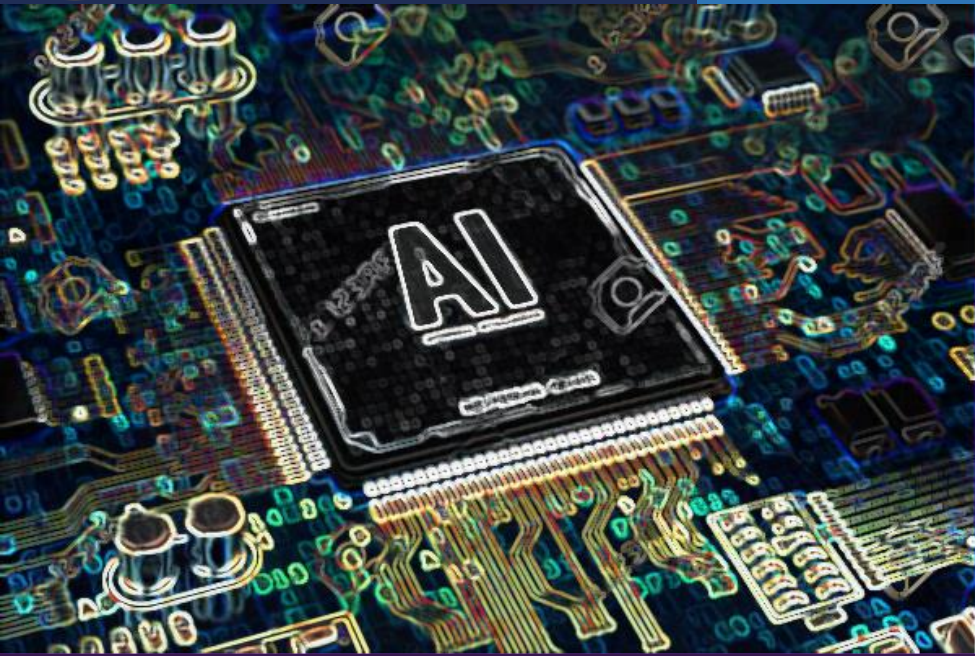




NNAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

NUST Academic Welcome 2020



Transformative Learning in the Era of AI – How can Machine Learning Propel Deep Learning at NUST

By: Mr Maurice Nkusi
Acting Director: Teaching and Learning Unit



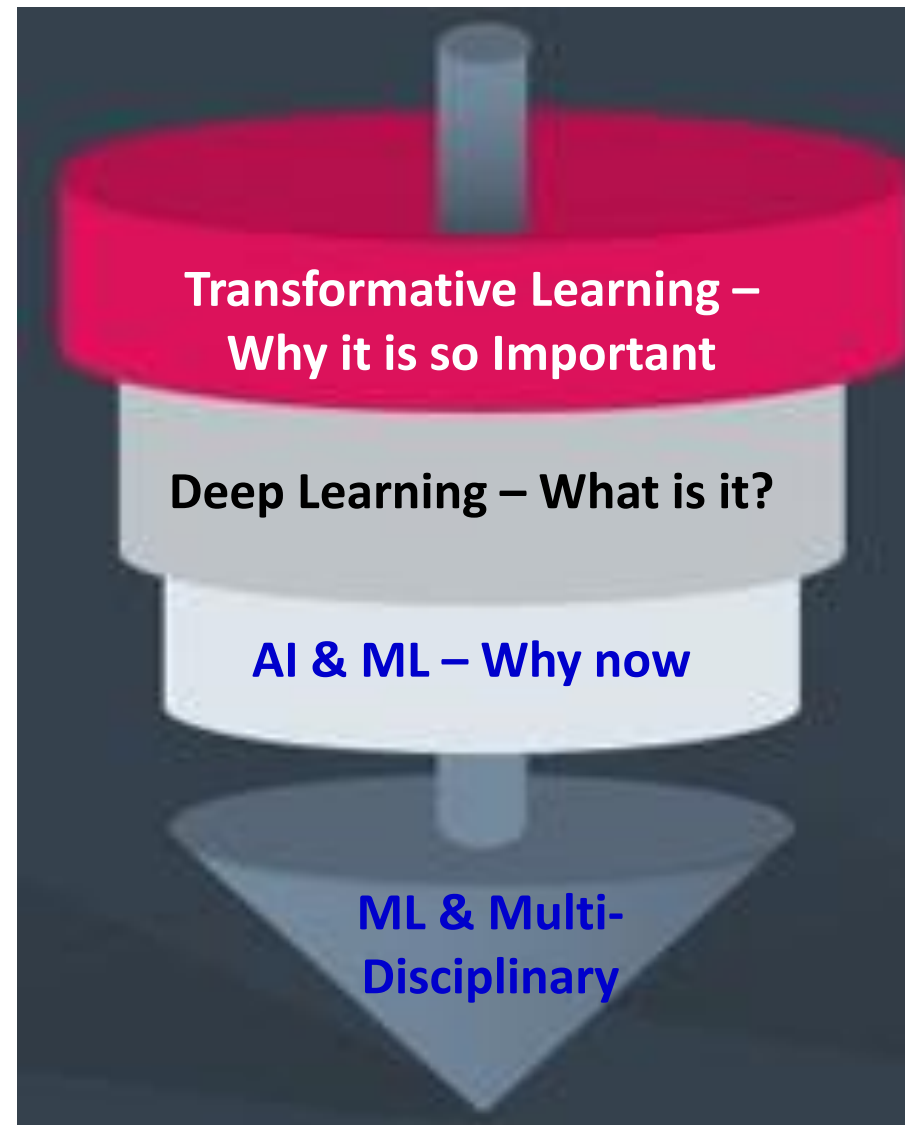


The grand aim of science is to cover the greatest number of experimental facts by logical deduction from the smallest number of hypotheses or axioms.

—Albert Einstein

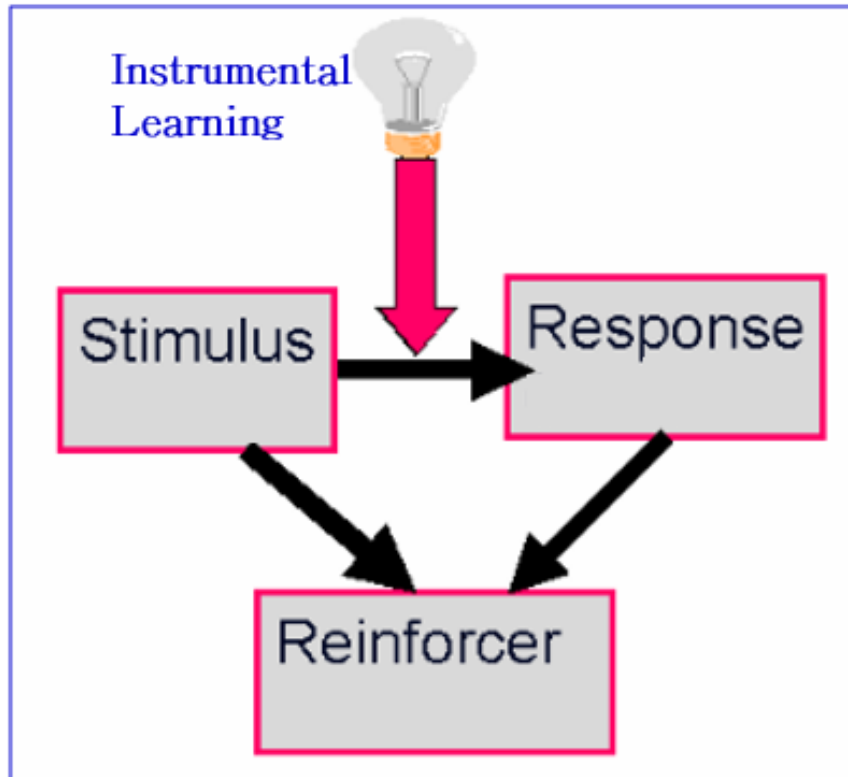
Civilization advances by extending the number of important operations we can perform without thinking about them.

—Alfred North Whitehead





Transformative Learning Concept



Operant conditioning (also called instrumental conditioning) is a learning process through which the strength of a behavior is modified by reinforcement or punishment.

Instrumental Learning

➤ Thorndike's Law of effect

- > "In a given situation, a response followed by a satisfying consequence will become more likely to occur and a response followed by an annoying consequence will become less likely to occur."

BOPPPS approach in teaching methodology
focuses on reinforcement

Focusing more on the "**What**"
and the "**How**"



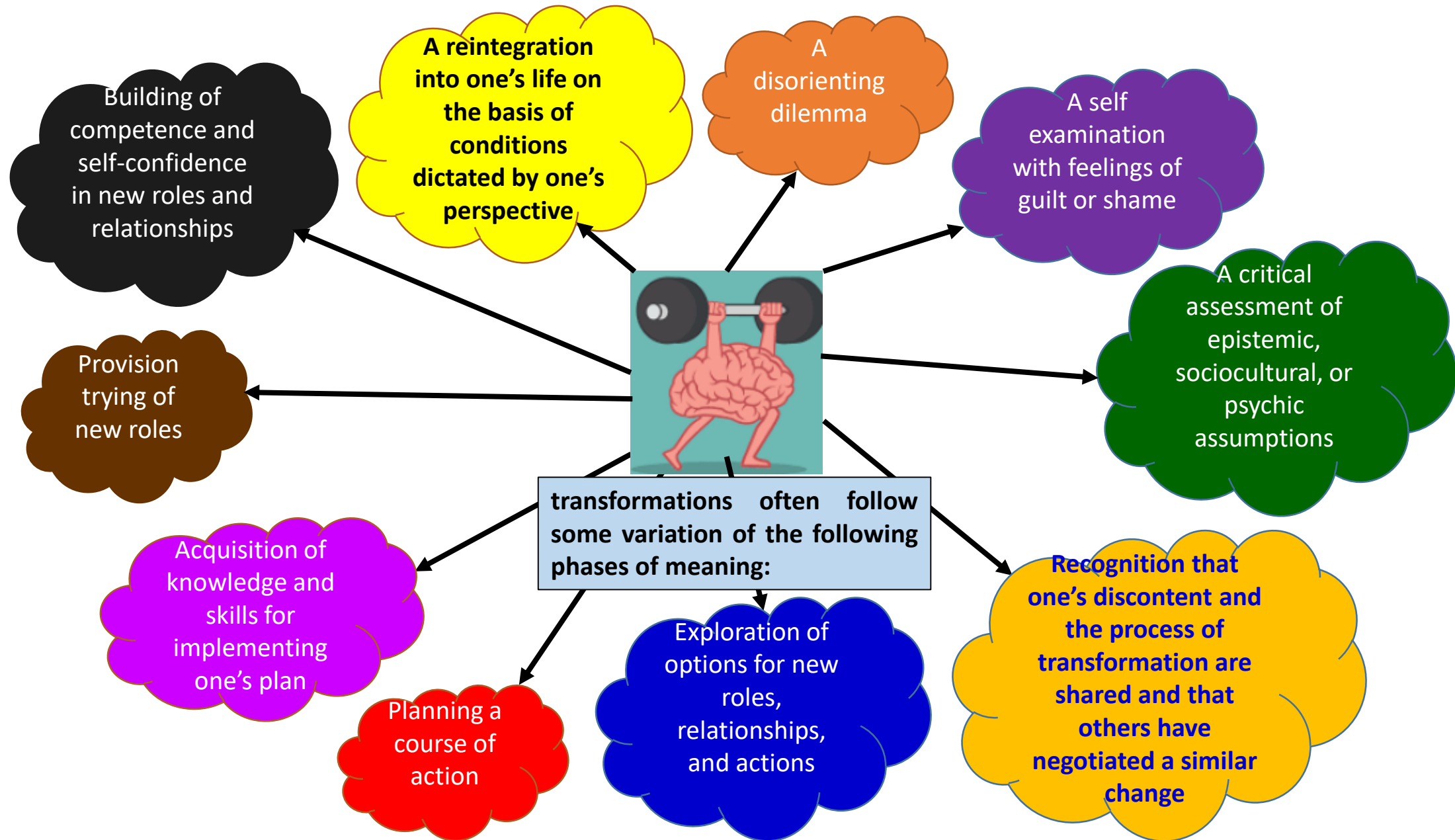
Transformative learning Concept

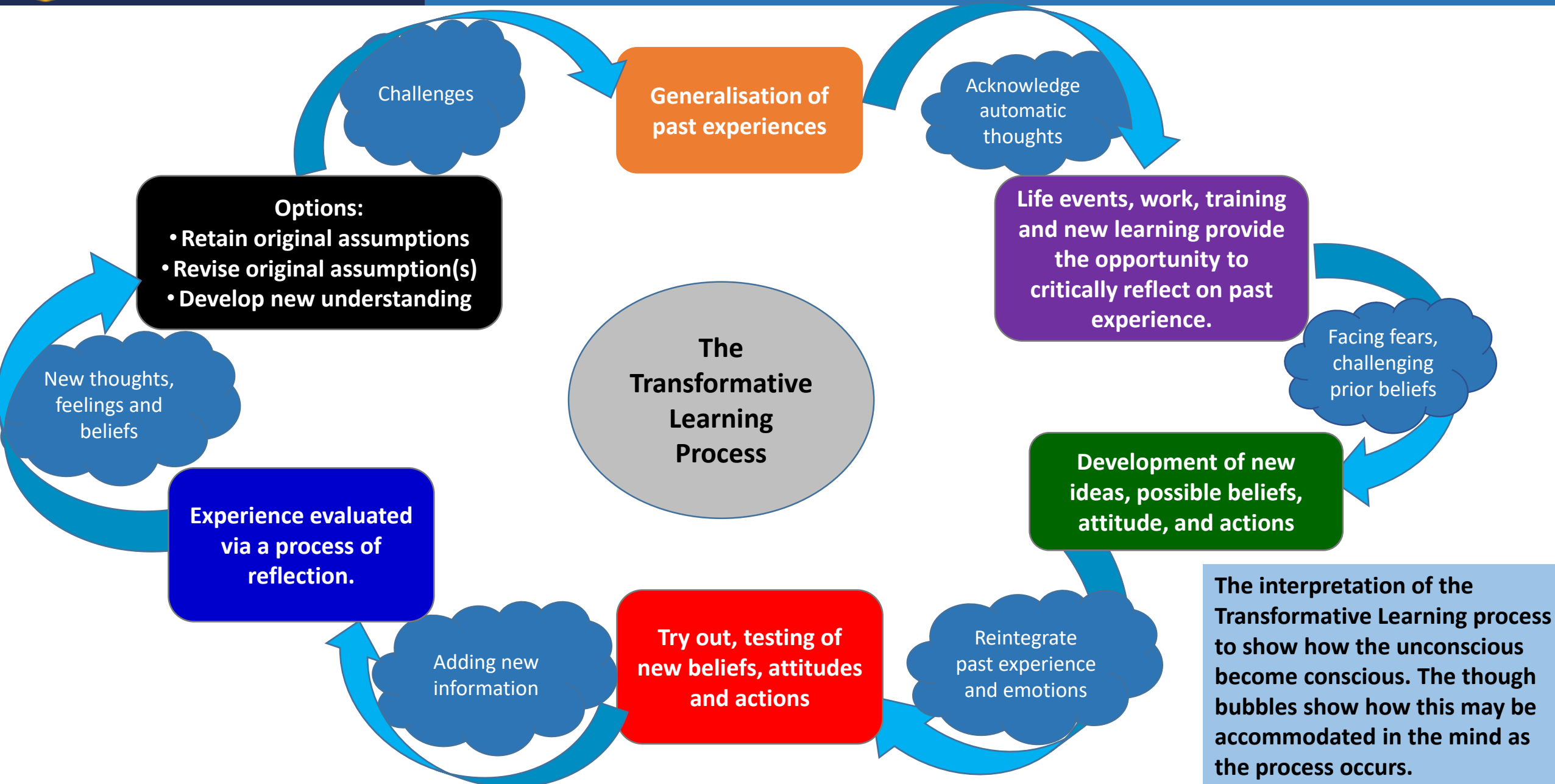
Mezirow's Transformative Learning Theory

In childhood, learning is formative (derived from formal sources of authority and socialization)

In adulthood, learning is transformative, as adults are more capable of seeing distortions in their own beliefs, feelings, and attitudes

Transformative learning theory says that the process of "**perspective transformation**" has three dimensions: **psychological** (changes in understanding of the self), **convictional** (revision of belief systems), and **behavioral** (changes in lifestyle).







Through the process of deep learning, students learn to self-direct their own education and to adopt what is known as 'academic mindsets'; and they learn to be lifelong learners." Deeper learning is the process of learning to transfer and create meaning of new information with the aim to take what's was learned in one situation can be applied in another." In this situation, learning becomes even more appealing if students receives constructive feedback helping them to trace the learning journey and highlight they behavior change in the process.

Deep Learning

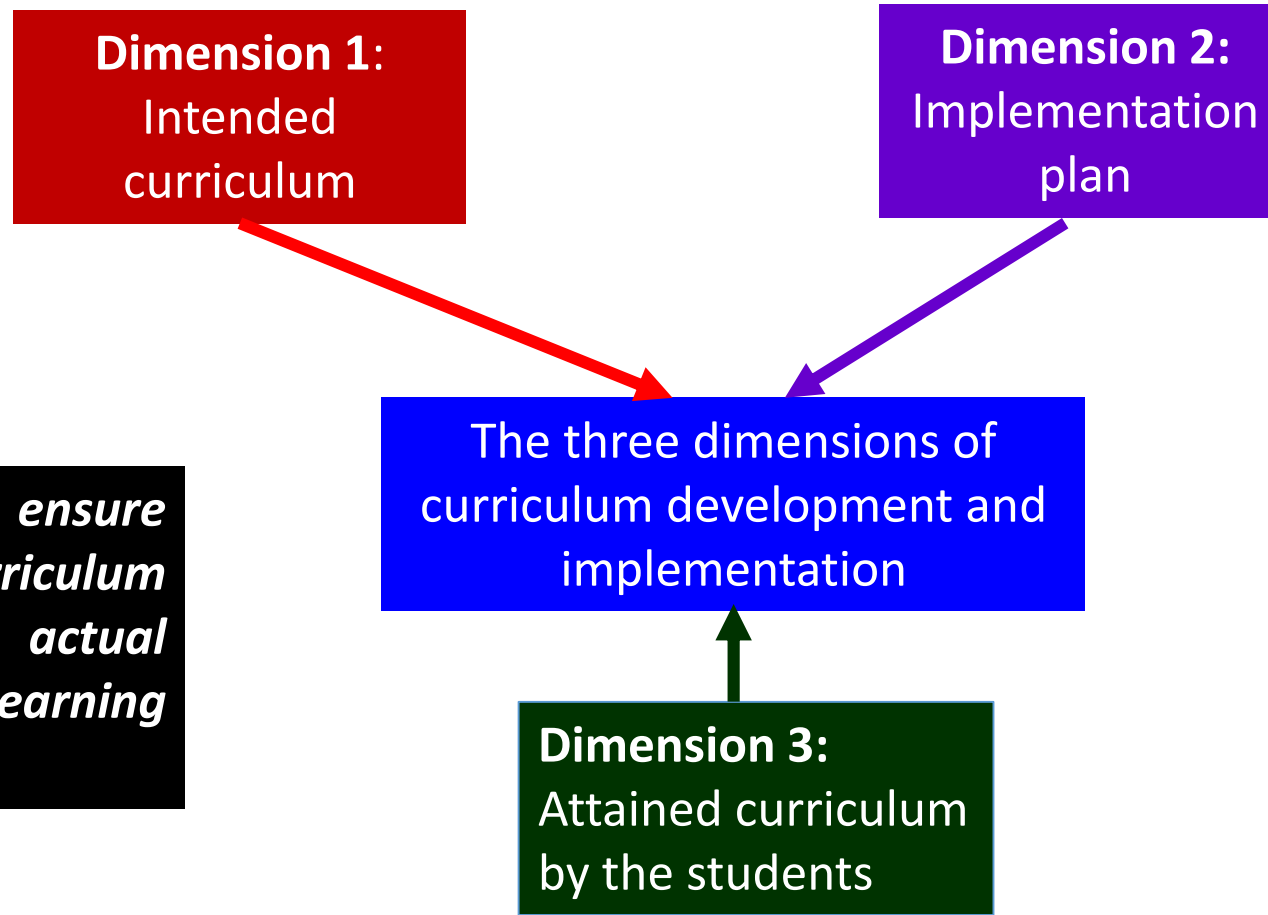


Deep learning instruction provides students with the advanced skills **necessary** to deal with a world in which good jobs are becoming more cognitively demanding. It prepares them to be curious, persistent, and independent **learners** as well as thoughtful, productive, active citizens in a democratic society.



Curriculum Development and Implementation

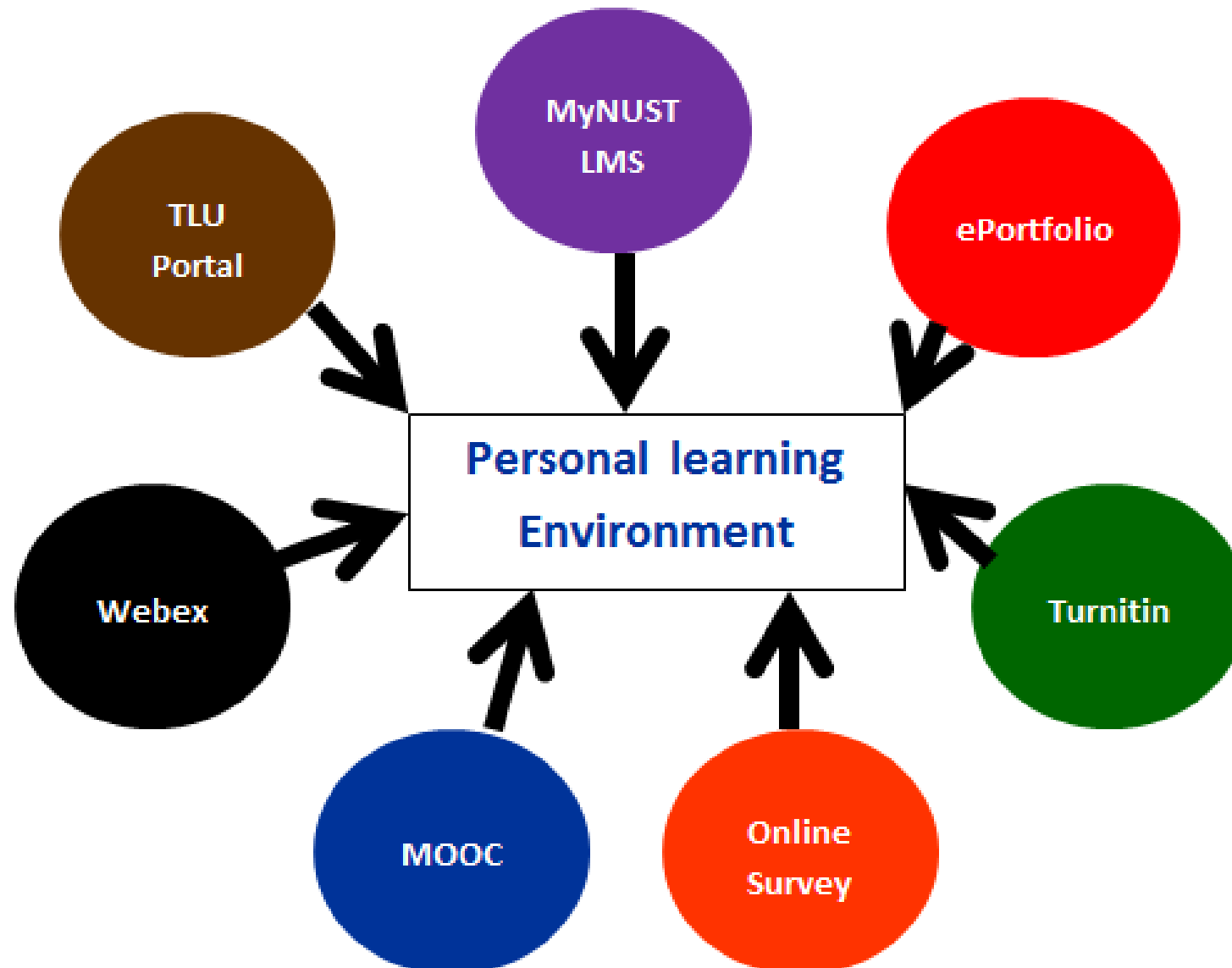
Once the curriculum is finally developed, circulated for consultation, improved and approved by authorized bodies, we have what we call the **first dimension** of the curriculum development and implementation.



The challenge is to ensure coherence among curriculum policy documents, the actual pedagogical process and learning outcomes

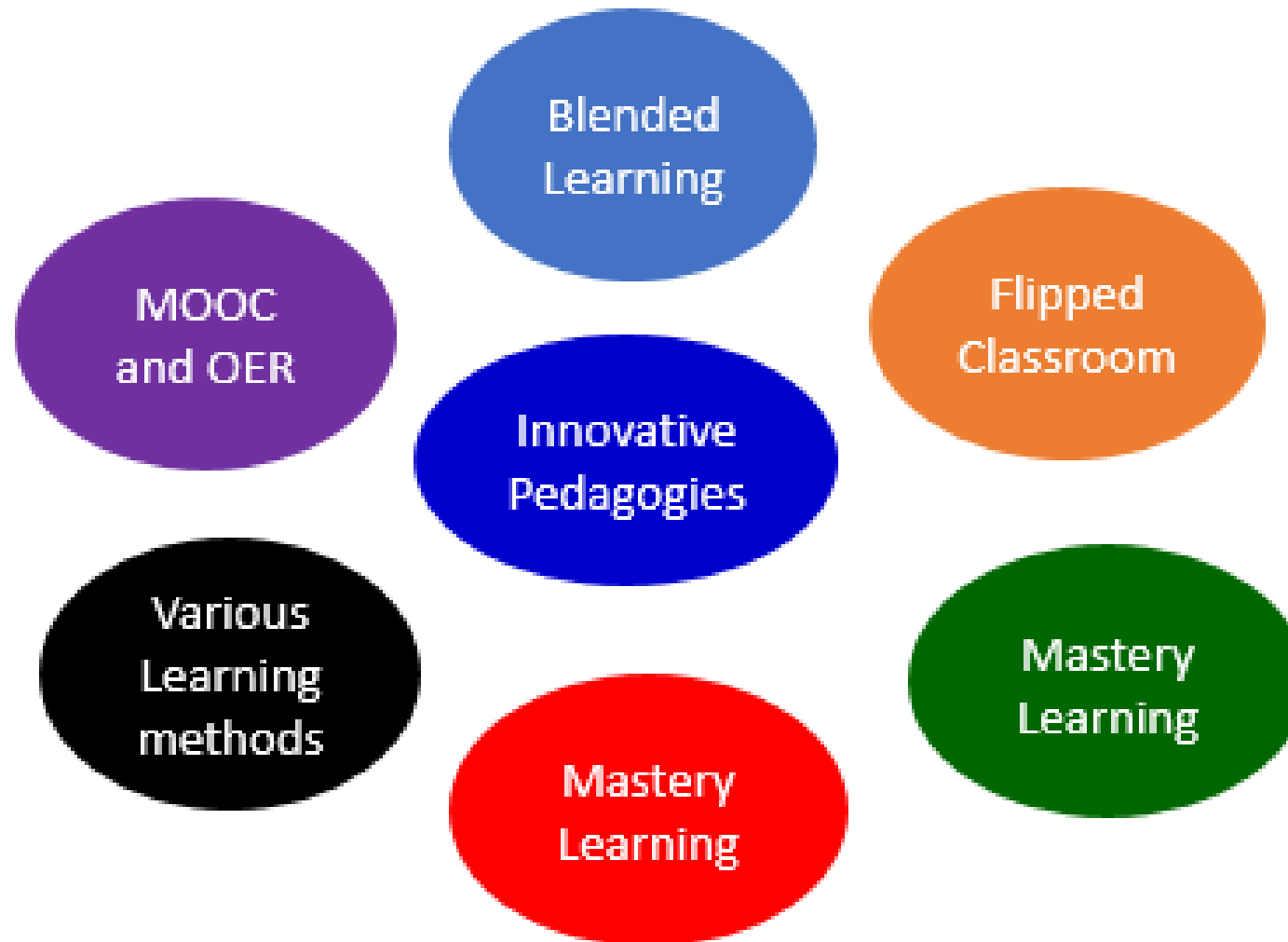


Various Technologies and Innovative Pedagogies





Innovative Pedagogies





Learning Methods to Support Deep Learning

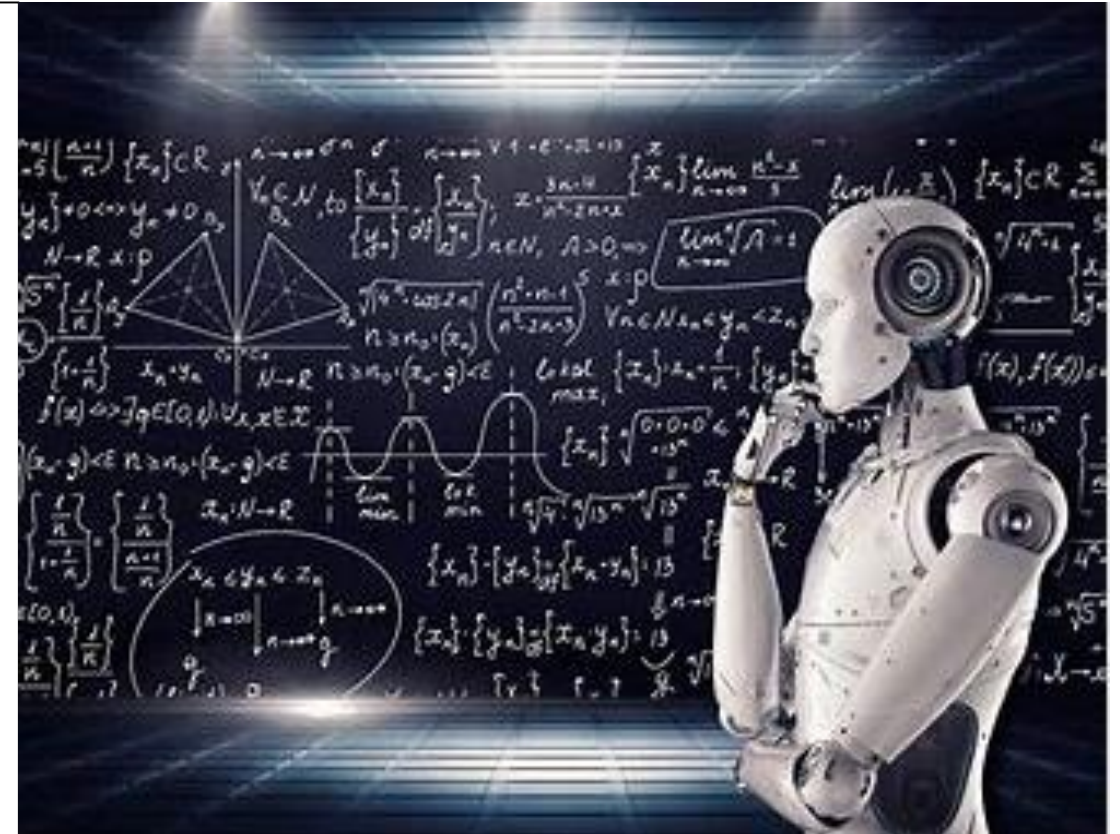




Artificial Intelligence (AI)

Machine with the ability to:

- Construct knowledge
- Reason
- Develop problem solving skills
- Perceive and sense the environment
- Learn
- Plan
- Manipulate and move objects
- Etc.

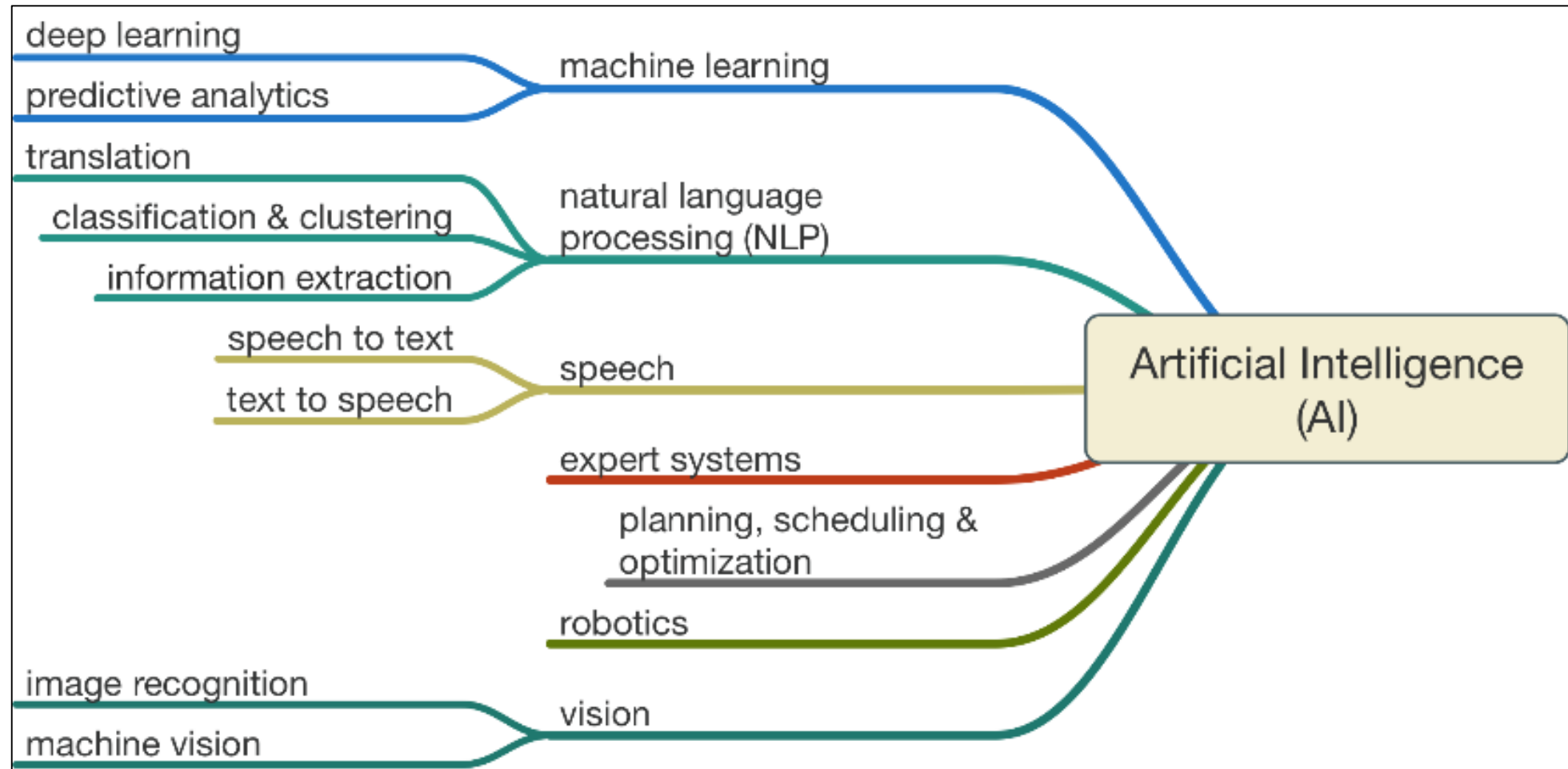


Extracted from:

https://cdn-images-1.medium.com/max/1200/1*92h6Lq1Bu1F9QqoVNrLdQ.jpeg



Artificial Intelligence (AI)

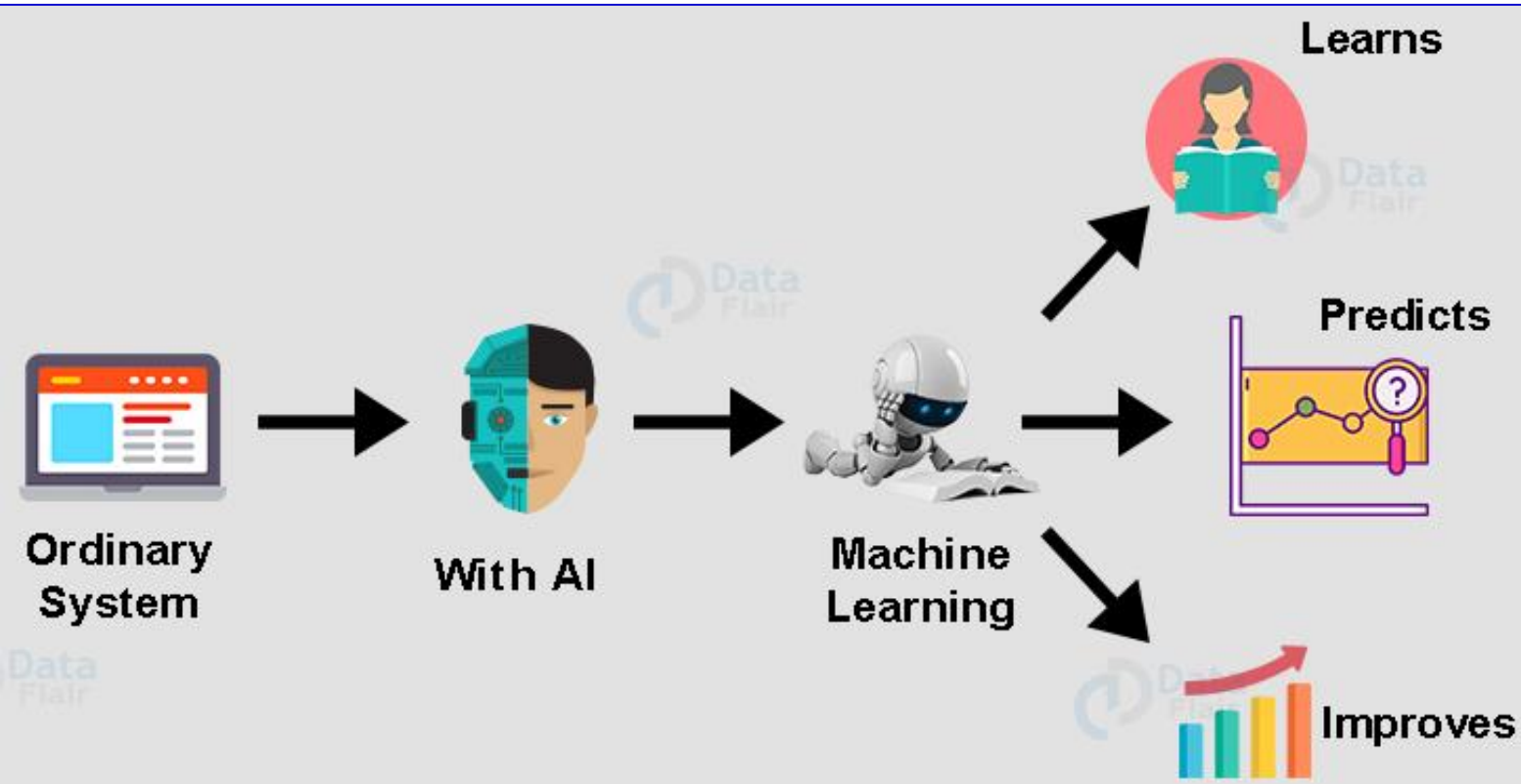


Extracted from:

<https://www.legaltechnology.com/wp-content/uploads/2015/11/Artificial-Intelligence-AI-larger-graphic.png>



Machine Learning Concept

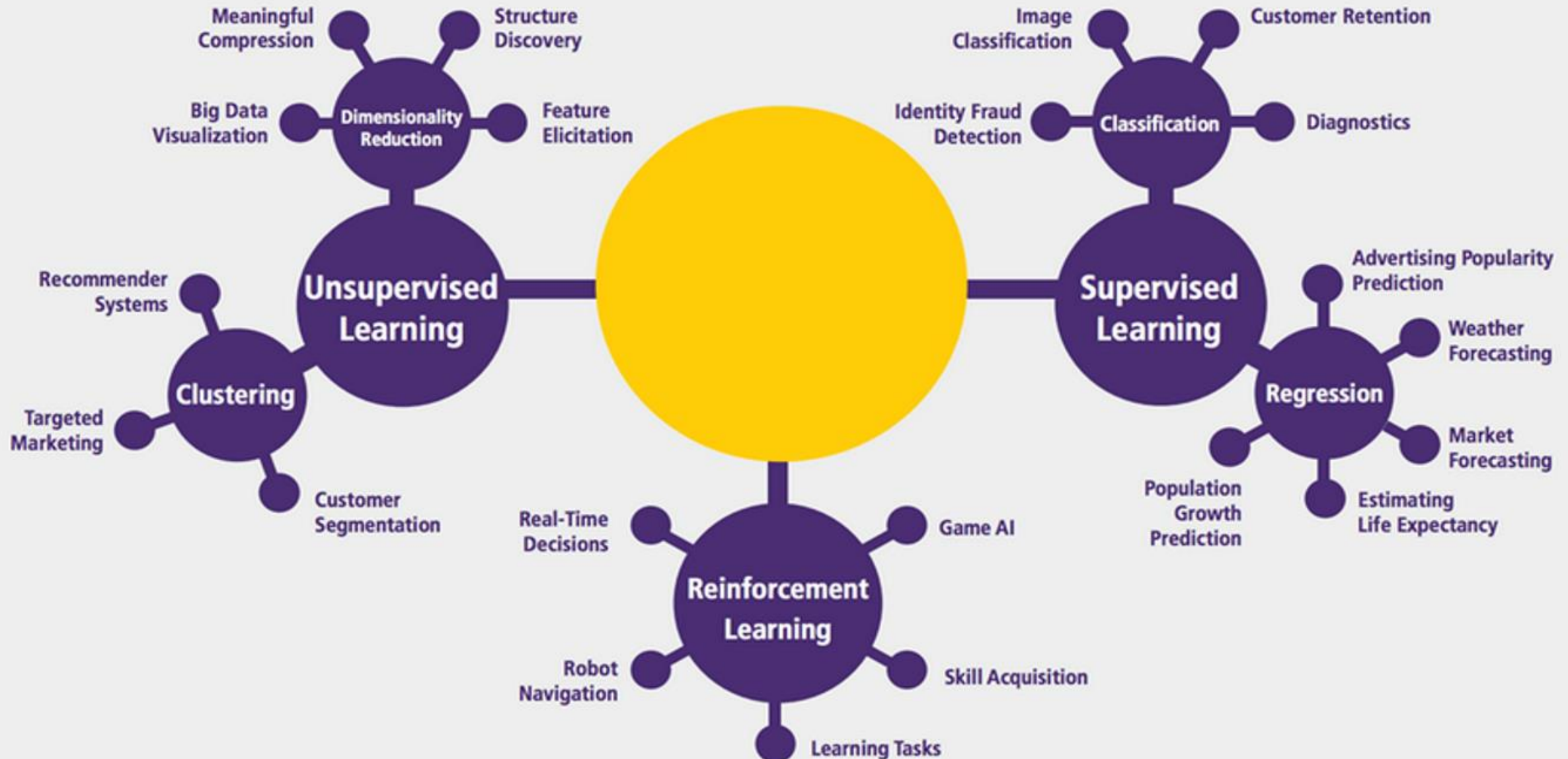


Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead.

The end results is that the machine teaches itself.



Machine learning Algorithms and where they are used?





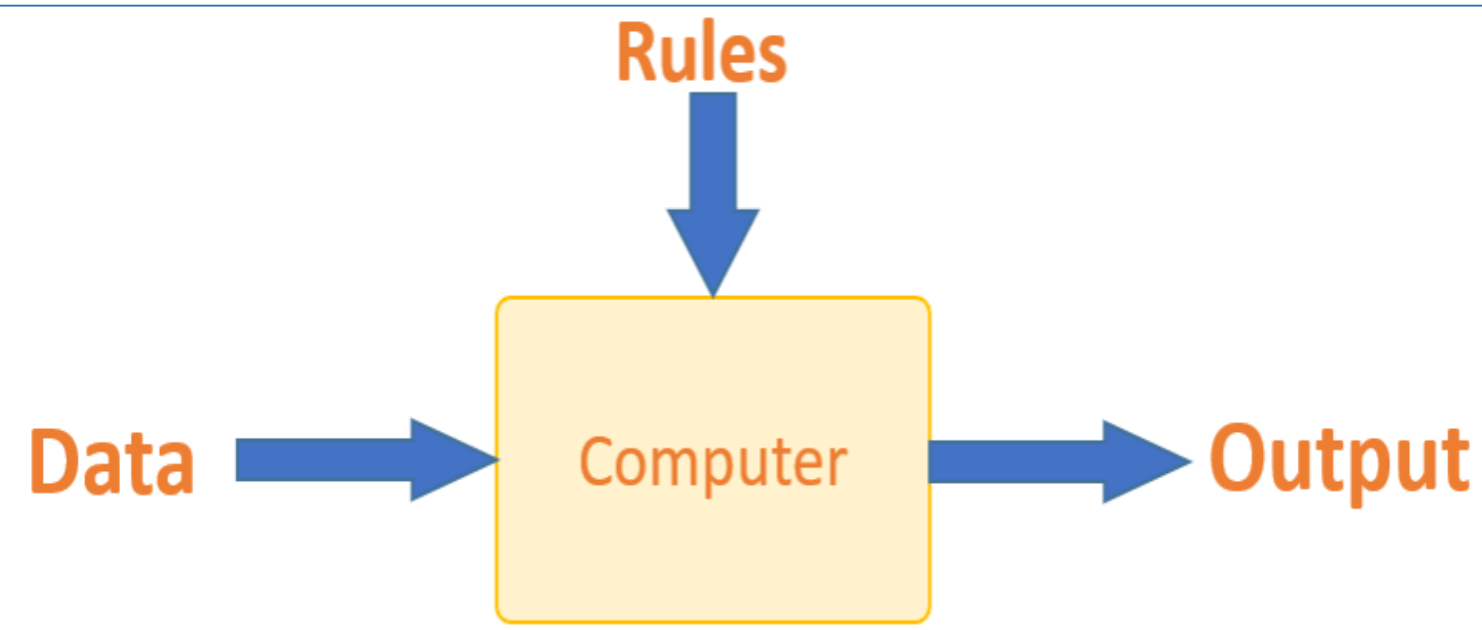
Pick algorithms
from existing
libraries (Python)

Training of the algorithm
following the standard steps →

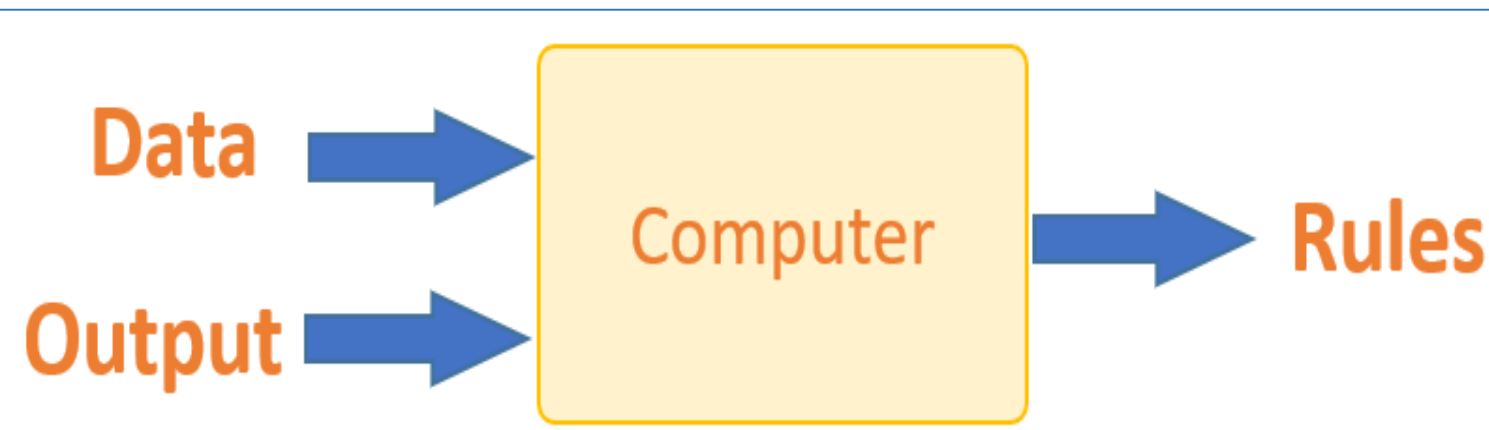
- Collect the data
- Train the classifier
- Make predictions



Traditional Programming vs Machine Learning



Traditional Programming

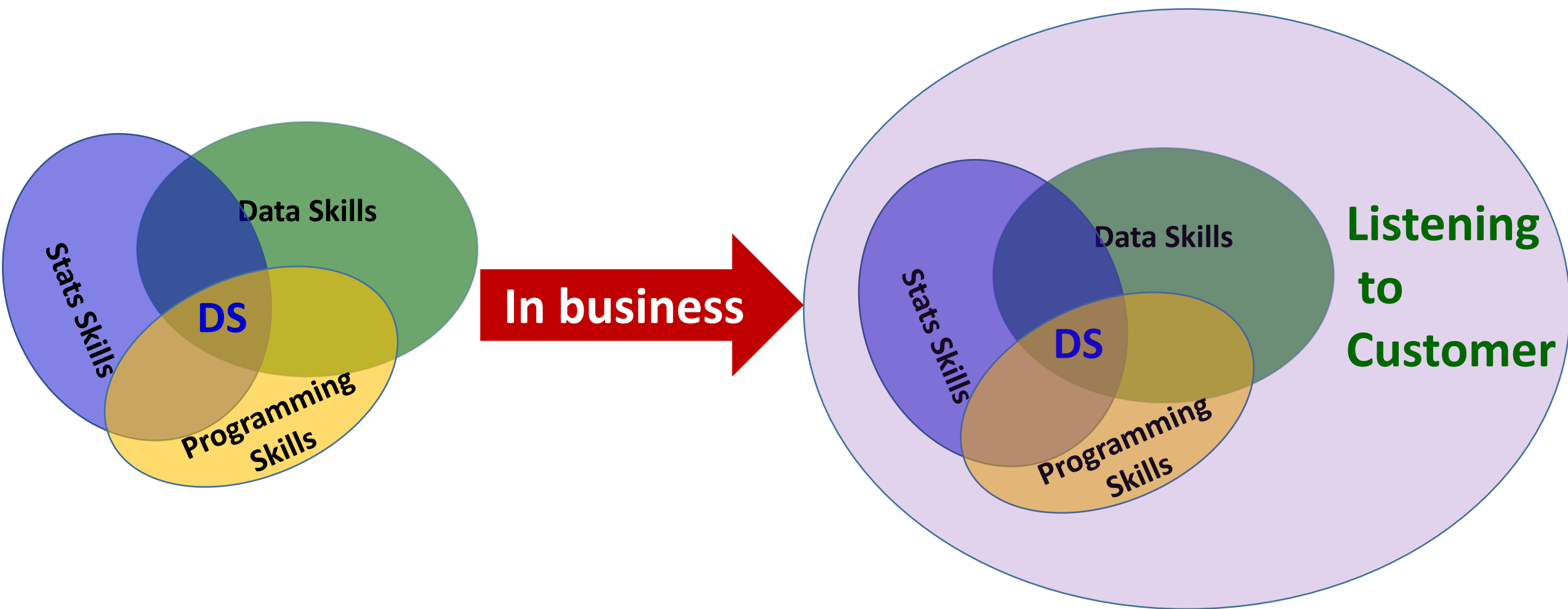


Machine Learning

Learn from experience

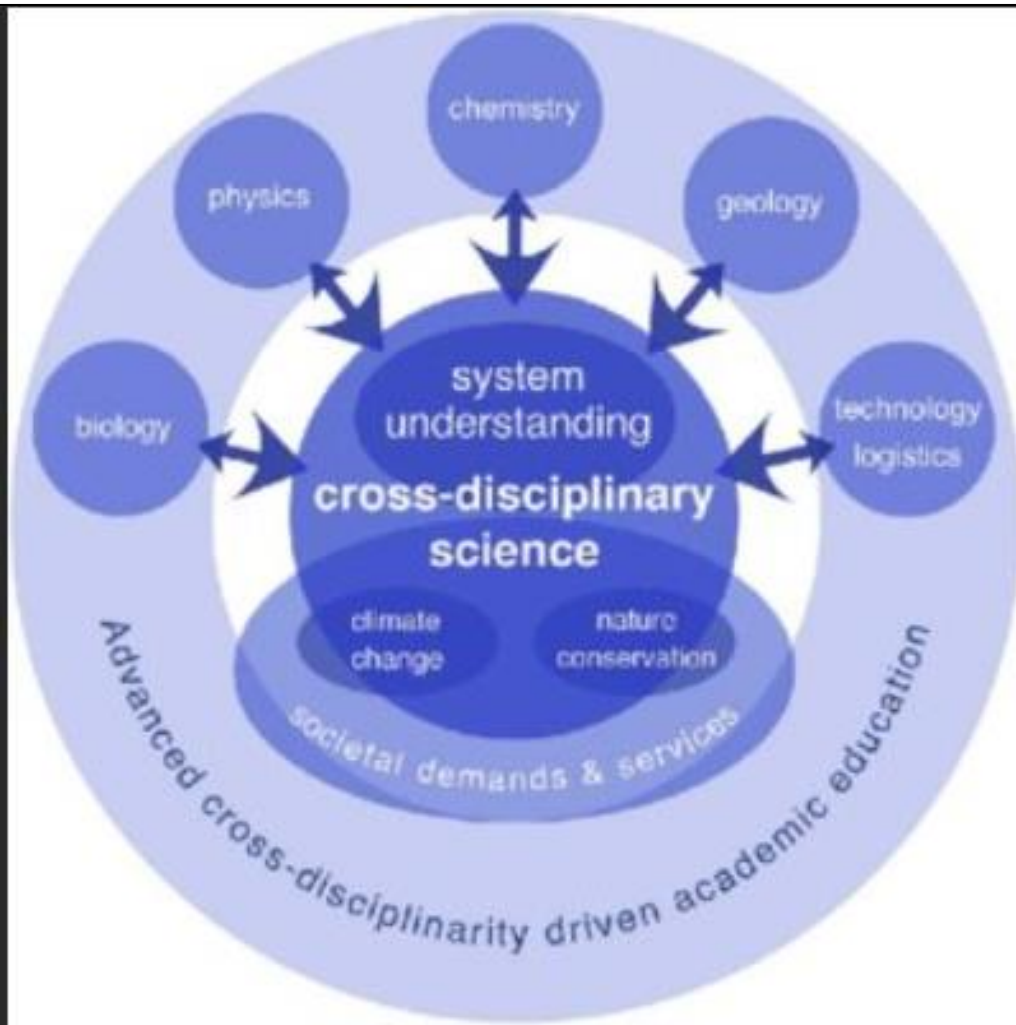


Monetising Machine Learning





Machine Learning Reinforcing Multi-Disciplinary



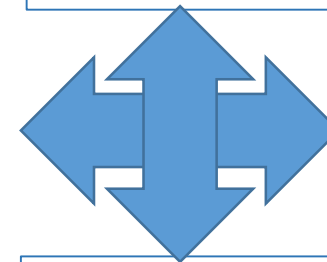
Various application:

- Augmentation
- Automation
- Finance Industry
- Government Organisation
- Healthcare Industry
- Marketing
- Supply Chain
- Education, etc.

Projects Across Faculties or Across Department within a Faculty

- Computer Science and Informatics
- Health & Applied Sciences

Engineering



Management Science

- Nat. Resources and Spatial Science
- Human Sciences

Extracted from:

https://www.researchgate.net/profile/Nerida_Wilson/publication/320127813/figure/fig1/AS:546055521148929@1507201189112/Schematic-overview-of-how-to-achieve-advanced-cross-disciplinary-research-Different_Q320.jpg



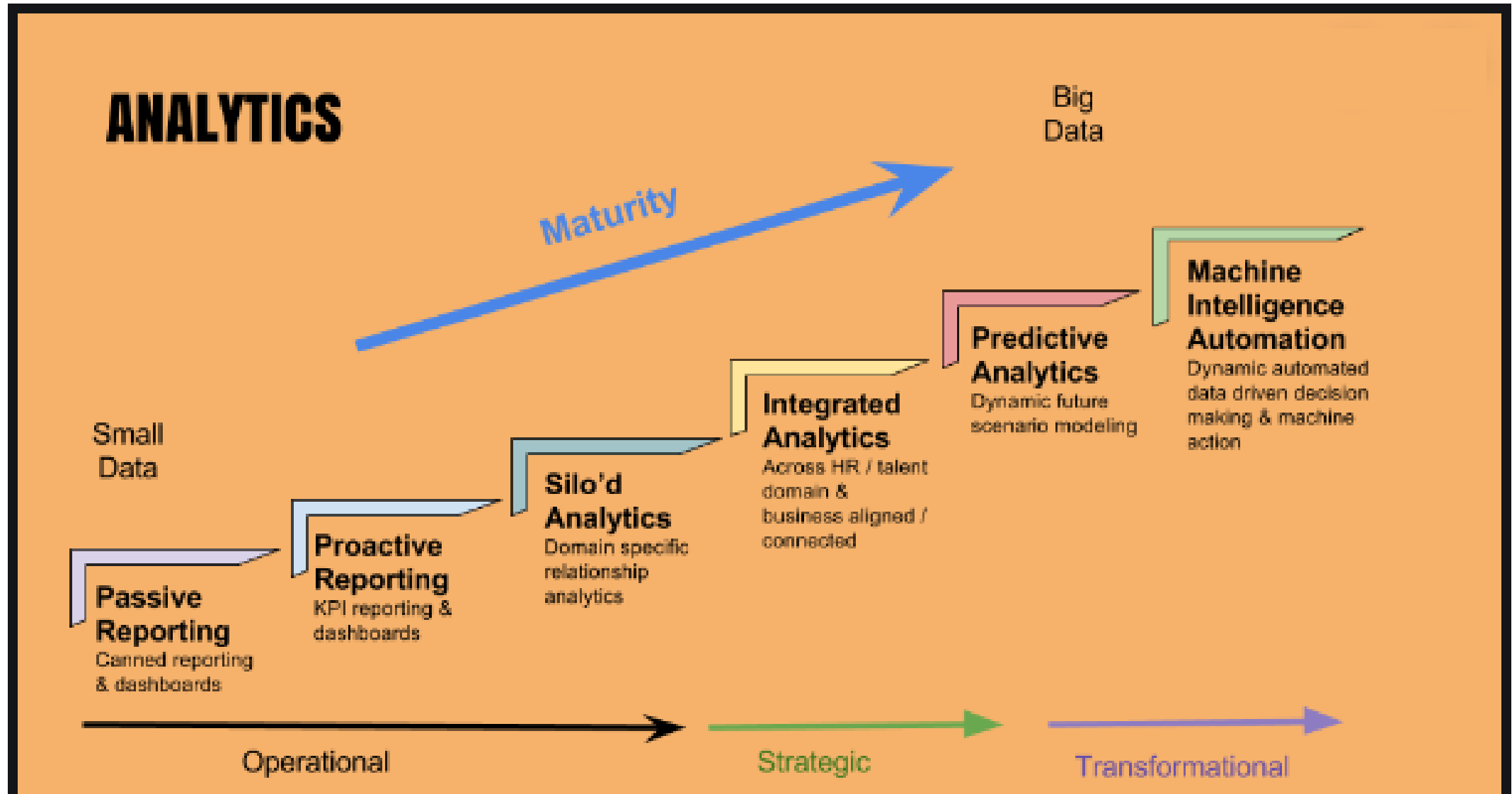
Moodle Tool Guide for Teachers



What you want to use (technology)	What you want to achieve (pedagogy)	Information Transfer	Assess learning	Communication & interaction	Co-create content	Bloom's
		Is it a tool for disseminating information from you to your students?	Will this tool allow you to assess your students' learning?	Can it be used for communication & interaction among participants (you & your students)?	Can you & your students collaborate & create content together?	Allows what thinking order? •Remember •Understand •Apply •Analyse •Evaluate •Create
Add Resource Upload a file (Word Document/ PowerPoint)	Easy, like an email attachment. But can your doc stand on its own?	Yes. Only teachers can upload files to course site. So definitely a push-tool.	Maybe. Use to give task. Collect student files through Forum or Assignment.	No. It's a distribution tool. No option for interaction or communication.	Maybe. Use to give task. Collect student files through Forum or Assignment.	None. This is not a learning activity, but information transfer.
Add Resource Link to a web page	Easy, find the web address (aka url – the bit that starts with http://), copy it, paste it.	Very easy way of leading students to information. Can link directly to database articles.	Not directly. Option is to link to external student e-portfolios or blogs.	Maybe. Link to external tools eg Google Calendar, groups, blogs or wikis.	Maybe. You can link to external collaborative sites e.g. Google Docs, wikis or blogs.	6/6 Can do all of the above, depending on where you link to.
News Forum Use to send out course announcements	Easy. It's a standard forum, already set up in your course.	Yes. Include course updates, encouragement, timely links, etc.	No. The News Forum is limited. Students cannot post new topics.	You can start new topics. Students respond. Great for establishing course rhythm.	Limited because students cannot start new topics. Tip: Set up another Forum.	2/6 Not strictly learning activity. Test readiness for next class? R & U
Discussion Forum Use for many types of learning activities *	Easy. Forum has usable default settings. A name & description is enough.	Share resources as links or files. High message volume? Risk of losing info.	Forum is versatile & allows this, e.g. design a formative assessment activity.	Yes. Students communicate with you & peers. Interact as a class or in groups.	Yes. Students can collaborate & explore topics, discuss them & write together.	5/6 Understand, Apply, Analyse, Evaluate, Create



Moodle Analytics Enhanced by Machine Learning






Moodle Analytics Enhanced by Machine Learning

Predictions through specific models, such as:

- Students at risks through well defined indicators
- Competence framework aligned to learning outcomes and graduate attributes
- Status of courses:
 - ✓ Dormant
 - ✓ Students enrolled but no lecturer and vice-versa – these are courses at risk of not to start
- Students performance (tests, assignments, formative assessments, etc.)
- Student progress in the course, etc.



Virtual Assistant as Student Support Tool




Great! Which pizza would you like? You can find our menu [here](#)

action_listen


I want to order a pizza

order_pizza



The Neapolitan

pizza_choice



No problem. Do you want any extra toppings?

Unit 1 - MIL: An Introduction

Communication has always been central to human existence. In prehistoric times, people spoke by imitating birdsong, scratched information on walls, horns, stones, and shells, and sent messages by beating on drums, bells and gongs. As time went by, humans developed sophisticated oral communication through speech, song, oratory, and verse. Writing implements and symbolic systems became more complex, resulting in manuscript and print cultures. Transmission technologies like the telegraph, telephone, underwater cable, radio, and satellite, and the internet whisked messages around the world in record time. The image technologies of the camera, film and television added a vibrant, visual component to human communication. Most recently digital and nanotechnologies have delivered previously unimagined communication tools into the hands of everyone, even small children.

Most of these technological advances have occurred with the last century, indeed many within the last twenty years. The changes in information and communication technologies (ICT) have been so fast and unevenly distributed that some people are faced with more and more information every day, while others are still starved for information. Yet, the societies in which we live today are driven by information and knowledge.

Any help? Let chat.




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Introduction

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What do we mean by Media?

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What do we mean by Information?

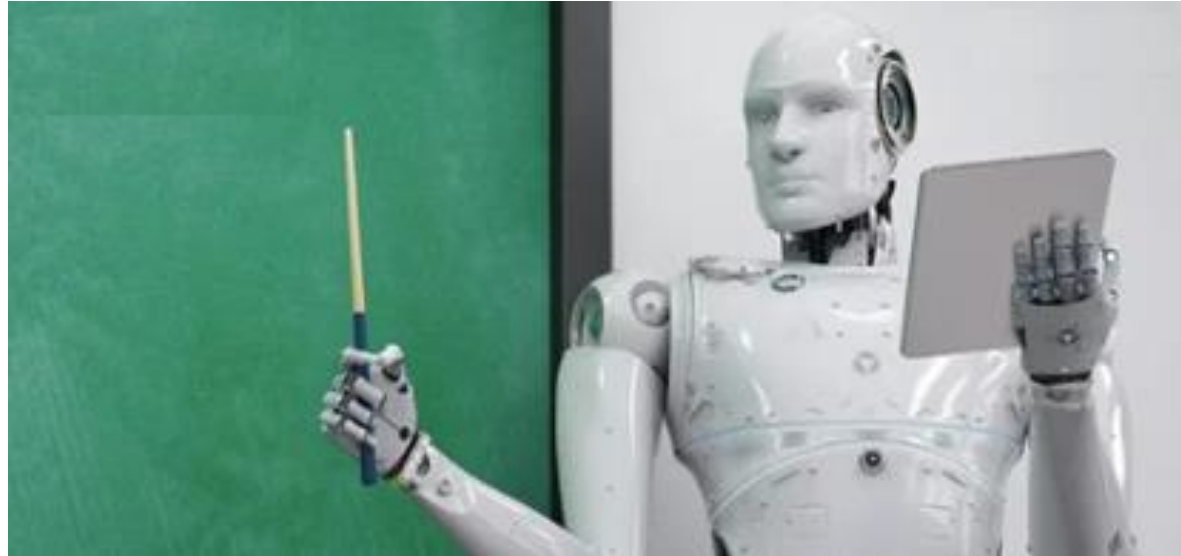
What do we mean by Literacy?

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Suggested Assignment



AI in Education – Project Around the World



Humanoid robots teaching Class 7-9 students at Bengaluru school, in India

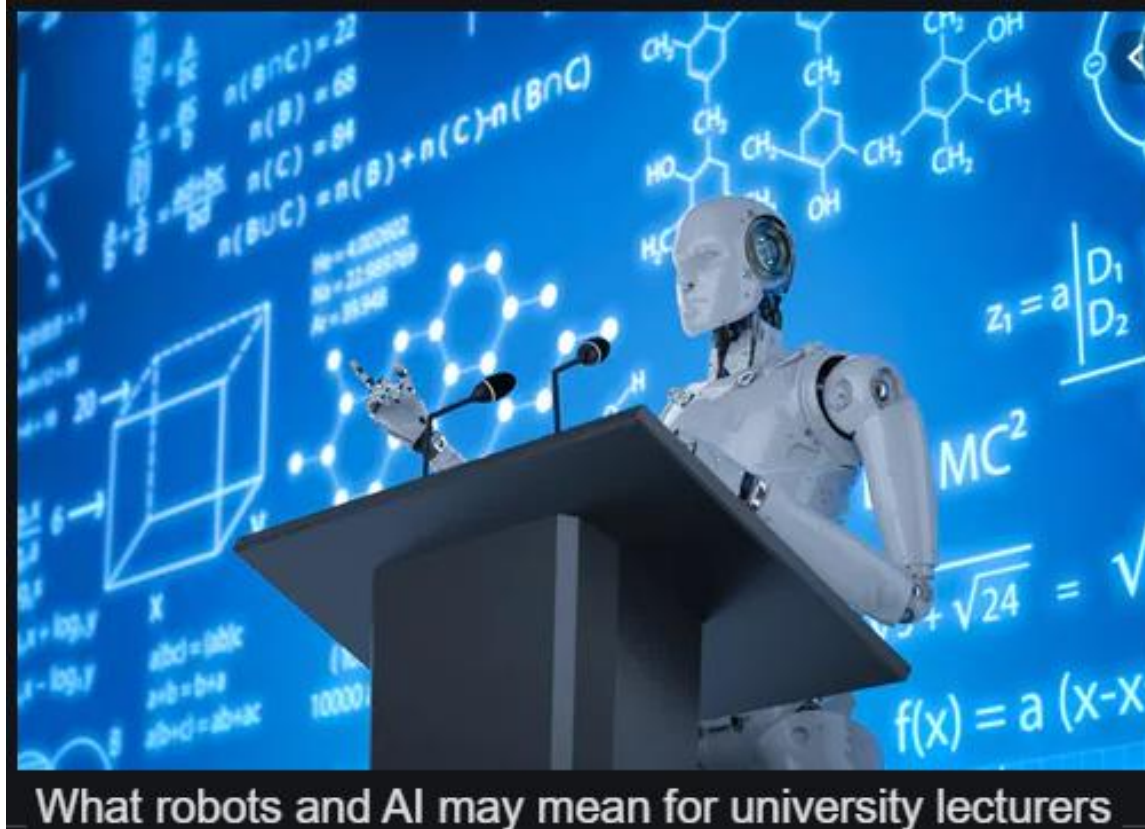
Extracted from:

<https://preptube.in/news/humanoid-robots-teaching-class-7-9-students-at-bengaluru-school/2019/09/02/>

The AI-enabled robots teach lessons in Biology, Chemistry, Geography, History and Physics to Classes 7-9. As per the Collaborative Learning Model (CLM), the man-machine team, comprising a teacher, students and the robot, collaborate in the classroom to deliver a lesson. The teacher collaborates with the robot and brings out the key concepts, relevance and application of the lesson being taught,”



AI in Education – Project Around the World



Extracted from: <https://images.theconversation.com/files/269008/original/file-20190412-76843-gjsiz1.jpg?ixlib=rb-1.1.0&q=45&auto=format&w=496&fit=clip>

A **novel teaching method** composed of Self-study, Test, Question and Discussion (STQD) sessions uses self-, peer-, co-learning, active learning, inductive **teaching**, and formative assessment to promote student-centered **teaching**

“AI is changing the knowledge and skills students need for success in a global, knowledge-based, innovation centered civilization. To accomplish these ambitious educational outcomes, AI is also enabling novel, powerful methods of teaching and learning.



Sophia may be a teacher – isn't it?

1) <https://www.youtube.com/watch?v=S5t6K9iwcdw>

2) <https://www.youtube.com/watch?v=kWIL4KjIP4M>



END