LEARNING SCENARIO

SIXTH FORM

Due to its adaptability, it can be done at more levels. For example:
* Digitalization at the different levels of secondary school (with a change of topic)
* Second year high school programming and data processing.
Due to its transversality, it can be used as a model for other topics or subjects.

Tittle

How to learn Normal Forms with an AI?

Areas, subjects or fields

Programming and data processing I

Sustainable Development Goals worked on

SDG9. Industry, innovation and infrastructure
SDG4. Quality education
SDG8. Decent work and economic growth

Awareness dynamics

* Introduction of the current habilities of the AIs with the conceptual map.
* Focus on to the part of the map descriving what can already be done.
* Propose questions:
  - What would you like an AI to be able to do to help you learn a topic?
  - What answers are viable?
  - How do you think it can be done?
    "We will test the feasibility with Normal Forms in Databases."
  - What precautions do you think we should take?

Instructions and materials

Instructions:
It is necessary for the teacher to test the AI's responses before proposing the assignment to see if the selected AI is capable of giving good results, taking note of the necessary conditions and indicating to the students the instructions indicated below.

Material:
A computer with internet access is the only tool we need. Homework can be done, but it's best developed in class with the teacher's support and evaluation.

Context or contexts in which the learning situation is located

School
Personal

What aspects are worked on, in addition to the curricular aspects of each subject in this SA?

Written expression
Promoting critical and scientific spirit
Autonomy
AI Literacy

This learning situation offers a wide range of possibilities. Teachers can adapt it to the needs of each group, adjusting the amount and complexity of the material based on the number of students, their level, and the available time.

Description and planning of the task or tasks	Instructions and materials
* This LS can be worked and corrected at the same time in 7 sessions, three weeks. * Advice the students: this work must be delivered in 4 or 5 sessions. * If necessary, it will be expanded for 2 more sessions. * It should be ensured that all students have time to receive two or three grades. Because those are indications on how to improve their abilities. We need: 1 to know if they are on the right track and are getting the specific results. -They have read, learned and gave the correct answers.- 2 to find out if they are capable of taking the AI exam with good grades and acquired skills. 3 to see if they have an opinion of the system, if they can explain the mechanisms, if they can evaluate it and if they may have ideas on how to improve their use of the AI to learn.	* Contact or make an account on / Perplexity / You.com / DeepAI / Copilot / *Komo* / *Gemini* / *Not Diamond* / ... the teacher will say which one or ones. * Give the AI the context that you are 1st year Bat students learning about normal forms and that she should: 1- Teach you the topic with an introduction to maximize understanding and learning. 2- Answer your questions about the causes, applicability and assessments. 3- He/she should ask you questions to see if you have understood and, looking at the answers, assess the knowledge by explaining improvements. 4- Afterwards you have to take a 5-question exam during which you cannot look at what came before to answer. 5- And it will also help you understand how to improve your answers/grades. 6- Finally, you will interact more times until you reach the grade you want to have.
	The teacher will provide individual assistance and will comment on changes in grades.
Multilevel proposals **Challenge 1: Let's understand Normal Forms using AI.** **Challenge 2: *Let's see who can/(how to) get the most out of it.*** * Who gets /(how to get) the best grades (with demonstrable rigor) * Who learns/(how to learn) with AI at the highest level. **Challenge 3: *Let's see who succeeds*** * the best ideas with good results, * rigor (check with other sources) * with good reviews to the whole idea and if possible,*Workarounds* to overcome them.	The result can be a report, a document with the chat, an oral explanation, a presentation to the group or any product that allows the teacher to asses with objectivity the acquired skills and knowledge of the Normal Forms. It widely allows for evaluation with UDL (Universal Design for Learning). (See second page.)

List of basic knowledge of the curriculum that mobilizes the learning situation
PTD. 11. Databases. Set logic. Creating databases.
PTD. 17. Introduction to concepts. Augmented reality, massive data (big data), artificial intelligence,...

Specific Competencies	Connected to...	Linked evaluation criteria
PTD4. Use databases and different repositories as data sources, performing basic operations on them. Design and use different data repositories by performing queries and modifications according to project requirements.	STEM1, STEM2, STEM4, STEM5, CD2, CD3, CD4, CD5, CPSAA1.1, CPSAA1.2, CPSAA5,	PTD4.1. Design databases that ensure data integrity and consistency to respond to a given problem.

Competencies

Two blocks are worked on:

1- know the Normal Forms

This Learning Situation aligns with the STEM framework, specifically addressing operational descriptors STEM1,2,4 and 5.
With Digital Competencies addressing CD2,3,4 and 5.
And Personal, Social, and Learning to Learn Competencies, as defined by CPSAA1,1, CPSAA1,2 and CPSAA5.

2- know how to use AI to learn

Associated competencies: - Learning to Learn, - Digital, - STEM -for technology-,
- initiative and critical thinking competencies (added to entrepreneurship)

This assessment model calculates assessment criteria that take values directly from the assignments or exams and indirectly from the key competencies associated with them, which are also reported to parents. This allows both taking into account key competencies or basic knowledge, while adding nuances. For example, basic knowledge nº 17 about AI and critical thinking.

Multilevel qualification

4: Students will receive a 4 if they have done some work but have not learned to effectively use AI as a learning tool. This will be evident if they are unable to pass exams even by looking at the answers (which is often their first instinct).
5: If, by simply looking at the answers, students can respond correctly, without repeating errors and understand the AI's corrections, it indicates that they have read, learned, and applied their knowledge successfully.
6-8: They pass the exam well, skills acquired in both senses: databases and individualized learning. If they know how to apply it 7 and if they know how to analyze it -giving causes and effects- 8
9-10: Grades higher than 8 will only be maintained throughout the course by students who can transfer knowledge to other learning areas.
If they evaluate this system well and are able to prioritize, 9. This results in quality, and the training becomes effective and agile.
If they have tested variations 9.5 and by proposing and testing hypotheses and suggesting improvements to this Learning Situation with AI, they receive a 10.

Knowledge transfer(*1)

The transfer of knowledge of this Personalized Learning with Ai to a real work context can be re-evaluated during the course to see if it is really used when working with other SSAA.

The idea is that this learning scenario be re-evaluated and graded in a flexible way by applying UDL as the teacher considers appropriate beyond the time of this learning situation.

Sequence of activities (homework, exams,...)	Sessions	Groupings	Products	Assessment instruments	Evaluation criteria applied in the evaluation of the work and percentage	Punctuation
Ask for the information and read it Ask and answer questions Ask for corrections, take notes of everything Take the exams and evaluate the entire system	7	Individual	Report	Rubric	PTD4.1	**Follow the Multilevel assessment**

If each teacher makes at least one learning situation and shares it we can have all needed materials with a good quality and with all the flexibility to adapt everything to our own students.

This document have been translated:	Catalan (VO):	SA: Aprenentatge presonalitzat: 1Bat: Bases of Dades-Formes Normals	Google Spreadsheet / template
	Spanish	saberlibre.net/AI/ES/SA aprendizaje personalizado con IA.ods	Open Document
		saberlibre.net/AI/ES/SA aprendizaje personalizado con IA.pdf	PDF
It can be downloaded from here:	English	saberlibre.net/AI/EN/LS Personalized Learning with AI.ods	Open Document
		saberlibre.net/AI/EN/LS Personalized Learning with AI.pdf	PDF

This learning situation is part of my free materials shared on the Internet.

UDL programming

(Anything covered here should not be included in the personalized assessment report) - All A*, B*, C* are translated from Catalan, other country laws may differ.-

Knowledge Networks (What do we learn?)

A.1. Options for perception	A.1.3. Oral guidelines for following the steps in a task
	A.1.4. Visual diagrams, conceptual maps
A.2. Options for language, mathematical expressions and symbols	A.2.2. Insert supports to unknown vocabulary/symbols/references within the text (hyperlinks, footnotes in definitions, explanations, illustrations, translations...)
	A.2.7. Have information available in other languages to compensate for deficiencies in language comprehension.
A.3. Options for understanding	A.3.1. Graphic organizers
	A.3.2. Offer connections with concepts already worked on previously
	A.3.3. Sequence and outline the information.
	A.3.5. Explicit indications of each step that makes up a sequential process.
	A.3.7. Checklists, organizers, notes, reminders, etc.

Affective Networks (How do we learn?)

B.1. Options for physical interaction	B.1.1. Increase task execution time
B.2. Options for expression and communication	B.2.1. Compose/Write in multiple media (text, voice, drawings, film, music, movement, visual art, etc.).
B.3. Options for executive functions	B.3.2. Work individually: agenda, checklists.
	B.3.5. Questions/templates that lead to self-regulation and reflection.

Affective networks (why we learn)

C.1. Options to capture interest	C.1.1. Adjust the level of tasks and content according to the needs of the students.

Other considerations

Inclusive and adaptive education

Personalized learning with AI can be highly adaptable to different types of learners, either very automatically or with specific instructions. We should take advantage of this

	C.1.4. Provide moments of active listening.	automatically or with specific instructions. We should take advantage of this. In addition to this, it can be useful to have strategies adapted to particular cases. Although in high school in Spain there are no significant adaptations, only the so called access adaptations, this does not mean that we cannot adapt our help to students with different characteristics. Whether you are a high school student or a compulsory secondary school student, these are some general ideas based on past experiences: **Cases** **Gifted students** If they are passionate about something, it seems a good advice to allow them to demonstrate their skills in a different way, with a different timing. The rule is to get a 5 first and them, if they want to move on to another topic and it seems productive, go ahead. A degree of freedom can increase the productivity. **ADHD / ADD** If there is a high level of frustration and discomfort, the most effective way tackle this is to show understanding, affection and patience. (In fact, this is the basis in all cases, but even more important in this one.) There may be a difficulty with understanding which can be addressed with lots of small follow-up interactions. This may be twice as much as for other students. This also helps with self-monitoring and focus. Being able to complete a baccalaureate degree and even get good grades can imply simultaneous double or triple diagnoses, giftedness being one of them. **TEA 1** If there is no lack of intellectual capacity, it may be helpful to dramatize the meaning / importance to achieve the level of stimulation that engages their attention. It should not be forgotten that it affects executive functions and the added difficulty of classroom noise or sensitivity to the social difficulty of presentations/ collaborations/ comparisons with other students. In case of additional intellectual disability, we must reduce the intellectual load by simplifying the tasks and requirements. For example, “just learn the 3 FN and do not take the exam” could be enough to pass it. In other words, not lowering the minimum requirements but focusing more on them. It is very important to work on maturity. They tend to be 1/3 younger in mental age than others and at the same time they are close to finding a talent due to their ability to focus on a subject that fascinates them. And many times even autonomy. **Intellectual disability - not common in high school -** As in TEA1 with intellectual disability, we need to add some monitoring to help them with self-control. That is, actively engaging the student to stay focused and not playing or talking or joking. Several interactions may be needed.
	C.1.5. Contextualize activities in real life and student interests	
C.2. Options for maintaining effort and persistence	C.2.1. Mark and identify goals and objectives clearly, as well as allowing students to reformulate them.	
	C.2.2. Mark and establish short-term objectives (road maps).	
	C.2.3. Informative and non-comparative feedback (from teachers to students, but also vice versa).	
	C.2.4. Multi-level activities that allow varying levels of demand.	
C.3. Options for self-regulation	C.3.6. Include self- and peer-assessment.	
	C.3.7. Activities that value errors as a positive part of learning.	

Awareness of the pace of change in training

Education is changing in astonishing and even worrying ways. It is fascinating to imagine the possibilities of personalized education with AI, which already talked about Asimov in this interview*1. We are not yet at this point, but the functionalities are beginning to appear and our role is the same as always, to help learn. We understand that as new ways of learning appear, we must taken advantage of them and know the correct limits. Just as the use of a calculator is limited for students who want to learn to multiply.

In this regard, two important aspects should be highlighted that may require guidance from teachers:

1-Homework

Since parents' work at home with their children can greatly help their intellectual development, both in terms of stimulation and by directly increasing learning -and consolidating study habits and individual effort,- it is important to promote it when feasible. This learning situation gives teachers and parents another way to help students at home. Personalized learning can help students at a very affordable cost. Without necessarily replacing anything, simply as one more tool.

2- Works highly adapted for students with special educational needs

In class (and at home) a student with severe difficulties in a subject can receive help for their training through different ways of using AI. Especially, focusing their attention. In this sense, we know that it is common for students with diagnoses (ASD, SLD...) to have immaturity and weakness of executive functions. Sometimes together with a very noticeable lack of autonomy. In these cases, interaction with AI can be a complement that guarantees prolonged focused interaction by the student. Not only does it give them information and normal work habits in class, but it can also be key to increasing their autonomy. Therefore, it can be a very convenient tool in class for teachers.

Reinforcing the acquisition of this work autonomy with AI at home can then boost it in class and vice versa. In this sense, it seems highly advisable that parents know what teachers are doing in class in order to find ways to reinforce this work and their autonomy at home.

Buy computers versus personalized learning

*1 What Asimov spoke literally understood as give computers to all children is not the key. In fact, over time we have seen that it causes problems and It may not be a good idea. What this prolific science fiction writer and science writer envisioned is a future in which all adults and children have access to personalized learning based on their interests.

Now that this future is here, we need to look at the nuances and take advantage of what is feasible and continue to imagine possible futures.

Cases 2

Broader or more indefinite diagnoses such as learning difficulties or developmental disorders:-not usual in high school-

If they are passing their high school diploma, it means that access adaptations such as providing more follow-up or support, giving them more time, focusing on the minimums... can work.

TEA+ADHD

The sum of both difficulties increases the deficiencies and at the same time can attenuate them in intensity. This means more difficulties, but with less intensity. If they are passing high school or even have good grades, it can also indicate high capacities or enhanced skills in some aspect. In any case, students with ASD+ADHD will generally struggle to pass almost everything except the few subjects that fascinate them. Stimulating this with positive reinforcement can be very effective.

TEA 2

What I have written about TEA 1 and the following applies:

If they can really complete high school, it means that they hava sufficient intellectual abilities despite the difficulties that autism has caused him, which is a lot. There may be simultaneous double or triple diagnoses, with giftness being one of them. The recommendation is to reinforce their significant deficits in communication (understanding the objective, the work they must do, presenting the work as it should be) and their different cognition (an access adaptation may be very necessary when receiving information or handing in the work). It is very important to work on autonomy and maturity.

Dyslexia and dysorthography

This task is to interact with an AI and it have no problem understanding misspelled words. And by the same token, the explanation to the teacher can be oral showing the chat. If they need more time, “ok”.

Disclaimer

Naturally, in a class with few students or with few diagnosed difficulties, devoting more time to these adaptations is feasible. If there are too many cases, time is distributed as best as possible and we can only hope that parent associations to fight for the fundamental rights their children - with our support and that of society in general.- If this damaging situation happens, I think teachers must to leave a written record because detection and the flow of information is key to change anything.

Overcoming language barriers - IT adaptations (late incorporation)

Learning the local language is essential for the integration of newly arrived students, thus avoiding the loss of opportunities. For this reason, public institutions allocate resources for this purpose.

Artificial Intelligence (AI) can also personalize language learning by adapting the level of difficulty, rephrasing explanations, checking understanding, and reviewing assignments. This makes it easier to use the new language.

Although AI is not yet fully autonomous, it can be a valuable tool under the supervision of teachers. Its multilingual versatility allows it to adapt to the individual needs of each student.