



# What Is Augmented Reality & How It Will Impact The L&D World

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Having familiarised yourself with virtual reality – after seeing it popularized in cinema blockbusters like Avatar and Matrix – it's now time to get to know the latest phenomenon, **Augmented Reality**.

Why?

Because this game-changing technology is about to explode onto the corporate scene and change the very fabric of the L&D World.

The easiest way to explain Augmented Reality it is to contrast it with Virtual Reality (VR), which you may already know a bit about.

As you've probably seen – and maybe even experienced – VR immerses participants in a virtual world: you put on a set of special VR goggles, shutting out reality, and playing out life in your virtual world.

In contrast, Augmented Reality glasses do the opposite, they don't immerse you in a virtual world at all.



When you put on a pair of AR glasses, you'll find that you are still looking at the real world, (not a virtual world), and your **reality is being enhanced or augmented by a visual overlay**.

Graphs, holograms, images, video and stats are layered or superimposed on your day to day reality.

For example, people who approach you might have a virtual floating name caption by their head.

Or routes to intended destinations could be virtually marked out in your visual field.

Perhaps a virtual menu could appear in your field of vision when you take a seat at your favourite restaurant.

Still confused? Try out the ['Pokemon Go'](#) app or look over your kid's shoulder when they are playing it, and all will become clear!





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## Augmented Reality Today

While still in their infancy, **Augmented Reality apps** are starting to find their way into the education and corporate learning sphere.

These AR apps are delivered via smart-phones or digitally enabled glasses.

So, what does the current AR app marketplace have to offer the L&D world?

[Anatomy 4D](#) is a great little learning app by Daqri which enables learners to examine the human body and identify and map out various body systems.

You print out a magic piece of paper, place it on a flat surface, and then view it through your phone's camera.



What you will then see on the table before you is a holographic projection of a human body which can be analysed in the greatest medical detail from all possible angles.

It's fascinating, but it is still merely **scratching the surface** of what is to come.

The makers of Anatomy 4D have a sister app AR app called Elements 4D which allows students to manipulate and combine elements like Mercury via their mobile device.

They get to see the chemical reaction as it might occur in reality, rather than being restricted to a 2 dimensional education experience via a text book.

[Aurasma](#) takes AR a step further and allows educators and learners to **self-author their own augmented reality experiences**.

It's currently being used in many exciting ways for learning.



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1. For example, Aurasma has been used to create **home-work mini lessons**.

When students scan a page of their home-work, a video of their teacher emerges giving them targeted coaching on how to solve that specific problem.

This is a great example of how AR can support, 'just in time', microlearning in the work-place.

2. Aurasma is also currently being used to support **induction and orientation processes**.

New starters can scan the image of any publicly displayed photo, such as faculty members, managers etc.. and that person comes to life providing a short bio about themselves and what they do.

3. AR is also being used to **facilitate social learning**.

Students are now able to record themselves giving a short review of a novel they have read. And using Aurasma, they can associate this 'aura' to this book.

When someone scans the book they can get immediate access to the digital video review.

4. **Safety** is another area where AR is bringing real benefits. Laboratories are full of hazards.

Currently, AR is being used to put AR triggers all around the science lab.

When students scan these triggers with Aurasma they will be informed of the specific safety protocol relating to that location or piece of equipment.

This kind of AR technology could have immediate application in the corporate and industrial space when orientating new starters or visitors.

5. AR is being used to enable a form of **virtual coaching and mentoring**.

Currently, parents can provide mini-coaching sessions for their kids and attach the image to the child's desk.

When they are under pressure, they scan the image and receive virtual words of encouragement from their parent.

It's not hard to see how this kind of app could be extended for use in the work-place in the form of virtual coaching or mentoring when a learner is trying to embed a new skill or operating outside of their comfort zone.



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## Augmented Reality in The L&D Workplace

These examples of AR gaining traction in the education environment give us a glimpse of the possibilities for AR in the L&D work-place, which are endless.



### *Paradigm shift in learning*

Augmented Reality is going to require L&D practitioners to adopt a **transformational attitude to learning**.

Block training will no longer need to precede execution, as tends to be the case with traditional forms of learning.

By overlaying visualized instructions over a person's field of vision, workers can learn new methods and execute them simultaneously, giving huge productivity advantages.

As a result, real-time, **formal learning on the fly** may become the norm, representing a paradigm shift in learning.

### *Real-time learning on the fly in practice*

[Lets delve into learning on the fly with Real-Time-Information](#), which is perhaps the ultimate end-game of just-in-time learning, by reviewing some examples and likely scenarios.

In an environment characterized by real-time learning, a typical industrial worker could be wearing their AR glasses and they will be able to recognize equipment, machinery and controls and will be able to work through step by step diagnostics to fix a malfunction.

**This isn't just-in-time learning, this is literally learning on-the-fly.**

Or, a repair technician could be looking at a specific type of high voltage widget on an oil rig, and using their AR glasses with real-time information, they would be safely taken through diagnostic and repair.



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In such scenarios, **real-time, on-the-fly formal learning**, removes the need to retrain the entire workforce if the system is modified or upgraded.

When new components or equipment is added to a facility the AR learning system will be updated and field workers will be fed the most up to date information via their AR glasses.

They will be able to quickly learn to maintain the new system without having to go back to the classroom or user manual.

This will **reduce the time** spent in off-site training which should lead to an increase in productivity.

The role of instructional designers and e-learning authors will be greatly expanded in an AR based corporate learning environment.

[General Motors is one of the industry leaders in applying AR](#) to corporate learning. They are using Google Glass to train their factory workers in real-time.

When workers are out on the factory floor, they use their Google Glass when they are doing complicated projects such as installing strip moulding. They are able to see the correct methodology in their Google Glasses as they carry out the task.

Once again, an **example of formal learning** and execution taking place at the same time!



[This video perfectly](#) demonstrates the power of AR to teach.

Imagine having to fix some strange water pump you'd never seen before?

You'd wouldn't know where to start.

However, once you put on your Scope AR Work-Link Smart Instructions goggles, you would be immediately presented with a step by step, AR training system.

Clicking on start, will indicate hazards, (e.g. where not to put your fingers).

Then the system will highlight the relevant part of the machine with a AR overlay, and a floating spanner will demonstrate unscrewing and removing screws.

You simply follow these instructions and move to step 2.

The AR overlay will then demonstrate how to remove the panel which you have just unscrewed, with two floating VR hands and a holographic image.

The next step shows how uses a floating screwdriver and hammer to show you the next step of the repair.

You are guided through each stage of repair by an **AR assisted visual overlay** that demonstrates the correct technique.

This shows how AR can be used for **simultaneous on-the-job formal training AND execution**.



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AR promises to make a huge impact on the on-boarding area.

[Take this AR app called EyeDecide](#), which lets patients see the impact that minor eye symptoms can have on their long-term vision.

This app can be used to **train new nurses**, enabling them to see how their own behaviour impacts patients for better or worse; they could interact in real-time with an AR generated patient and see the impacts of asking the wrong question or overlooking a procedure.

## *AR Trigger Points*

To truly understand the full potential of AR, it is necessary to be familiar with the **concept of trigger points**, which this examples illustrates well.

[RTS Group are using AR](#) to help learning within the automotive industry.

Their tools allow learners to find out information about specific car models by using their smartphones.

Their AR powered vehicle contains 10 trigger points that are located all over the vehicle at key points.

The learner can move around the car and retrieve information on the car, presented by a **3D service advisor** via the app.

This means that the learner could point their phone at the tyres and find out the correct tyre pressures and size or perhaps open the bonnet to see where the washer fluid goes, removing the need to use a manual.

It's clear that this has a use for potential car customers and new car owners, but it could also become an induction tool for new starters which could help them learn about the models and features of their cars, on the fly.



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## *On-boarding with AR trigger points*

AR trigger points could be used to **aid learning in the wider workplace**.

By placing trigger points throughout the office at key points, new starters could run through an AR driven orientation which takes them on an educational trail around the office to key trigger points such as the printer, stationary cup board, health and safety equipment, kitchen equipment, etc., providing AR driven information at every point.

It doesn't stop there.

Going into the meeting room and scanning the image of the CEO or any of the management team could trigger a welcome presentation via AR as a hologram or free-floating video.

Apple have perhaps given us the biggest clue as to how AR could revolutionize the on-boarding process. [The newly launched \\$108 million visitor centre on the Apple](#) has, along with the retail store and cafe, developed a topographical scale model of Apple Park, (their corporate campus HQ), which is presented through an in-house augmented reality iPad app.

When you arrive you are given an iPad installed with the app and then you simply point it at the scaled down map of the campus.

The map subsequently springs to life, providing information all about Apple Park and its structures.

The app is **customizable** so visitors can adjust their viewing experience according to the time of day, and they can see the energy expenditure and airflow coming in and out of each apple park structure.

As it stands, it's a basic on-boarding tool for visitors which could be instantly applicable to new hires.

But, with a little imagination it's not hard to see how this could become extended to become an advanced on-boarding tool. New employees would be able to use this tool to get a real feel for the culture and spirit of Apple as they could walk around the campus in real-time and see how each department works.

The financial services industry is another sector that would benefit hugely from **incorporating AR technology** into its on-boarding and training processes.

Front-line financial staff have to learn what can seem like an overwhelming amount of detailed information about financial products before being put in front of clients.

AR could really help this kind of **on-boarding and training process** as it would enable them to practice using finance specific terminology with AR avatars in a safe environment.





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## Beam's AR Based On-Boarding Programme



[Beam have developed a cutting edge AR-driven on-boarding programme.](#)

**New starters** are able to use AR headsets when they are **on-boarding** at their new company.

It enables them to take a walk-around AR tour of the office and learn about the business, office and helps them connect with colleagues.

The makers of this tool urge caution with this AR tool to minimize culture shock.

Rather than throwing a set of AR goggles into the mix on an already awkward first day, Beam recommend that new starters use their AR headsets out of normal hours.

The headsets inform staff members of who sits where, what their job entails, who their key clients are and how you can get in touch with them.

If you click on a person you will be shown a short video about the person where the employee expands on their job duties and gives some tips on how they can help the new starter.

For example, in the video promo, Andy the VP of Content Strategy gives a warm hello, and says, *"Ask me how content strategists and copywriters collaborate here, or simply ask me about joining the new Fantasy Football League, I'm the commissioner"*.

Another neat feature of this AR on-boarding tour is that it allows you to **geographically target and locate people**, according to their interest.

The system allows you to select one or more business clients and it will quickly geographically pinpoint your team mates and key collaborators.

Next, if you walk into the conference room you are immediately presented with a visual overlay that shows a history of meetings that have taken place in this room, which you can access at a click.

These are designed to provide insights and training on important methods, techniques and ways of working.



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When you click on a meeting, then the AR magic happens and you are transported back in time to when the meeting took place.

You can walk around the room viewing artefacts from the meeting that were photographed at the time, such as diagrams, visualized discussion, brain-storming charts, etc... Looking at the table will show the workshop attendees and you are given the option to reach out to them for follow-up.

There are more light-hearted aspects to the tour such as signing an AR wall to commemorate the tour or heading to the canteen to enter a poll for your favourite recipes.

**The possibilities with this AR enhanced on-boarding tour are endless.**

## *Social Learning*

Another area where AR can have a massive impact on corporate learning is **social learning or peer to peer learning**.

Getting employees to transfer knowledge to one another can be a real challenge when staff are time-pressurized, competitive, or just not that way inclined.

AR can automate this process of social learning. AR systems have the ability to retain an employee's learning and insights and transfer them to others. How?

Artificial Intelligence based systems have the ability to watch workers in action and then learn and adapt by observing what workers do **right and wrong**.

Machine learning can mean that augmented systems are smarter and safer and enables existing workers and future workers to benefit from what one worker has discovered.

An added benefit of this kind of automated social learning and knowledge capture is that the new skills that are acquired by your staff are retained when they leave, reducing the brain-drain effect that occurs when an employee leaves.



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## *Remote Working with AR Based See What I See Glasses*



Taking this theme of social learning further is the AR concept of SWIS, (See What I See glasses). This enables an organization to **transfer staff's skills and knowledge to anywhere in the organization at any time.**

Let's take the example in a technical environment where an unusual problem faces a worker when in the field.

This can often lead to second set of more senior technicians needing to be dispatched to fix the problem.

But, AR eliminates the need for this second line support by enabling those more senior technicians to view the field-based problem from the comfort of their centralized location via the field worker's **augmented glasses.**

The desk-based construction crane technician can then remotely operate cranes at a building site any where on the planet, using the AR glasses.

AR glasses will enable highly skilled technicians to transport their knowledge around the world without leaving their desks.

From a learning perspective, not only does the desk-based worker fix the problem, but the more junior field technician gets to observe and learn in practice how to fix the problem.



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## *NASA and Microsoft HoloLens*



[The space agency's Jet Propulsion Laboratory and Microsoft HoloLens](#) have developed some exciting software that enables **earth-based scientists to work on an augmented reality version of the Mars Landscape.**

As they put it, the AR system, “fundamentally changes their perception of Mars and how they understand the Mars environment surrounding the Mars rover.”

Until now scientists, could only examine Mars imagery on a computer screen, but this lacked a realistic sense of depth, making it an underwhelming experience.

So, the AR system uses **holographic images** to overlay images and rover data into the users field of vision.

It blends a view of the real, physical world with computer-generated imagery to create a **hybrid of reality and virtual**. It will help researchers to better understand the environment and workspace of robotic spacecraft.

## *Everyday Applications of HoloLens*

It's not hard to imagine how this kind of technology could be extended within the mainstream corporate workspace.

Nervous or rusty presenters could practise giving a presentation in a real auditorium or meeting space with a simulated audience provided by an **augmented reality holographic overlay**.

This virtual audience could potentially be interactive and present various challenges for the presenter to deal with such as, answering mobile phones, chatting audibly to colleagues, late arrivals, interruptions and tough questioning.





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## *AR Can Bring The Social Back Into E-learning*

Augmented reality training experiences could bring the social back into e-learning.

The power of that HoloLens system above was that it can allow **2 or more remote users** to convene in a remote space by superimposing holograms over their current reality.

By using advanced avatars and projecting data and 3D models two workers in different continents could in theory interact as if they were in the same room, standing side by side.



By using advanced avatars and projecting data and 3D models two workers in different continents could in theory interact as if they were in the same room, **standing side by side**.

This could mean that staff could attend training holographically or trainers could deliver training holographically in a recorded or live format.

Imagine sitting in your home office wearing your AR goggles and having a holographic trainer, presenting training to you as if they were in the room.

It might seem a little bit bizarre to begin with, but you'd soon get used to it!

In time this could be upgraded to give you the opportunity of having an augmented reality representation of other remote learners, (who are taking the course at the same time as you), right in your room with you.

You'd be able to interact with each other as if you are **physically located together**.



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## Retail sector – Problem Solving Simulators



The retail sector already makes use of mobile apps during the merchandising and auditing process, but when combined with AR features, smart phones will be able to deliver training.

This training can take the form of **'quests'** during which trainees meet avatars, (virtual personas), as they walk around the store..

For example, lets say a trade marketing specialist attends a specific retail shop.

As they walk around the store, they'll pass an **AR trigger point** and their mobile shows a window with a text from a virtual persona.

The text might be from a virtual manager who argues that the product supply figures don't match those in the contract.

Once the problem has been communicated, the app provides tips on how to **solve the problem**. For examples, it instructs the employee to go to the back of the store where there is another AR trigger point which indicates the virtual state of supply.

The quest can be populated with as many challenges as required in order to help train and prepare the employee for the potential problems they may face on the job.

This kind of technology can be extended across the retail workforce. Retail Assistants are vast in number, creating a **huge training burden on the organization**.

With the retail and (particularly the supermarket sector), facing a competitive squeeze, reorganizations and mergers, AR training could give retail organizations an advantage, by both **reducing training costs and increasing the effectiveness of training**, and helping employees adapt to change.

Retail Assistants could be put through a sequence of store 'quests' using AR technology and trigger points, located around the store.

Any thing from dealing with spillages, trip hazards, broken glass, shop lifting, suspicious behaviour, excessive queues, lost children, complaints, moments of truth, empty shelves etc....

**Thousands of staff could be on-boarded and trained to customer service perfection** at the fraction of the cost of doing it with face-to-face assistance. Specific training could be quickly targeted to stores with specific problems, such as excessive queues, or poor stock control.

New policy, process or procedure training could be quickly rolled out nationwide in a 'just in time' learning capacity



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## The Future

AR is going to transform the way we think about learning in the future.

Where block-based classroom away days are being replaced in part with **just-in-time, bite-size micro-learning modules**, so **micro-learning** will in time be superseded by AR goggles and real-time instructive visual overlay that can be called up on demand to assist you with your current knowledge gap.

Can't operate some new graphics software? No problem. Your AR goggles can guide you through key functions as you need them. This means that instructional design skills will be at a premium in the learning and development arena.

Can't speak or read Spanish? No problem.

In the near future, your AR glasses will translate any foreign words you see in your visual field into your native language and it will be able to place subtitles on screen, translating any foreign words you hear you see or hear into your native language.

It may also be able to provide you with **suggested responses in the foreign tongue**.

Of course if you and the foreign language speaker who you encounter are both wearing AR glasses you'll be able to have a fluent conversation even though none of you speak the same language, because the glasses will act as a universal translator.

Or perhaps you need to install some fixtures to get your new lights working. You'd normally have to go on a course, get a manual or watch a youtube video.

[When these prototype HoloLens AR goggles from Microsoft](#) hit the market, you could complete this complicated task on the fly as you'd receive detailed instruction in a visual overlay that shows the correct wires or functions.

AR based learning will enable people to truly learn as they go.



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## *Immersive Learning Experiences with AR*

Moving on, that same HoloLens tech mentioned above could transform lessons. Microsoft have developed an Augmented reality Mars Study lesson.

Students could put on their goggles and **holographic images would be projected around them**, turning their classroom floor into the surface of Mars.



Learning could be made far more immersive with AR in that it could actually modify the learning environment to make it more conducive to learning a particular subject.

Let's say students were in a classroom learning German, they could **enhance the learning experience** by putting on goggles and having a German classroom setting projected around the room.

This is quite a long way in the future, but eventually the classroom could be augmented with avatars of German students who learners could interact with just like with real students in the room with them.

AR could also instantly turn the average Joe on the street into a doctor.

Using AR glasses, a person could carry out first aid to themselves or anyone else who had been in an accident or fallen ill. The AR glasses once again could provide **real-time instruction** with holographic images, guiding you through various medical procedures and techniques.

This could enhance your company's first aid training at work as, in addition to sending people on first aid courses, you could have a pair of AR goggles available in the first aid box.

**AR will change the L&D world**, putting greater emphasis on instructional design and real-time learning via augmented reality, dynamic visual overlays and instructions.

Learning will increasingly move to a need to know basis; if we need to know it, we'll access are AR kit there and then and use it.

Since the knowledge is so easily accessible it will be more disposable – and there will most likely be a reduced emphasis on knowledge retention.







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