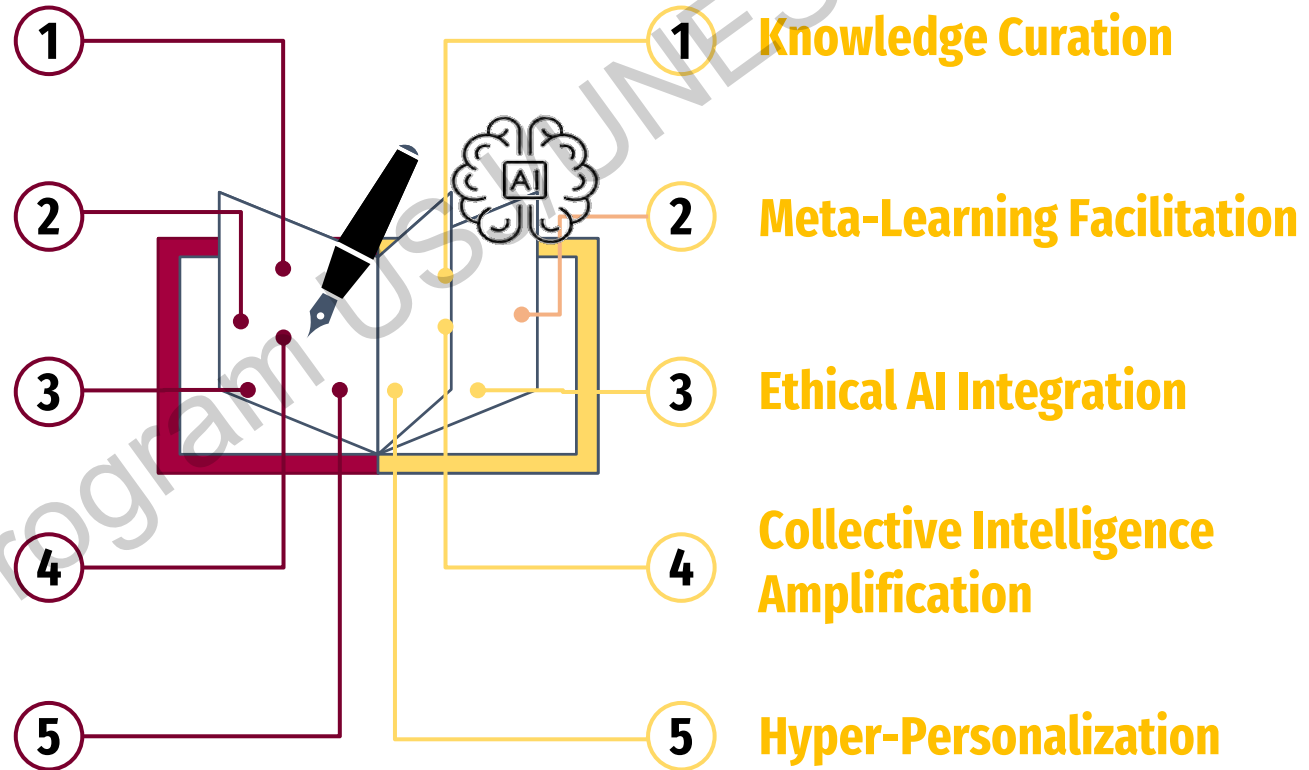
**Knowledge Transmission**

**Learner Skill Development**

**Capacity Building for Practice**

**Organizational Learning**

**Access to Learning**





AMERICAN  
UNIVERSITY  
OF BEIRUT

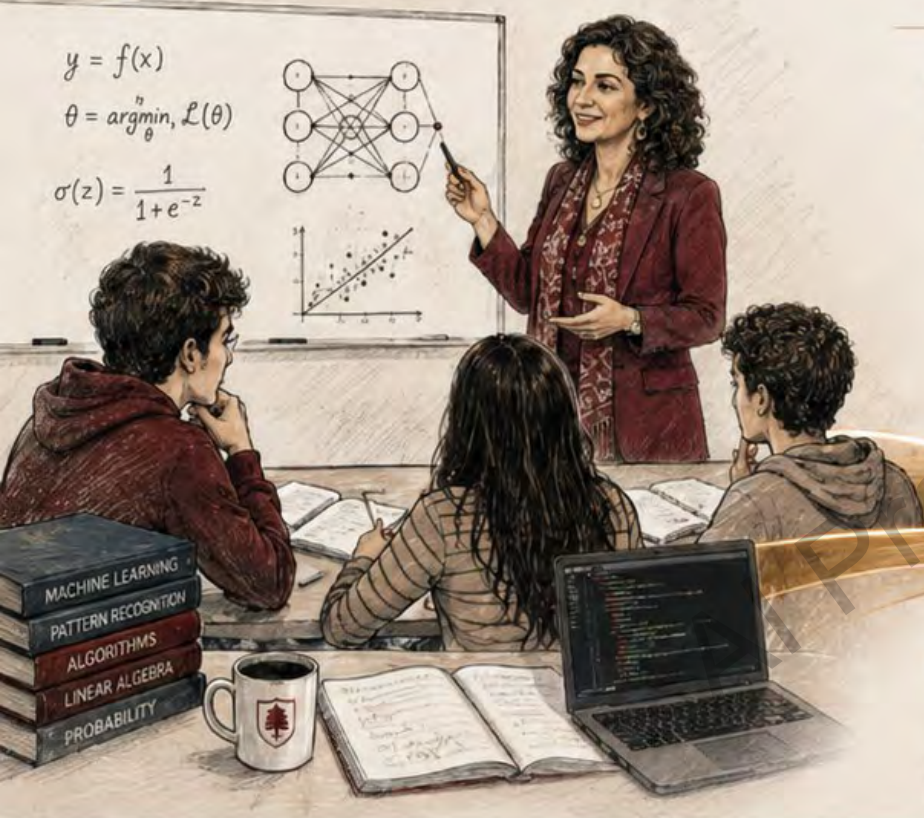


# 18 Years of Teaching AI

## Now Teaching AI Using AI

From teaching algorithms to teaching judgment.

THEN  
Teaching AI  
(Foundations)



NOW  
Teaching AI  
Using AI



2006  
Algorithms & Models



2015  
Applications & Impact



2024+  
Judgment & Stewardship



FROM KNOWING  
THE TOOLS



TO QUESTIONING  
THE ANSWERS



TO SHAPING A  
BETTER FUTURE

AI is powerful.  
Judgment is human.

# The goal is not AI-proof teaching. It is AI-responsible learning.



AI should not reduce learning to faster answers.  
It should raise the standard for explanation, verification, and responsibility.

# The AI classroom plot twist

When answers become instant, the course must make thinking visible.

The “Ethos–Tech Nexus” frames AI teaching as technical mastery joined to ethical discernment: students must design, interrogate, and defend intelligent systems.

AI should raise the standard, not lower the effort.



# The Good Practice

AI is integrated as a learning partner — but every output must be questioned, verified, and defended.

## CORE IDEA

### Explore

Use AI to generate explanations, alternatives, code hints, and questions.

### Verify

Test claims against theory, data, experiments, and course concepts.

### Explain

Defend assumptions, model choices, code behavior, and ethical implications.

**AI should expand student agency — not replace intellectual responsibility.**

# The Missing-Cell Challenge

Incomplete notebooks turn AI from a shortcut into a reasoning test.

```
EECE490/690 · pre_lab.ipynb
```

```
# explain before running
```

```
X_train, X_test = _____
```

```
baseline = choose_before_complex_model()
```

```
metric = justify_metric( _____ )
```

```
# where could leakage happen?
```

```
student_reflection = "_____"
```

AI may suggest. The student must complete the thought.

## Why it is catchy in class

1

### A blank cell becomes a checkpoint

Students cannot hide behind generated code

2

### The notebook asks “why?”

Assumptions, baselines, leakage, metrics

3

### Class time becomes a clinic

Debugging + architectural reasoning, not syntax repetition

Examples: incomplete notebooks · interactive lectures · self-tests · DataCamp scaffolding

a) Spring 25: EECE693 Interactive lectures, which complements with some main online references, the lecture material for each topic in the syllabus

b) Spring 25: EECE693 Test your knowledge and Self Tests for each topic in the syllabus

c) Spring 25: EECE693 Python Notebooks for the hands-on

### Topic 3 - Recurrent Neural Networks

- RNN
- LSTM
- Attention
- Transformers
- Visualizing LLM
- Visualizing Attention
  - (Interactive Lecture) Introduction to Recurrent Neural Network
  - (Interactive Lecture) The Basics of RNN
  - (Interactive Lecture) Recurrent Neural Network: Training
  - (Interactive Lecture) RNN Variants, LSTM, GRU, Attention Networks
- RNN hands on session
- RNN hands on session solved notebook

### Test your Knowledge

#### Topic 1 - Deep FeedForward Networks

- NN Practise
- NN Practise Solution
- Test Your Knowledge: Introduction to Feed Forward Neural Networks
- Test your knowledge
- Test Your Knowledge: Components of Feed Forward Neural Networks
- Test Your Knowledge: Feed Forward Neural Networks: Training
- Test Your Knowledge: Feed Forward Neural Networks: Regularization

#### Topic 2 - Convolutional Neural Networks

### Self tests

- Self Test - Basics of Machine Learning
- Self Test - Regression
- Self Test - Decision Trees and Random Forests
- Self Test - SVM
- Self Test - Neural Networks
- Self Test - NN Solution
- Self Test - Bayesian Models
- Self Test - Unsupervised and RL

### Previous Quizzes

- Quiz 1: Basics, GD, Regression, Logistic
- Quiz 2: Decision Trees, Random Forests

### FeedForward Deep Neural Networks

- Building A Neural Network From Scratch
- Utils
- Building A Neural Network From Scratch (Solution)
- Training the Built Network

### Convolutional Neural Networks

- Training the Built Network (Solution)
- Chins with Small Datasets
- Visualizing What CNNs Learn

### Lab 2 - Neural Networks

You can upload the given notebooks to your Google Drive to open them directly in Colab. It is highly recommended that you upload the "kaggle.json" file to your Google Colab runtime to be able to download the dataset.

For image reading and processing check the different Python image libraries you can use: <https://towardsdatascience.com/are-they-different-11672b56273d>

Once finished, you can submit your solution as an HTML file for submission.

Due November 4

Lab 2 Hints

<https://aub.webex.com/jub/join?pwd=9Ea4100c43d13c9e79e4c36de61722b7>

Password: 6EeR/h3@

d) Fall 22: EECE490/690 – asynchronous support video to help students navigate complex coding assignments

### 3.2 - Handling Missing Values

We need to fill the gaps in the Age and Embarked columns.

Exercise: Fill the missing Age values with the median age, and

```
##> LEAVE THIS CELL AS IS ##>
...
##> END YOUR CODE HERE ##>

print("Missing values after imputation")
print(df_clean.head())
```

### 3.3 - Converting Categorical Data

Our model needs all input to be numerical. We'll convert Sex and Embarked into numbers using one-hot encoding.

Exercise: Use pd.get\_dummies to convert Sex and Embarked to numerical columns. Set drop\_first=True to avoid redundant columns.

```
##> LEAVE THIS CELL AS IS ##>
# Convert categorical variables into dummy/indicator variables
df_model = ...
##> END YOUR CODE HERE ##>

df_model.head()
```

c) Spring 25: EECE490/690 Course- Notebooks with incomplete cells for the Hands-on sessions, structured as pre-lab then active learning

# The Defense Arena

Learning reward ownership, not just output.

## WHY?

Every AI-assisted result must survive explanation, evidence, and questioning.

**4–5 handwritten synthesis sheets**

concept compression

**Recorded implementation walk-throughs**

student-level ownership

**Transparent AI assistance declaration**

visible use

**Oral defense questions**

trade-offs under pressure

Core assessment question: Can the student explain why the result is correct, limited, or wrong?

## Flip the Classroom



GANs

Recording link: <https://aub.webex.com/jub/ld>

Password: qSWvzK\$4



GANs notebook



Deep RL



Deep RL Notebook



Zero shot learning



Transfer Learning



Transfer Learning Python Notebook 1



Transfer Learning Python Notebook 2



Siamese Networks



Siamese Networks Notebook



Large Language Models



Federated Learning



One Class Models



U Net



U Net notebook



GNN

## Deliverables (One submission per group is enough)

### 1 Jupyter Notebook Submission

- Download the attached Jupyter Notebook with **missing code snippets** that you need to complete. Make sure to follow the steps and guidelines provided.

#### Instructions:

- Complete all missing code sections.
- Provide clear explanations in markdown cells.
- Ensure proper variable naming and comments for readability.
- Do NOT import additional libraries—only use those already included in the provided notebook.
- Make sure to rename the notebook to `EECE693_act1_subnets.ipynb`, where `subnets` is the AUBNet of group members, separated by an underscore.

### 2 Video Explanation (Max: 5 Minutes)

- Each group must submit a **video (max 5 minutes)** explaining their solution.
- All members must **speak** and introduce themselves.
- Clearly explain your approach, results, and key takeaways.

Neural Networks (not unique solution)

regression (linear)  
binary class (sigmoid)  
multi-class (softmax)

$$J = \frac{1}{2} \sum_{i=1}^m E(i) = \frac{1}{2} \sum_{i=1}^m (y_p(i) - y_a(i))^2$$

or multiclass:  $-\frac{1}{m} \sum_{i=1}^m \sum_{n=1}^N y_n^{(i)} \log(h_n^{(i)}) + (1 - y_n^{(i)}) \log(1 - y_n^{(i)})$

sample input  $x$  output  $y$

input  $X: m \times (n+1)$   
output  $y: m \times 2$

$\sigma_{J_i}^{(l)}$ :  $S^{(l+1)} \times (S^{(l)} + 1)$

$\{j\}$  = in layer  $l$   
 $a_i$  = neuron  $i$

## Deep Learning in Industry



Bioinformatics meets Deep Learning



Bioinformatics meets Deep Learning code



Chatbots

# The AI Mistake Hunt

Students learn to treat AI output as a suspect — not a verdict.

## Bias

Who is missing?

## Framing

What values are assumed?

## Evidence

What cannot be verified?

## Cost

Was a simpler tool enough?

Controlled prompting experiments · cross-model comparison  
· usage audits · medical AI risk analysis

Ethical AI becomes a lab practice, not a lecture topic.



## Assignment 1

Introduction to Large Language Models  
American University of Beirut  
Instructor: Prof. Mariette Awad

### Shaping the Future of Large Language Models: Vision, Constraints, and Economics

Submission: PDF  
Total: 100 points

#### Why This Assignment

Large Language Models (LLMs) extend beyond algorithmic artifacts. They function as research systems, economic infrastructures, and interventions with societal impact.

This assignment is designed to assess your ability to reason about LLMs under explicit constraints. In particular, it evaluates whether you can:

- Reason systematically under stated assumptions.

## Assignment 1: Learning with ChatGPT

- 1) Find a use case where ChatGPT displays a human par performance
  - 2) Find a use case where ChatGPT fails to perform as a human expert
  - 3) Demonstrate through use cases how ChatGPT learns
  - 4) Reflect on how ChatGPT will impact engineering and STEAM education as well as society at large
- And finally why and how you would use ChatGPT

You can use ChatGPT in your assignments as long as you acknowledge it and is able to defend your work. Group work is encouraged. Submit your work in ppt format, few slides for each part of the assignment.

### LLMs and Controversial Topics

Edit

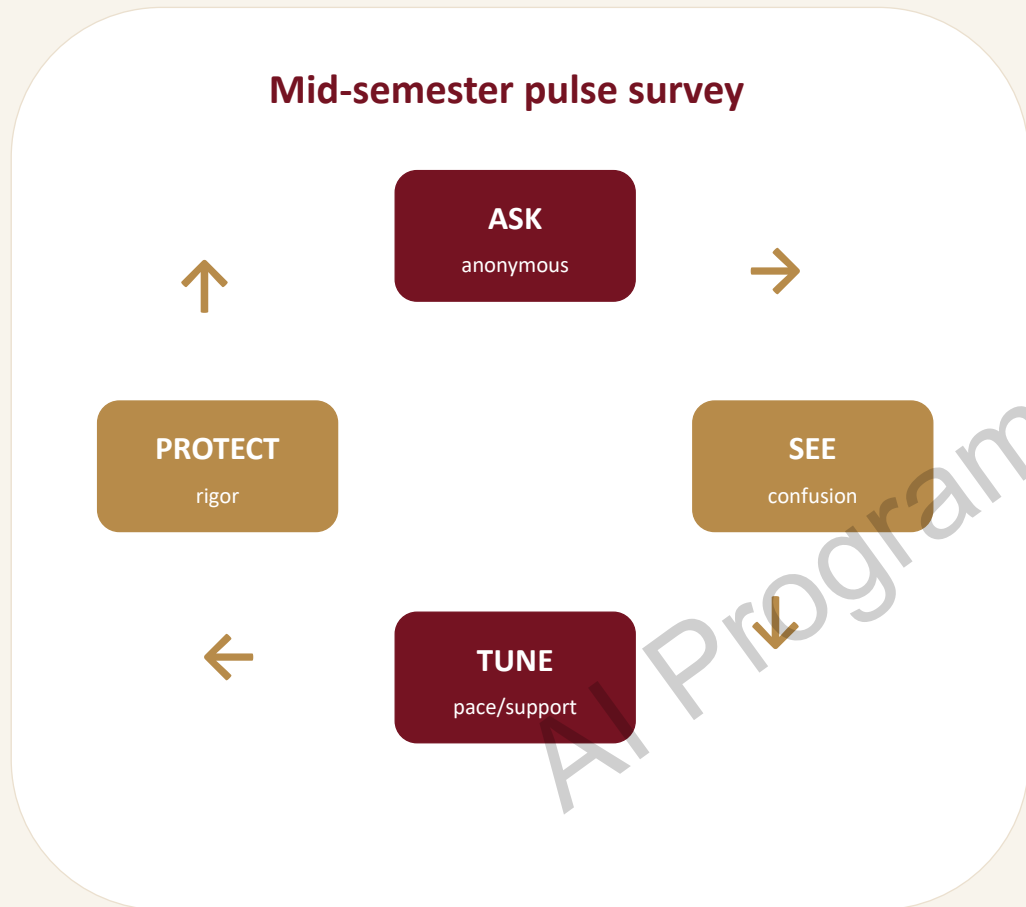
Comparing responses of LLMs created by different regions on controversial topics (such as cultural sensitivity, religion, conflicts, gender, professions, global south, philosophy, bullying, security, etc...) of your choice.

LLMs to include:

- Mistral (Europe)
- ChatGPT, LLAMA (US)
- Deepseek, Kimi (China)
- Jais, Fanar (Gulf)

# The Feedback Radar

The course learns while students learn.

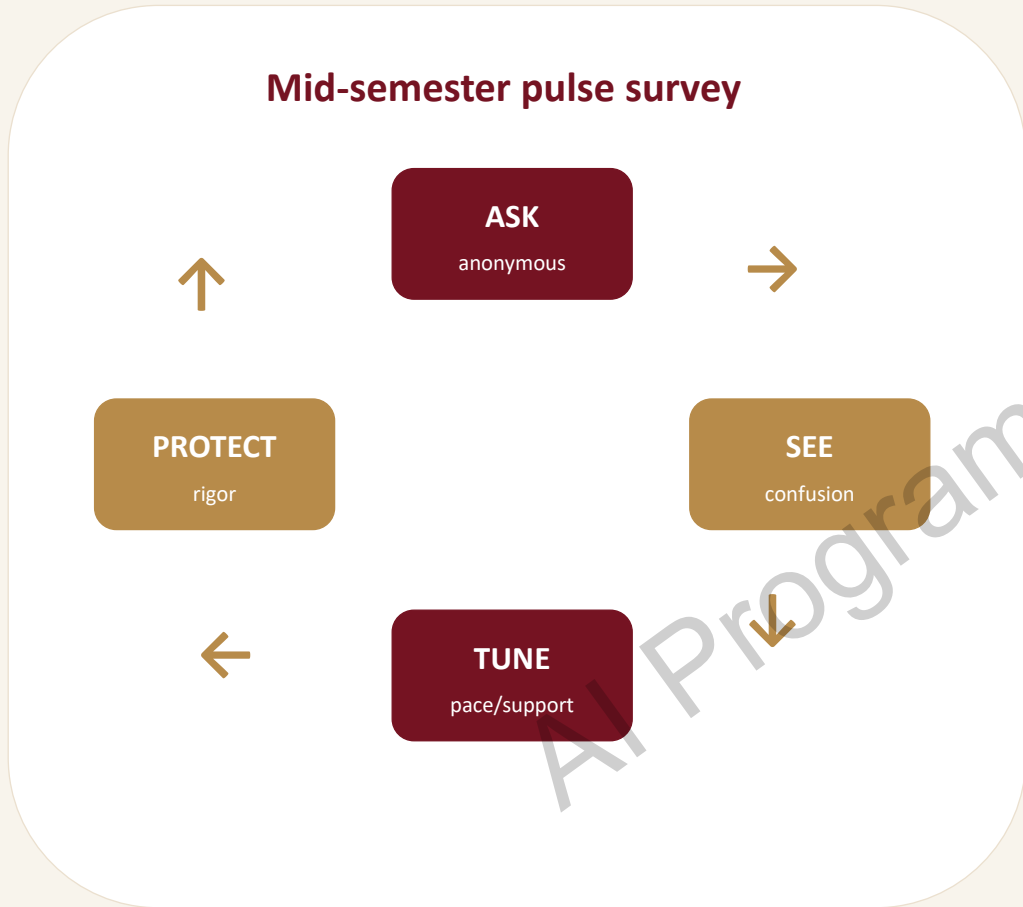


**Anonymous Surveys from EECE490/690 and EECE693 for years 2023-2025**

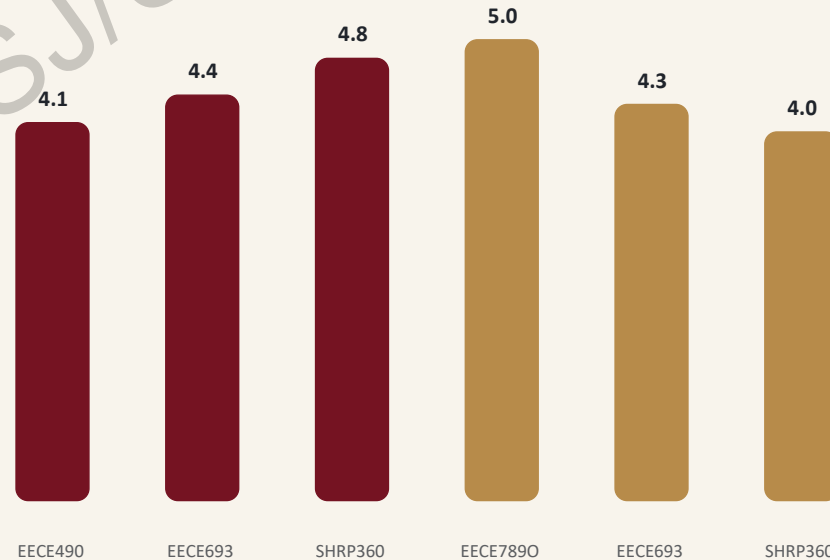
<p><b>What do you believe the instructor has done especially well so far?</b> 16 responses</p> <p><b>Course Organization</b></p> <p>The classes are very interactive and the labs (/assignments) are practical. The course is well paced and flexible, giving us time to prepare &amp; do our best!</p> <p><b>Class Discussions and hands on sessions</b></p> <p>The instructor has demonstrated some levels of professionalism with experts while delivering the course at all time.</p> <p>Linking the various topics to actual real-world deep learning applications.</p> <p><b>You could write:</b></p> <p>The instructor's enthusiasm when explaining concepts, along with her warm smile, reminds me of my school teacher, making the learning experience more memorable.</p> <p>Adding hands-on sessions after each chapter to complement the theoretical aspect.</p>	<p><b>What do you believe the instructor has done especially well so far?</b> 12 responses</p> <p>I like how from time to time there's the solving together or the idea of asking someone to explain something the class feels more interactive. I also really find the test your knowledge sections on moodle and the way they affirm whether I understood the material or I need to work more on certain areas</p> <p>Clear explanations and more explanatory materials</p> <p>Great at delivering the message of each topic</p> <p>NA</p> <p>Concepts are made easy to understand. The slides' visuals and content really help a lot, as well as the interactive lectures on moodle. Also, it's good that we have hands-on session.</p> <p>Simplify complex ideas</p> <p>Pace in lessons and labs is good</p> <p>Project organisation</p>
<p>16 responses</p> <p>...making, like having examples, and so on. Encouraging environment for learning. This patient and effective teaching methods make the material both interesting and accessible.</p> <p>Going through the topics at an extremely manageable pace, giving us students enough time to comfortably revise the material at home and also dedicating lab sessions for practical implementations of said topic.</p> <p>Other than the instructor's excellent knowledge and understanding of the course material. The course project is very well guided with very interesting topics that will for sure increase my interest in this course.</p> <p>Recap all info after watching the interactive lectures</p> <p>I think the instructor has done a great job by introducing new topics instead of repeating what we learned in EECE 490. The course builds on what we already know, and the instructor quickly reviews the old material so we can focus more on learning new and advanced concepts.</p> <p>Dr. Mariette is an amazing professor. She makes the session not the typical lecture-based sessions, more like discussion-based, which makes the course more engaging. She always tries to push our boundaries to think about the implications of what we're working on, and at the same time, how we could dive more into a more mathematical-based approach for research.</p>	<p>13 responses</p> <p>The effort to make the class interactive so it doesn't seem like a dead class. She really cares for us to catch the info well. She is also cool.</p> <p>The instructor showed a lot of knowledge in the material explained. She demonstrated the ideas in a very clear way that made them very understandable. A small note though is that she can be a little bit slower while explaining.</p> <p>Yes</p> <p>The slides are perfect</p> <p>The flow and the way of explaining is very well</p> <p>The instructor "forced" us to understand all the details of all the concepts instead of simply memorizing them. This positively affected the engagement in classes.</p> <p>Other than the instructor's excellent understanding and knowledge of the course material, the guidance that is being offered for the project and its importance makes the course more interesting. Also, the project topics provided for us are very interesting and tackle actual world problems</p>

# The Feedback Radar

The course learns while students learn.



## Evidence strand: recent ICE scores



*Use ICE score with caution: not as the whole story, but as one signal alongside artifacts, reflections, and defenses.*

CHATGPT  
USER

NON-CHATGPT  
USER



**AN MIT BRAIN SCAN STUDY FOUND CHATGPT USE LED TO A 47% DROP IN NEURAL ENGAGEMENT, USERS TYPED FASTER, BUT REMEMBERED LESS AND SHOWED WEAKER COGNITIVE PERFORMANCE OVER TIME.**

## SKILLS FOR AN AI WORLD



### CRITICAL THINKING

Evaluating information and arguments, recognizing biases



### DIGITAL LITERACY

Using digital tools safely and effectively



### DATA LITERACY

Understanding and interpreting data



### SOCIAL & EMOTIONAL LEARNING

Empathy, collaboration, and self-awareness



### CREATIVITY

Original thinking and problem-solving



### ETHICS

Considering the implications of AI on society

# Implications for Professional Settings

## Strategic Role

Curate responsible AI learning journeys;  
position as a hub for AI



## Learning Organizations

## Collaboration and Human-AI Partnerships

Promote cross-agency AI co-learning labs



## Call to Action

Empower professionals to lead with AI

THANK YOU

[mariette.awad@aub.edu.lb](mailto:mariette.awad@aub.edu.lb)



AMERICAN  
UNIVERSITY  
OF BEIRUT

ARTIFICIAL INTELLIGENCE,  
DATA SCIENCE,  
& COMPUTING HUB



## Prof. Mariette Awad

AI-DSC Hub Director | PhD | Certified  
Assessor in ethical AI | 2024 Abdul  
Hameed Shoman Award for Arab  
Researchers | Top 2% Research  
Scientist in 2022, 2023 | Author of one  
of the 5 most downloaded Springer  
Nature books 2020

# L'IA au service du développement des compétences des étudiants

## *Co-création de questionnaires avec l'IA*

Loubna Alsaghir Oueidat  
Faculté de sciences économiques  
USJ - Mai - 2026

## Plan de la présentation

1- Du context à l'objectif

2- Description de la pratique

3- Compétences développées

4- Exemple concret

5- Apports et limites

6- Conclusion

AI Program USJ/UNESCO

# Du contexte à l'objectif

- Montée massive de l'IA générative
- Le problème : usage « passif » de l'IA
- Objectif: mobiliser l'IA non comme un outil de substitution mais comme un support d'interaction critique

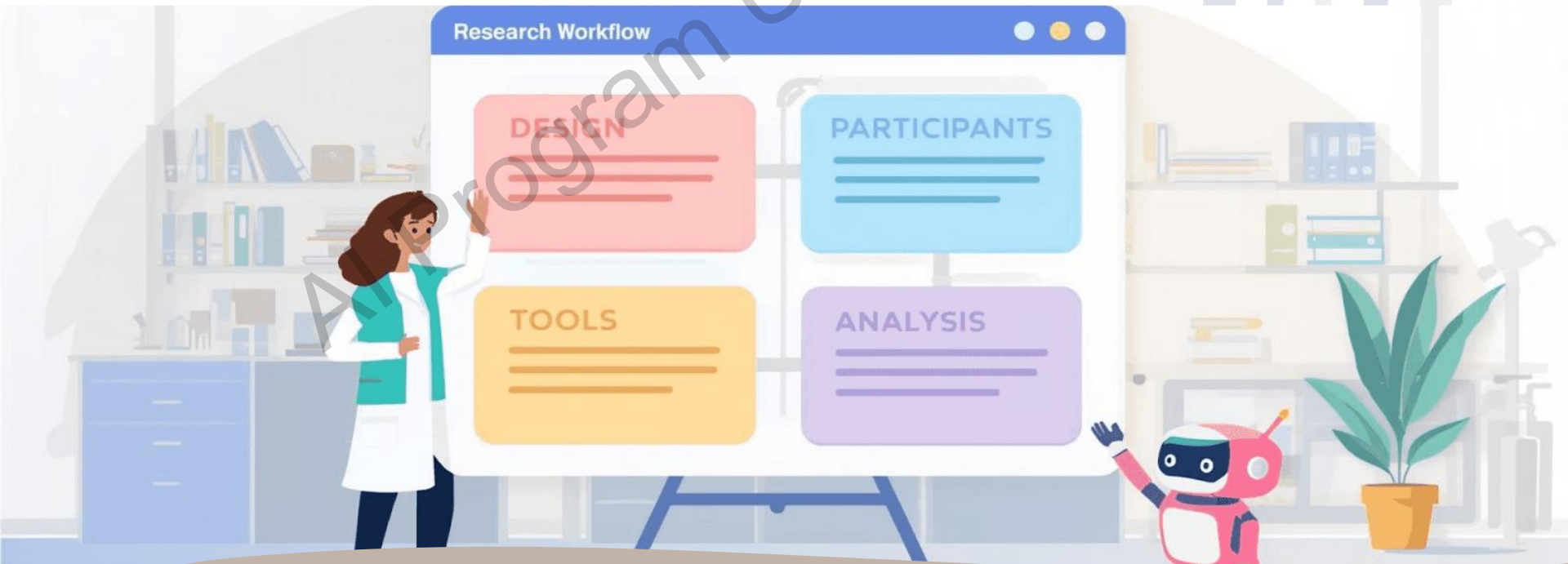


# Description de la pratique

Consignes données aux étudiants: élaborer un questionnaire d'enquête en interaction avec l'IA

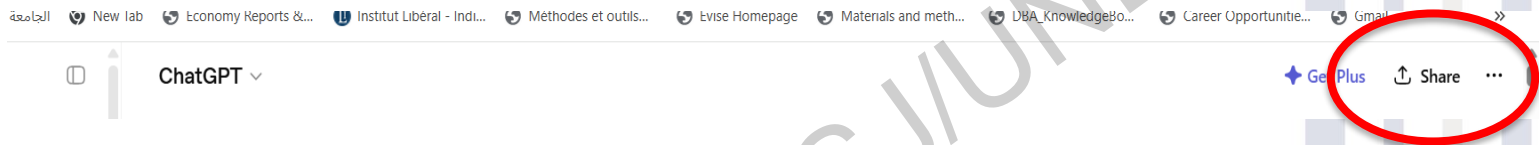
Étapes-clés:

- Définition de la problématique
- Génération et reformulation des questions avec l'IA
- Analyse critique des propositions



# Description de la pratique

- Dispositif de suivi
  - Partage des échanges via le bouton « share »



- Accès au processus de raisonnement étudiant - IA



# Compétences développées

- Compétences méthodologiques  
Construction d'items, d'échelles, ...
- Compétences numériques avancées
- Réflexivité, prise de recul sur le processus
- Pensée critique  
Évaluation des biais et limites de l'IA



# Exemple concret

based on these elements can you suggest a 5-item construct of algorithm aversion with associated questions (5-points likert scale)

To create a 5-item construct of algorithm aversion with associated questions suitable for a 5-point Likert scale, we can focus on various dimensions of control, preference for human judgment, perceived control, ethical concerns, and other related items:

## Algorithm Aversion Construct

### 1. Trust in Algorithms:

- "I trust algorithmic recommendations to make important decisions."
  - (1 = Strongly Disagree, 5 = Strongly Agree)

### 2. Preference for Human Judgment:

- "When making important decisions, I prefer to rely on human judgment rather than algorithmic recommendations."

**Erreur 1**  
Item et question associée ne sont pas en cohérence avec la variable mesurée

# Exemple concret

**don't you think that the first question reflects more algorithm acceptance than aversion? is the construct coherent?**

You are correct in pointing out that the first question may reflect more of an acceptance of algorithms rather than aversion. For a coherent construct focused specifically on algorithm aversion, it is essential to ensure that all items consistently reflect a negative or skeptical attitude towards algorithms.

Here's a revised version of the 5-item construct of algorithm aversion, ensuring coherence throughout:

## Revised Algorithm Aversion Construct

### 1. Distrust in Algorithms:

- "I often doubt the accuracy of algorithmic recommendations."
  - (1 = Strongly Disagree, 5 = Strongly Agree)

# Exemple concret

based on these elements can you suggest a 5-item construct of algorithm aversion with associated questions (5-points likert scale)

To create a 5-item construct of algorithm aversion with associated questions suitable for a 5-point Likert scale, we can focus on various dimensions of algorithm aversion, including trust, preference for human judgment, perceived control, ethical concerns, and transparency. Here are the suggested items:

## Algorithm Aversion Construct

### 1. Trust in Algorithms:

- "I trust algorithmic recommendations to make important decisions."
  - (1 = Strongly Disagree, 5 = Strongly Agree)

### 2. Preference for Human Judgment:

- "When making important decisions, I prefer to rely on human judgment rather than algorithmic recommendations."

## Erreur 2

5 items qui correspondent à 5 dimensions différentes. Les forcer dans une variable fait courir le risque d'un construit non-cohérent

# Exemple concret

when a variable is multidimensional, isn't it better to treat every dimension as a single latent construct to avoid blurring the concept?

You are right that combining dimensions can sometimes **blur meaning**, especially if dimensions are conceptually distinct.

This is preferable when:

- dimensions have **different antecedents or outcomes**
- dimensions are weakly correlated
- each dimension captures a substantively different phenomenon
- theory treats dimensions as relatively autonomous

Analyser chaque dimension

Proposer des regroupements

Proposer un construit cohérent

# Apports et limites

- Apports :
  - Engagement actif des étudiants
  - Visibilité du processus d'apprentissage
  - Développement d'un usage raisonné de l'IA
- Limites :
  - Risque de dépendance à l'IA
  - Variabilité de la qualité des prompts
  - Nécessité d'un encadrement explicite



# Conclusions

Passage d'un usage instrumental à un usage **critique et formatif** de l'IA

Conditions de réussite:

- Clarification des attentes et critères d'évaluation
- Accompagnement des étudiants (prompting, reformulation, sélection)
- Sensibilisation aux biais de l'IA
- Encadrement à l'usage de l'IA dans une perspective éthique.

Potentiel pour renouveler les pratiques pédagogiques en méthodologie

# L'IA au service du développement des compétences des étudiants

## *Co-création de questionnaires avec l'IA*

Loubna Alsaghir Oueidat  
Faculté de sciences économiques

*Merci!*