

# Technologies for Assessment & Evaluation

Possibilities & Experiences



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# Assessment and Evaluation

## Assessment

- Process oriented
- Focuses on learning
- Formative
- Continuous
- Diagnostic
- Observation-based
- Reflective
- Shared (student-instructor)

## Evaluation

- Goal oriented
- Focuses on learning outcome
- Summative
- Set intervals
- Judgmental
- Rule-based
- Prescriptive
- Set by evaluator

Both require data-based approach, collaboration, and authentic, well-defined and scalable processes all of which can be achieved using technology

# Objectives and Approaches

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The objectives of technology enabled continuous assessment and evaluation are to:

- Enable students' learning
- Improve process & control
- Achieve the above two at scale

Broad approaches to adopting enabling technologies:

- Reviewing/ strengthening the fundamental processes to suit the changing needs
  - Adapting to technologies with a long-term and progressive mindset
  - Addressing the challenges in an inclusive way
  - Assessing the impacts and challenges objectively
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# Emerging Technologies

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## **AR-VR-XR:**

- AR layers physical elements and scenarios with virtual content, and the user often accesses it with a smartphone.
- VR comprises a highly immersive experience using head-mounted displays, facilitating manipulations and interactions with virtual objects.
- XR is mixed reality, a hybrid method merging the digital and physical context to generate new virtual simulations and environments.

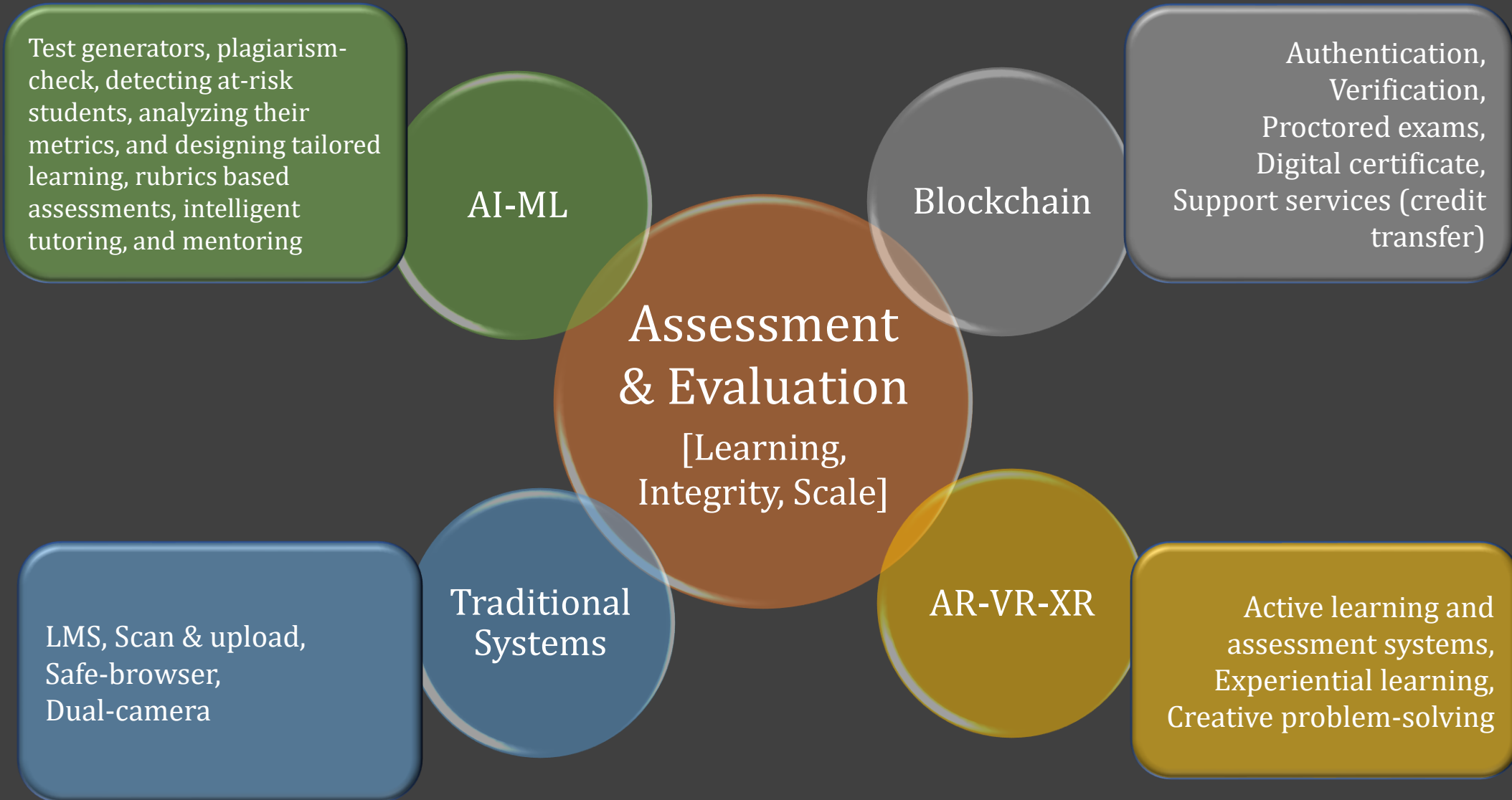
## **AI-ML:**

- Artificial intelligence relies on computer systems to execute tasks and activities that functionally and traditionally rely on human cognition, especially in terms of learning and problem-solving.

## **Blockchain:**

- The basic goal of Blockchain is to eliminate a central authority to mediate transactions between diverse parties.
  - Transactions occurring between several parties can be stored as a distributed ledger using blockchain technology.
  - Immutability, reliability, availability, and trust are some of the characteristics of blockchain technology.
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# Popular Technologies in Assessment



# Our Experience



## Traditional systems

- Administering MCQs with auto grading over LMS for over 200 courses every semester assessing around 15,000 students.
- Have conducted over 247,000 online exams with remote proctoring last semester.
- Have adopted a QR based scan and upload system for online exams of analytical courses that cannot be typed in the answering window.
- Have tested dual-camera based remote proctored exams with about 10,000 students during the current semester.

## Remote/ Virtual/ AR labs

- Have created [remote labs](#) in 11 domains, meeting the experiential learning demands of over 4500 students every semester.
- [Virtual labs](#) with 17 industry scale software tools offered over cloud for 46 courses focusing organization [problem-solving](#).
- [AR labs](#) developed in thermal domain to provide an engaging experience and ubiquitous learning at scale for over 800 students. This is being expanded to other domains as well.
- Developing a progressive [learning app](#) integrating AR models for formative assessment.

## AI-ML\*

- Developing an ML algorithm to assess dissertation reports using defined rubrics employing supervised and reinforced learning.
- Designing an app to alert the evaluator with a fairness-index by synthesizing proctored data of object recognition and gaze dynamics.

*\*under experimentation*

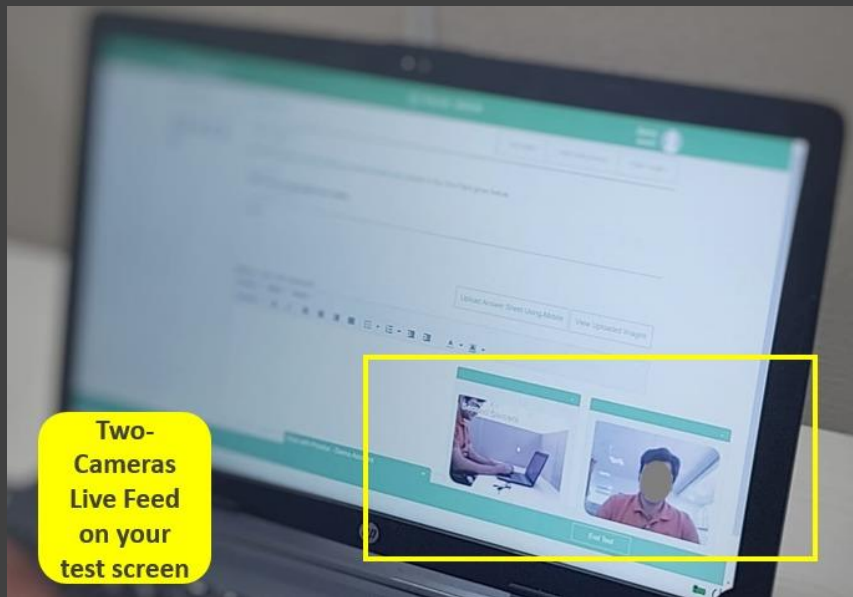
# Illustrations



Remote Proctoring

Remote-Virtual-AR labs Learning App

<https://youtu.be/4sIG3URajVw>



# Concluding Remarks

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- Some of the challenges:
    - Privacy protection while adopting Blockchain technologies
    - Data sets for generating ML models
    - Expertise in developing AR-VR-XR models with academic fidelity
  - Some key questions:
    - How do we respond to ai systems like ChatGPT!
    - How can regulations enable technology adoption?
    - How do we handle the uncertainties during this transition?
  - Key action items:
    - Sensitize stakeholders on the possibilities, benefits and risks
    - Invest in expertise and infrastructure
    - Undertake pilot projects and share the learning liberally
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Discussions...