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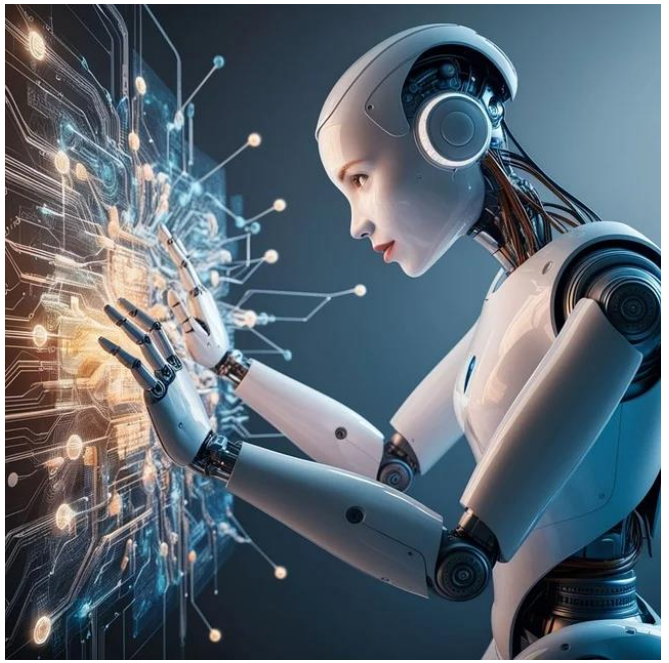
Using AI Technology to Improve Safety Performance and Reduce Risk for Construction MEP Contractors



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Safety Director

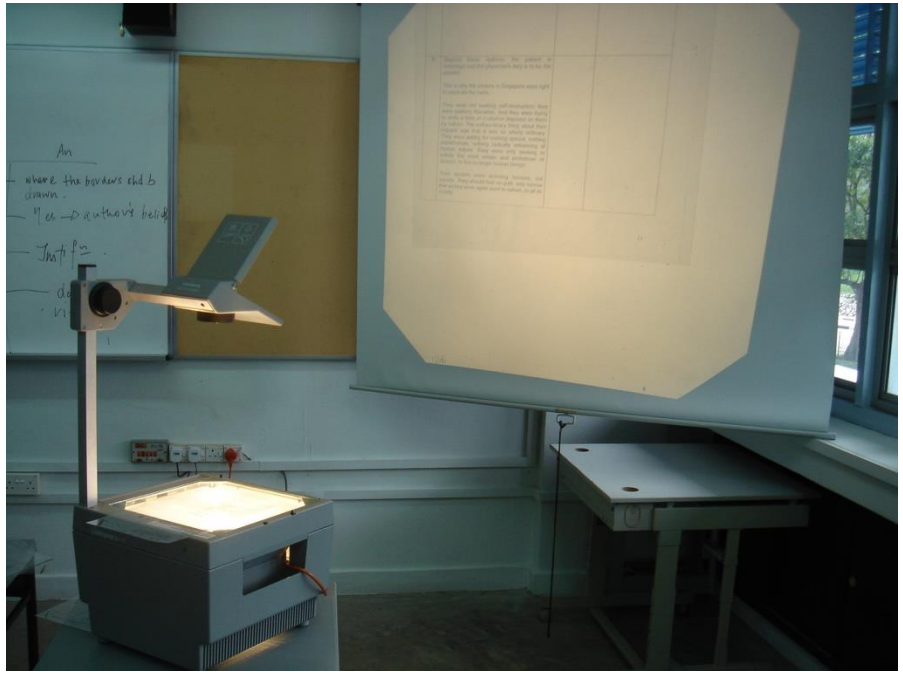
PremiStar

Agenda

- Safety Training Tool Evolution
- HS&E Software Solutions and Learning Management Systems (LMS)
- Evolution of AI in Construction Safety
- AI in Safety Training for Construction
- AI-Driven PPE for Enhanced Safety
- Synthesia Overview
- Pros and Cons of Using Avatars for Safety Training

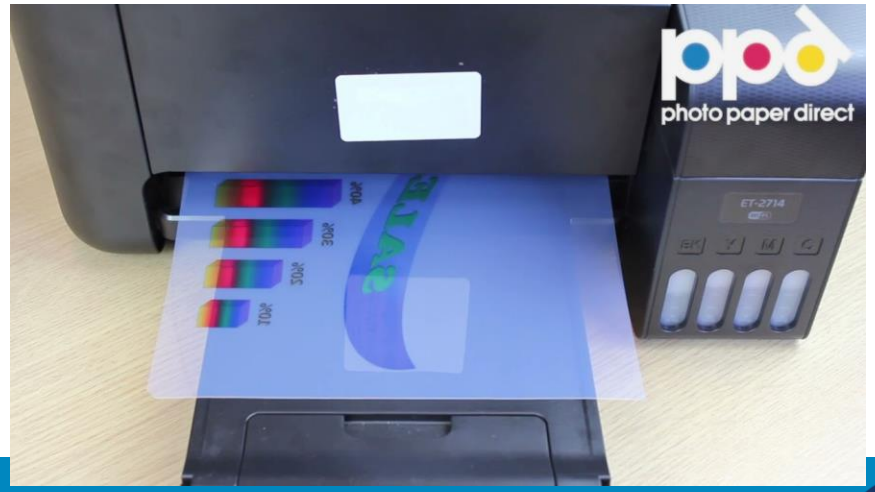
Safety Training Tool Evolution

1. **Pre-20th Century: Chalkboards and Slates**
    - ***Technology***: **Chalkboards (or blackboards) and slates used by teachers for lessons.**
    - ***Training Method***: **Teachers wrote lessons and illustrations for the entire class to see, with students taking notes.**
2. **Early 20th Century: Overhead Projectors and Transparencies**
    - ***Technology***: **Overhead projectors used with transparent film.**
    - ***Training Method***: **Teachers wrote or projected content onto transparencies, and slides were changed manually.**



Safety Training Tool Evolution

3. 1980s: Film Projectors & Overhead Transparencies
    - *Technology*: Film projectors used to display visual materials.
    - *Training Method*: Trainers used transparencies and wrote on them with markers for interactive presentations.
4. 1990s: Printed Transparencies & Color Overlays
    - *Technology*: Printed transparencies with static slides and color plastic overlays.
    - *Training Method*: Trainers displayed printed slides on an overhead projector and used markers for highlighting key points.



Safety Training Tool Evolution

5. Late 1990s: Microsoft PowerPoint

- ***Technology***: **Microsoft PowerPoint introduced dynamic slides.**
- ***Training Method***: **PowerPoint slides offered a digital format for creating and customizing presentations.**
- ***Visual***: **Screenshot of a PowerPoint slide presentation.**

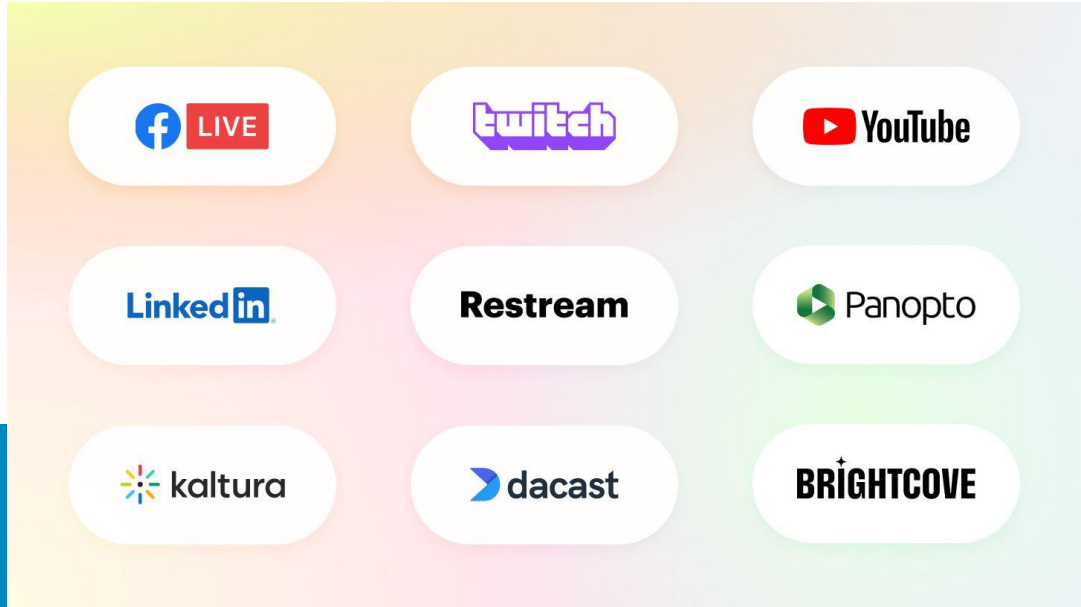
6. 2000s: Interactive eLearning & Multimedia

- ***Technology***: **CD-ROMs, early web-based platforms, and multimedia (audio, video, animations).**
- ***Training Method***: **Interactive lessons with quizzes, multimedia elements, and self-paced learning.**
- ***Visual***: **Image of an early eLearning platform or CD-ROM interface.**

Safety Training Tool Evolution

7. 2010s: Video-Based Learning & Webinars

- ***Technology***: **Online video courses, live webinars, and streaming platforms.**
- ***Training Method***: **Self-paced learning through video tutorials, live instructor-led training.**
- ***Visual***: **Screenshot of an online learning platform with a video lecture.**



Safety Training Tool Evolution

8. 2020s: AI-Powered Training with Avatars (Synthesia & Virtual Learning)

- ***Technology***: **AI-driven avatars, virtual instructors, and personalized learning experiences.**
- ***Training Method***: **Custom avatars deliver training content through dynamic, interactive videos.**
- ***Visual***: **Image of a Synthesia-generated avatar delivering a training video.**

Safety Training Tool Evolution

9. Future: Virtual Reality (VR) & Augmented Reality (AR)

- ***Technology***: **VR and AR technologies offer immersive, interactive learning experiences.**
- ***Training Method***: **Realistic simulations and hands-on learning in virtual environments.**
- ***Visual***: **Image of a person wearing VR goggles and interacting with a virtual environment.**

Learning Management Systems (LMS)

•**1990s: Early Development**: Simple platforms that allowed instructors to post course materials (e.g., Blackboard, WebCT).
•**2000s: Growth & Features Expansion**: Introduction of more sophisticated features, like multimedia support, quizzes, and online assessments.
SCORM Compliance: Integration of SCORM (Sharable Content Object Reference Model) for tracking and managing e-learning content.
•**2010s: Cloud-Based & Mobile Learning**: LMS moved to the cloud, enabling better accessibility and scalability.
•**Mobile Learning:** Platforms began supporting mobile devices, facilitating learning on-the-go.

Learning Management Systems (LMS)

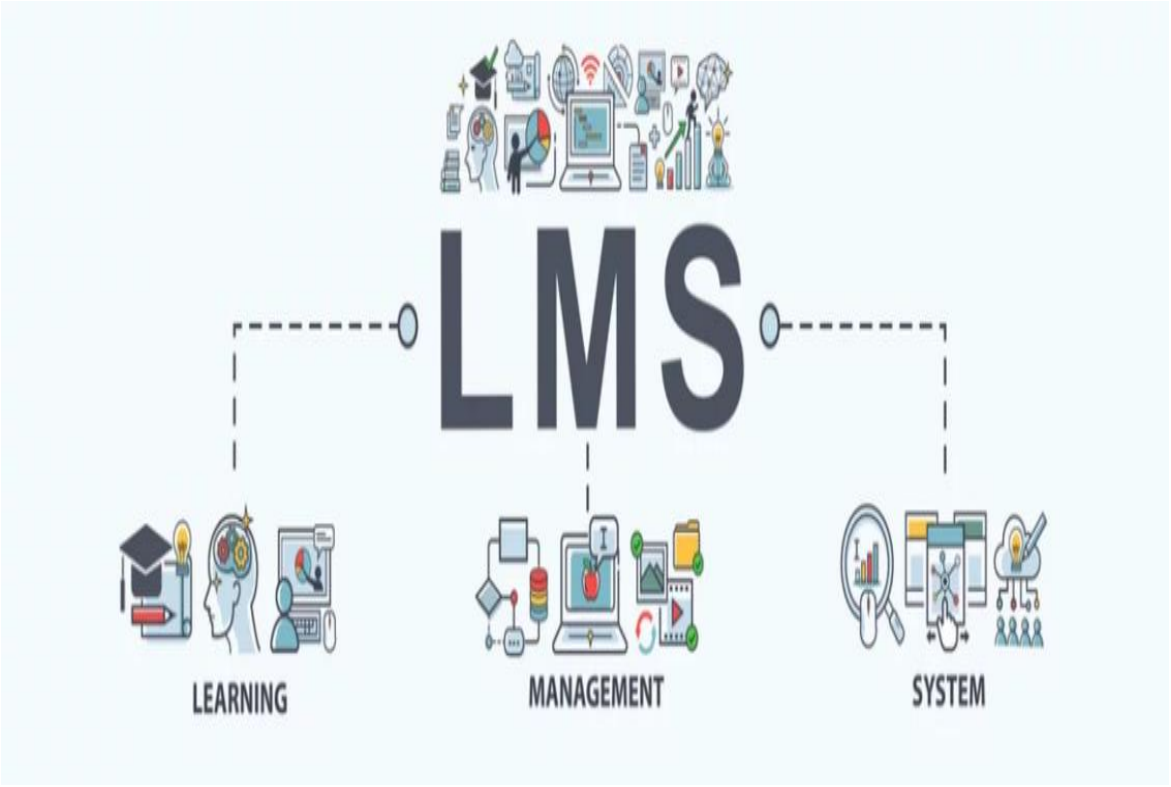
- **Integration with Other Tools**: Integration with video conferencing, collaboration tools (e.g., Zoom, Teams), and social learning features.
- **2020s: AI & Personalized Learning:** AI is now integrated for personalized learning experiences, smart recommendations, and adaptive learning paths.
- **Data Analytics**: Advanced reporting and data analytics help track learner performance and predict outcomes.
- **Gamification & VR/AR**: Gamified experiences and immersive virtual/augmented reality tools have started being incorporated.

Learning Management Systems (LMS) PROs/CONs

Pros of LMS

- **Centralized Learning**: Easy access to all learning materials and resources in one place.
- **Scalability**: Easily scalable to accommodate a growing number of users.
- **Flexibility**: Learners can access content anytime and from anywhere.
- **Tracking & Analytics**: Built-in tracking for progress, assessments, and learner performance.
- **Cost-effective**: Reduces costs associated with physical learning environments and materials.
- **Personalization**: Tailored learning paths and resources through AI and data analytics.

Learning Management Systems (LMS) PROs/CONs



CONs of LMS

•**Technical Challenges**: Issues with platform usability, integration with existing systems, and technical problems can hinder user experience.

•**Learning Curve**: For both instructors and learners, mastering the LMS can take time.

•**Engagement**: Keeping learners engaged through an LMS can be challenging without interactive or engaging content.

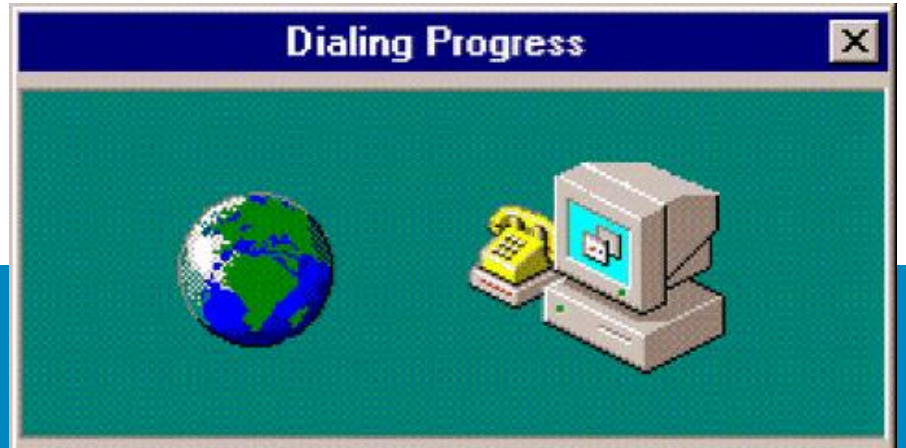
•**Dependence on Technology**: Internet connectivity or system downtime can disrupt access to learning materials.

•**Data Sharing:** Restrictions in using systems (Field Applications: Tablets, Cellphones, etc.)

•**Limited Social Interaction**: Can lack the face-to-face collaboration of traditional classroom learning.

2024 AI=Dial Up INTERNET

Do You Remember Dial Up-Internet Services? AI current evolution is equal=dial up internet solutions. We are just beginning.



Evolution of AI in Construction Safety

Evolution of AI in Construction Safety

1. **Early Days (1950s-1980s)**: Rule-based systems and automation.
2. **Growth (1990s-2000s)**: Rise of machine learning algorithms to process safety data.
3. **2010s-Present**: Implementation of real-time monitoring, wearables, and predictive analytics.
4. **The Future**: Autonomous safety machinery, AI-enhanced risk management, and immersive training tools.

AI in Safety Training for Construction

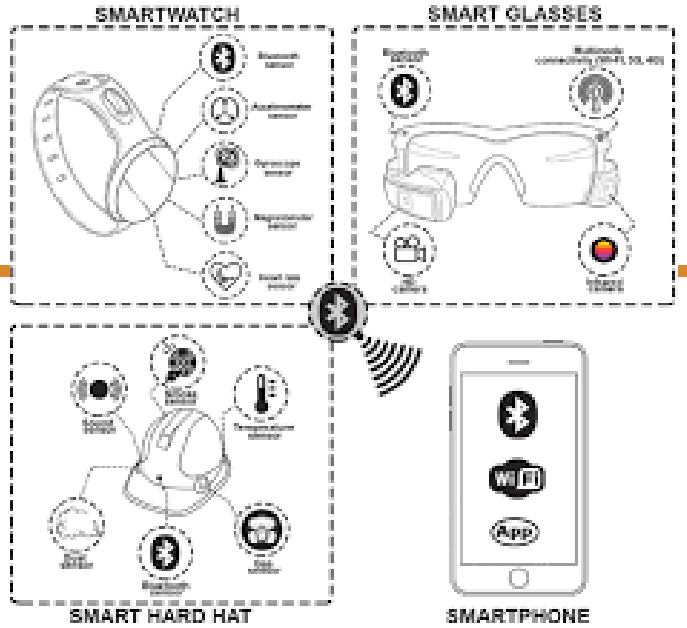
AI in Safety Training for Construction Workers

- **Key Areas of AI Integration**:
  1. **Predictive Analytics**: Analyze historical data to predict and prevent accidents.
  2. **Virtual Reality (VR) & Augmented Reality (AR)**: Immersive, interactive training environments.
  3. **Wearables & Sensors**: AI-powered devices that monitor health and safety in real-time.

Real-Time AI Monitoring: AI detects unsafe behaviors and sends immediate alerts to prevent accidents.

AI-Driven PPE

1. **Early Stages**: Basic PPE for physical protection (Pre-2000s).
2. **2000s**: Basic sensors integrated into helmets and vests.
3. **2010s**: AI-powered wearables that monitor fatigue, location, and physical health.
4. **2020s**: Predictive AI technologies in PPE that alert workers and supervisors to potential hazards before they occur.



Synthesia DEMO

https://www.synthesia.io/

Click Here: https://share.synthesia.io/e4bf29c3-9106-464a-bcde-573b5afb9b88

Synthesia Software

Overview of Synthesia: https://app.synthesia.io/#/welcome

- AI-driven video creation platform that generates lifelike avatars for training.
- Customizable content with the ability to add scripts and change avatars.
- Supports multilingual training for diverse construction teams.

Synthesia Software

Benefits:

- **Engaging and Interactive**: Realistic training modules with AI avatars.
- **Scalable & Cost-Effective**: Training can be delivered to large teams at a lower cost.
- **Quick Updates**: Easy to modify content as safety regulations change.
- **Multilingual Capabilities**: Offers training in various languages to accommodate diverse workforces.
- Do you Remember Dial Up-Internet Services?

Synthesia Software

Challenges:

- Learning curve for those unfamiliar with the platform.
- Lack of personal touch compared to human-led training.
- Over-reliance on AI could diminish hands-on, practical training.
- Script/Scene Creation and Customization Time. 1Hour/Minute?

Avatars: PROs

Pros:

- Enhanced Engagement & Realism: Immersive and interactive training.
- Scalable & Consistent: Uniform training across large teams.
- Simulated Dangerous Scenarios: Safe practice in high-risk situations.
- Personalized Training Paths: Tailored learning for individual workers.
- Instant Feedback & Performance Tracking: Real-time assessments of progress.

Avatars: CONs

Cons:

- Lack of Human Interaction: May lack emotional intelligence and connection.
- Technology Barriers: Some workers may struggle with the technology.
- High Setup Costs: Significant initial investment in avatars and equipment.
- Limited Real-World Context: Simulations may not capture all complexities.
- Over-Reliance on Technology: Potentially neglecting hands-on, practical training.

Summary & Closing Thoughts

- AI technologies, from avatars to wearables provide innovative solutions for enhancing construction site safety, reducing risks, and improving training outcomes. AI is not a replacement for human oversight, but when used alongside traditional safety methods, it can significantly improve safety performance and reduce operational costs.
- The future of construction safety lies in **AI-driven technologies** that empower workers and safety professionals with real-time data, predictive insights, and immersive training environments. AI will be a key partner in creating safer, more efficient construction environments.