CIPD

*Championing better work and working lives*

# EFFECTIVE VIRTUAL CLASSROOMS

## An evidence review

**Practice summary and recommendations**

October 2021

The CIPD is the professional body for HR and people development. The registered charity champions better work and working lives and has been setting the benchmark for excellence in people and organisation development for more than 100 years. It has more than 160,000 members across the world, provides thought leadership through independent research on the world of work, and offers professional training and accreditation for those working in HR and learning and development.

Practice summary and recommendations

# Effective virtual classrooms: an evidence review

## Contents



## Acknowledgements

This report was written by Jake Young, Jonny Gifford and Andy Lancaster of the CIPD. It is based on the scientific summary produced by Emilia Wrietak, Denise Rousseau and Eric Barends, from the Center for Evidence-Based Management (CEBMa).

We thank a number of area experts for their contributions to this research. In particular, we thank Donald Clark and Leonard Houx for their in-depth advice, which was central to informing the scope of the study. We also thank Stella Collins, Jo Cook, Gary Cookson, Gaëlle Delmas-Watson, Michelle Parry-Slater and David Hayden from the CIPD, and the Eberly Centre for Teaching Excellence and Educational Innovation, for their valuable practitioner insights and comments.

## Publication information

When citing this document, please use the following citation:

Young, J., Gifford, J. and Lancaster, A. (2021) *Effective virtual classrooms: an evidence review*. London: Chartered Institute for Personnel and Development.

This and the accompanying scientific summary are available at cipd.co.uk/evidence-virtual-classrooms

# 1 Introduction

## Lockdown and the rise in digital learning

Effective support for people's learning and development (L&D) is vital for organisations to improve and respond to change. Until the onset of the pandemic, a steady change was taking place in how L&D was delivered.[1] As employers and workers demanded more flexible provision of learning support, digital learning was increasingly coming to the fore, either replacing face-to-face, classroom-based learning or complementing it through 'blended learning' approaches.

That change was greatly accelerated when the pandemic struck and lockdown measures were implemented. Many L&D professionals and school and university-based teachers found themselves making a rapid transition to online delivery. The CIPD *Learning and Skills at Work* surveys show that while in February 2020, 36% of L&D professionals' organisations used webinars or virtual classrooms in their organisation, this had jumped to 51% one year later. As employers turn increasingly to hybrid working, we expect that level of change to be maintained.

However, there is a real need for advice on the skills sets, techniques and approaches that facilitate digital learning. More specifically, there is a need to be clear about the body of knowledge: what we know about the effectiveness of virtual classrooms and the approaches that do or don't work.

## Research focus and approach

This evidence review looks at the challenges and success factors in virtual classes or

webinars where people can interact directly. We summarise what research tells us about the characteristics of successful virtual classroom delivery. We also look at how virtual classroom learning differs from 'face-to-face' learning and what the difference is in the outcomes of these approaches.

The focus will be on synchronous virtual classrooms – webinars or other facilitated learning – for adults, in workplace contexts, but also considering further or higher education. Virtual class systems used include Zoom, Microsoft Teams, Skype, Webex and Adobe Connect, but it is the approaches rather than the specific platforms or technologies that we assess here.

In an age of information overload, it's a challenge to cut through speculation and anecdotes, to avoid cherry-picking research that supports our preconceptions and identify what we can most reliably say about what works and what doesn't. The approaches principle of evidence-based practice helps us achieve this. As for our other evidence reviews, we undertook a rapid evidence assessment (a short systematic review) to get a solid view of the best available research evidence.

All the insights in this report are evidenced by research referenced in the accompanying scientific summary. This also details our methodology and technical information of the referenced studies.

## 2 What is a virtual classroom?

Distance learning has a long history dating back to the 1800s or earlier, with courses conducted through mail, radio and even television. Virtual classroom learning has evolved from this, booming with the wide availability of personal computers, smart devices, and broadband internet, making learning at any time, from any part of the world, affordable and accessible.

We don't have clearly agreed definitions of digital or online learning. The terms virtual-, online-, digital-, remote-, distance- and e-learning are often used interchangeably and described as L&D that makes use of technology, usually the internet, and involving geographical and/or temporal dispersion between the facilitator and learners.

Virtual classroom is a more specific term. It describes synchronous L&D activities with facilitators interacting with learners in real time. This can be distinguished from asynchronous digital learning – where people work through online material in their own time and on their own – and blended learning, which brings the two approaches together. Even so, there are a variety of methods that are used in virtual classrooms, including presented information, interactive activities, discussions, small group breakouts and tutorials becoming more popular in recent years.

**Recommendations and reflective questions for practice**

- Familiarise yourself with the different digital solutions that can be used for L&D in your context and develop clear working definitions with stakeholder input. Don't think of digital learning as a single approach.
- Ensure everyone has a shared view. Don't assume there is a common understanding of digital learning terminology. Consider creating a glossary that can be shared to establish a common understanding.
- Apply digital and virtual learning approaches purposefully, involving stakeholders and using the right 'tools' for the objectives in mind.

# 3 Differences from face-to-face learning

### Are virtual classrooms less effective than face-to-face?

Many learners and L&D professionals have a strong preference for face-to-face classroom settings. But are virtual classrooms less effective as a learning delivery method? Do they detract from the learning benefits of face-to-face classroom facilitation?

The short answer is no. The impact of any learning provision is determined by the quality of its design and delivery. The evidence shows that overall, there is no difference in the effectiveness of well-designed virtual and face-to-face learning. High-quality studies conducted over the past several decades have consistently shown this to be the case, irrespective of the method of delivery, target group or learning outcomes. Indeed, virtual classrooms sometimes lead to greater learning gains than face-to-face learning.

Experts in virtual class design and delivery shared this sentiment, highlighting the view that virtual classrooms can't be as effective as in-person learning as outdated, particularly given the changes we have seen in workplaces over the course of the pandemic. For example:

> *…modality doesn't necessarily adversely impact learning. It doesn't matter if you are facilitating physically together or remote via a live online learning platform; good learning is good learning. Prior to the COVID-19 pandemic… there was so much pushback and a feeling that virtual just wasn't as good as face-to-face. Here, the evidence says otherwise.*
>
> **Jo Cook, Director, Lightbulb Moment Limited**

L&D professionals would do well to pause and consider if virtual learning is seen as second-best to in-person learning in their organisations. In particular, has the reputation of virtual learning been damaged by poor design and previous learner experiences? That can have a major impact on learner engagement. If so, how can these established impressions be overcome?

**Recommendations and reflective questions for practice**

- Consider what gains can be had for the learner and organisation from the use of virtual learning classes and how you can communicate these persuasively.
- Gather learner feedback to inform the design of virtual learning classes to ensure they provide an effective learning experience.

## How different are virtual and face-to-face classrooms?

At a fundamental level, what makes virtual classrooms effective is the same as for traditional face-to-face classrooms. This is a consistent finding in the research that was confirmed by a recent systematic review comparing the two approaches.[2] It's important, as we have several decades of research on the conditions that support effective learning, and we can usefully draw on this body of knowledge for virtual settings. So more specifically, another systematic review[3] found that the core strategies identified by influential education researchers Susan Ambrose[4] and John Hattie[5] also apply well to online learning.

Of course, the change of setting does introduce some important differences, but the key thing to note is that the basic learning processes are the same or similar. Our expert practitioners spoke about how insights from broader L&D research can be applied to online settings. For example:

> *Many good designers and facilitators use evidence-based strategies, but the challenge is blending them for the best experience and results. Adapting strategies into the digital world requires creativity and bravery to give it a go. Use the agile approach of measuring, testing, and adapting until you find an optimal solution.*
>
> **Stella Collins, Co-founder and Chief Learning Officer, Stellar Labs**

> *Good learning interventions, such as formative evaluation and feedback, are not reliant on the modality of delivery. It doesn't matter if you are in a physical or virtual classroom if you are using the right strategy and designing and facilitating learning well.*
>
> **Jo Cook, Director, Lightbulb Moment Limited**

# 4 Overview: what works in virtual classrooms?

In this report, we discuss some key methods and approaches that make an important contribution to positive learning outcomes in virtual classes. We draw on the principles established in the broader body of educational research, as well as research specifically on virtual classrooms.

Table 1 shows some of the most effective methods for both virtual and in-person classrooms. We include the typical 'effect sizes' of these main approaches. Effect sizes are measures used in research (often Cohen's d)[6] that are vital for understanding the importance of techniques or factors of influence: in particular, they tell us *how much* difference they make in practice. As a general rule, assuming they are relevant, techniques that have moderate or large effect sizes should always be considered in decisions, whereas those with small effect sizes may not be worth the time or expense. As Table 1 shows, all these methods make a substantial difference to learning outcomes.

**Table 1: Some key factors in effective learning**

| | Effect size (S/M/L) | Effect size (d) |
|---|---|---|
| Classroom discussion | ●●●●○ | .82 |
| Scaffolding or mastery learning | ●●●●○ | .82/.61 |
| Feedback | ●●●●○ | .73 |
| Reciprocal learning or peer tutoring | ●●●◒○ | .74/.51 |
| Learning goals and objectives | ●●●◒○ | .68 |
| Spaced practice | ●●●◒○ | .65 |
| Direct instruction | ●●●○○ | .59 |
| Meta-cognitive strategies | ●●●○○ | .58 |
| Worked examples | ●●●○○ | .57 |
| Formative evaluation | ●●●○○ | .48 |
| Test-enhanced learning | ●●●○○ | .46 |
| Co-operative or social-collaborative learning | ●●●○○ | .40/.55 |

Notes: The rule of thumb for effect sizes is: ●●●●● very large; ●●●●○ large, anybody can easily see the difference; ●●●○○ moderate, visible to the naked eye of an expert or careful observer; ●●○○○ small, the difference probably needs to be measured to be detected; ●○○○○ very small. Sources: see Scientific Summary.

In the following sections we explore the best available evidence on each of the above approaches. We also include the research evidence on more general factors of influence – that is, widely researched 'moderating' factors that can have a pronounced impact on learning outcomes, both in face-to-face and virtual settings.

# 5 Preparing for virtual classrooms

## Learning goals and objectives

Goal-setting has an important positive influence on performance. A large amount of research over the past several decades across a wide range of disciplines (education, medicine, sports, and so on) has shown this. The effects of goal-setting depend on several factors, including the skills needed and the outcomes desired. For example, in general, performance objectives that are specific and challenging do more to help performance than vaguer objectives to 'do your best'. However, when people first need to acquire skills or knowledge before performing a task, learning objectives aid performance more than performance objectives do. Indeed, in pure learning contexts, performance goals can hinder learning outcomes.

In L&D, objectives are often known as 'mastery goals'. The basic premise is that learners have the same idea as their instructor as to what they should be learning. To be effective, learning goals or objectives must define what learners will learn and present clear success criteria. One way to do this is to specify the learning outcomes associated with different levels of learning – for example, novice, intermediate or expert.

> *A successful virtual classroom will set up an accountability framework with clear milestones using various tools to measure progress.*
>
> **Gaëlle Delmas-Watson, Founder and Principal Consultant, SyncSkills**

*Adopt a scientific mindset… Measure, collect data, analyse, and share it to support learning. Does it change behaviours at work? What's the impact?*

**Stella Collins, Co-founder and Chief Learning Officer, Stellar Labs**

**Recommendations and reflective questions for practice**

- Consider how you clearly present objectives in the virtual class, including allowing time for discussion so that they can become shared goals.
- Are the objectives stretching yet realistic? How can the objectives be differentiated to tailor to knowledge and ability?
- Are objectives revisited at the end of a class to enable learners to reflect on progress?

## Learning to learn

To *learn how to learn*, it can help to *think about thinking*. Meta-cognition in learning is the process by which we reflect on our own learning and choose activity to support it. Planning, monitoring, and evaluating a personal learning journey is important to stay on track. While many learners develop these skills spontaneously, some do so less effectively than others, and may need additional guidance. Many studies demonstrate that developing meta-cognitive skills has a positive effect on learning outcomes. This can include helping learners to understand how people learn, how to assess their personal strengths and learning needs, and how to approach a given learning task. Sometimes challenges in the learning process are of immense value.

*Desirable difficulties lead to deeper cognitive effort and better long-term retention. Examples of desirable difficulties may be spaced practice, interleaving, generation and retrieval practice, all useful in online learning.*

**Donald Clark, CEO, WildFire Learning**

**Recommendations and reflective questions for practice**

- Explain to learners the benefits of meta-cognition or *thinking about thinking* and encourage them to regularly reflect on and monitor their learning approach and progress.
- While a virtual class may often have a largely common approach, think about how some learner choice of approaches can be encouraged in both synchronous and asynchronous activities.
- Encourage learners to use the insights from this reflection to inform their learning approach, and to feed back to virtual class facilitators, so they in turn can modify and improve their practice.
- Consider allocating time and incorporating specific material for learners to develop meta-cognitive skills in the learning process.

# 6 Designing virtual classes

In this section we consider what the research evidence tells us about how L&D professionals can design both the content and structure of virtual classrooms.

## Cognitive load

Cognitive load theory (CLT) suggests that learners can only hold a certain amount of information at one time in their working memory, or short-term memory, before this can be processed and move into long-term memory. Virtual classroom design should consider this limitation, given that CLT has been found to be the foundation for many effective facilitation methods, including worked examples, spaced practice and instructional scaffolding.

> *Cognitive load is a hugely important concept for online learning. Being cognitively overloaded hinders learning, leads to 'Zoom fatigue' and even makes us more biased. Learning is a demanding process as it is. It's more enjoyable and effective when we reduce the cognitive demands in ways that are not inherent to the learning itself.*
>
> **Leonard Houx, Senior Instructional Designer and doctoral student, Bayes Business School**

*The aim of learning is a relatively permanent change in long-term memory. We need to know how to get there. Working memory has limitations in capacity and duration. Less is more as, like a shooting star, your memories literally burn up behind you… Chunking down to smaller, meaningful segments and providing the opportunity for active, effortful learning will both enhance learning by reducing cognitive load and increasing reinforcement, retention and recall.*

**Donald Clark, CEO, WildFire Learning**

**Recommendations and reflective questions for practice**

- Cognitive load is partly determined by what is called 'extrinsic load' – the circumstances in which the learning content is presented. In the context of virtual classroom learning, many factors should be considered. In particular:
- How can we support learners to manage factors that may lead to cognitive load and minimise them in the virtual class design? Think about:
  - ease of use of virtual class platform
  - environmental distractions, for example interruptions, lack of privacy, noise, poor connections, temperature
  - excessive visual stimulation, such as too much information on screen, all cameras on (gallery view)
  - the potential overload of communications channels: video, audio, chat, interactive activities, such as polls.
- Brief learners about the impact of cognitive load factors before the session to help them reduce their impact. For example, think about where they will join the session from.
- Carry out a system check before the session to minimise factors that may distract learner engagement and focus on the day.
- Build up questions, activities and use of the platform tools over the course of a session and explain the tools as you use them.
- Consider a virtual class induction to establish key working principles and functions to reduce the cognitive load of having to become familiar with the platform at the same time as the learning content.

## Direct instruction

Direct instruction involves a facilitator giving explicit, guided information to learners. Generally, this approach takes the following steps:

- determine the learning intentions and success criteria and make these transparent to the learners
- specify content, typically in the form of a presentation
- present the new material or demonstrate the new skills
- provide the opportunity for guided practice
- determine learners' level of mastery and provide feedback
- provide the chance for independent practice
- evaluation.

Direct instruction can also be described as 'I do', 'we do', 'you do'. Although sometimes criticised, research finds direct instruction to be an effective instructional method with a strong impact on learning.

> *While direct instruction can play an important and effective part of an online class, careful consideration must be given to the presentation of information. Less is frequently more. And, if direct instruction is appropriate, it must be part of a considered process in which participants are empowered to apply it in their context. The transfer from the online session to the participant context must be an integral part of the design and impact measurement.*
>
> **David Hayden, Learning Portfolio Manager for L&D/OD, CIPD**

> *Learning content should be focused so learners aren't looking at the wrong material at the wrong time. The best way to ensure learners are not distracted by irrelevant or secondary material is by excluding it! On the other hand, it helps to highlight key material – for example, with progressive revealing, arrows, bold typeface, or outlining.*
>
> **Leonard Houx, Senior Instructional Designer and doctoral student, Bayes Business School**

**Recommendations and reflective questions for practice**

- While direct instruction has clear value, this must be balanced against the need for virtual class interaction. Lectures alone do not foster an active learning experience, as demonstrated by the diverse learning approaches detailed in this summary.
- Think about the learners, learning objectives and content when considering the use of direct instruction. Think carefully about when direct instruction may be more effective and when it might be better to use other methods, such as discussion. For direct instruction go for quality rather than quantity.
- When using direct instruction, consider differences in learners' existing knowledge or skills. How can all learners be supported, for example through differentiated tasks or material?

### Scaffolding or mastery learning

'Mastery learning', also known as 'instructional scaffolding', suggests that learners should gain a full understanding of one topic before they advance to a new one. This allows them to develop the essential skills to master a new topic. High-quality studies consistently show that this approach enhances learning, especially when combined with spaced practice (see below).

> *The effectiveness of virtual class design and delivery is often hampered by time constraints. The frequent organisational*

*expectation is to deliver much content in a short time period. Not only that, but sessions are tightly shoe-horned between operational activities. L&D practitioners must strongly advocate for the necessary time to scaffold a learning experience in which learners are given the space to reflect, to master the content and skills.*

**Michelle Parry-Slater, L&D Director, Kairos Modern Learning**

**Recommendations and reflective questions for practice**

- Encourage learners to reflect on their learning, with regular recapping, to identify the knowledge and skills they have mastered and those they still need to develop.
- Consider how the pace and flow of a virtual class can accommodate this. Are learners given sufficient time to reflect on and consolidate their learning? Ensure pauses in delivery.
- Incorporate consolidation activities in the virtual class learning process, either as synchronous group activities or as supporting asynchronous tasks.

## Worked examples

In this learning method, learners are given fully worked-out examples of problem solutions and asked to study the solutions, before having to solve problems themselves. Research finds that this can be a lot more effective than simply asking learners to solve problems 'cold'. Conventional problem-solving approaches can lead people to work through them unsystematically by trial and error. Worked examples reduce cognitive activity that's inefficient or irrelevant. Instead, it focuses learners on the nature of the problem and how it can be solved, thus giving clearer learning goals.

*When material is complex or learners are beginners, full examples with guidance reduces cognitive load and supports learning. Before engaging learners in activities where they have to work things out for themselves, show them in detail how the whole process works.*

**Leonard Houx, Senior Instructional Designer and doctoral student, Bayes Business School**

*Worked examples are incredibly powerful for learners in the virtual environment, so practitioners need to think about preparing case study examples for learners to discuss and share ideas in groups or breakout rooms.*

**Gary Cookson, Director, EPIC HR Ltd**

**Recommendations and reflective questions for practice**

- Where can you find relevant case studies, both internally and externally, that can be used as worked examples?
- How can the learners' actual experience be harnessed to create scenarios for worked examples?

## Spaced practice

Learning can take time, as the brain needs to process the information it has received. So it's no surprise that research finds that periods between learning sessions help people with knowledge retention and application. 'Spaced practice' makes use of this effect, by splitting learning into a number of sessions over a period of time. Repeating these periodically is especially effective. How spaced apart learning should be depends on the type of knowledge or skills being developed – complex outcomes require longer rest periods than simple learning outcomes.

There is an ideal opportunity with virtual classes to apply spaced practice. The fact that sessions are frequently shorter enables time to be naturally created between classes with greater flexibility for learners to have reflective and application time when they don't need to be in the same place. To that end, the designers and facilitators of virtual classrooms have the flexibility to deliver learning in chunked sessions to support paced practice and effective learning practice.

Our expert virtual classroom practitioners encouraged combining spaced practice with different activities, for example.

*Using different media in spaced practice – a mix of reading, watching, or listening – clearly improves future performance. The timing of this practice is important; consider the rhythm of minutes, hours, days, weeks, months in the pattern.*

**Donald Clark, CEO, WildFire Learning**

**Recommendations and reflective questions for practice**

- Build in breaks to allow learners to digest and avoid lengthy one-off sessions.
- Are virtual classes seen in isolation or embedded in a designed 'spaced' learning process that includes time for learners to internalise and consolidate their learning?
- Are the length and rhythm of virtual classes more determined by calendar or system requirements rather than the complexity of the topics being covered?
- Are virtual classes designed to enable concepts, content and learning to be revisited?

## Media richness and multimedia

In virtual classrooms, facilitators communicate with learners in a variety of ways, which differ in terms of media richness – a medium's ability to reproduce the information it is presenting. The richest medium is face-to-face communication, followed by video communication, audio-conferencing, chat and email. While research shows that media richness boosts the effects of online communication, and consequently learning outcomes, video communication offers a good alternative to face-to-face communication, provided the technology is easy to use.[7]

This does not suggest that multimedia learning is always more effective than single-medium learning. For one thing, research shows that the technology must be simple to use. Multimedia can increase cognitive load as learners suffer from 'the split-attention effect', by having to focus on several sources of information during the virtual class – speech, slides, camera feeds, audio stream and chat window, for example – causing a barrier to learning.

> *The use of media must be carefully planned and delivered with the participants in mind. Not everyone has the quality of connection to successfully receive all media types. Not everyone may be accessing a virtual class in a location that*

*makes all media types convenient. Not everyone will find all media types helpful. Understanding the diverse learner needs in a virtual class group is vital.*

**David Hayden, Learning Portfolio Manager for L&D/OD, CIPD**

**Recommendations and reflective questions for practice**

While the influence and growth of online communication tools has had numerous benefits for virtual learning, practitioners should be careful about how they are used in classes. Specifically:

- Think about whether the choice of medium used to communicate works effectively with the broadband or wi-fi connections of learners. For example, pre-testing video could be useful.
- Think about the balance of media used. Consider minimising some communication channels, such as camera feeds, when others, such as video streaming, are in use.
- Explore the use of multimedia to discover which different types will enhance the learning experience and which will distract learners.
- In virtual class design, obtain feedback from learners if they are being forced into experiencing 'split-attention effect'. At a given time, what is the key attention focus and what other stimuli should be minimised?

# 7 Interacting in virtual classrooms

## Why do we need interaction?

Interaction refers to the active exchange of information, not only among instructors and learners, but learners' interaction with the content. Unsurprisingly, interaction has been found to be an essential part of effective virtual classrooms. Interestingly, interaction between learners is found to have a larger positive effect than learner–content and learner–instructor interaction. Interaction is also considered necessary to engage learners, which will in turn increase learning outcomes.

*Interactivity is particularly important in virtual classes as distractions around the learner can be numerous; engaging activities focuses attention.*

**Gaëlle Delmas-Watson, Founder and Principal Consultant, SyncSkills**

**Recommendations and reflective questions for practice**

- In virtual class design, consider the use of multiple interactive modes: learner–facilitator, learner–learner, and learner–content.
- Review session outlines and timings. What is the balance between presentation and interaction?
- Learner–learner interactivity is a powerful learning mode. How is this factored into session design?
- Consider using a variety of interactive tools to ensure engagement is meaningful and creative, rather that repetitive.

### Group cohesion and trust

It is unsurprising that many studies show high intra-team trust and social cohesion – friendship, caring and empathy among group members are key to developing effective teams. These two factors are also relevant to virtual classes as they strongly predict learner collaboration.

> *It's unrealistic to expect participants to turn up to a session 'cold' and for everyone to be comfortable to share and interact. Consider making introductions and creating group cohesion both outside and inside the virtual class. Chat groups, social forums and online communities are great ways to connect people.*
>
> **Michelle Parry-Slater, L&D Director, Kairos Modern Learning**

**Recommendations and reflective questions for practice**

Learning facilitators would do well to consider how they create social connections within their class throughout its duration. Specifically:

- Think about the focus given to creating social cohesion through welcome and engagement activities.
- It may be challenging, but think about how trust can be quickly established, especially if learners are joining a one-off virtual class session. Can activities or resources be accessed before the session to support trust-building?
- In longer-term virtual class series, consider how social cohesion can be enhanced. For example, how could the use of social learning communities or forums increase group bonding, interaction, and relationships?

## Social presence

Social presence refers to feeling connected to the virtual class facilitator and to other learners. This can be enhanced by the use of social cues (facial expressions, gestures, tones) and through interaction and discussion. Several studies find social presence to be positively associated with self-rated learning outcomes in an online environment. However, other research finds that social presence more positively influences learners' satisfaction than their performance, for example their grades.

Our virtual class expert practitioners were keen to point out the key role of leaders in building social connections in virtual settings and to understand the impact of culture on social interaction.

> *The role of the facilitator, teacher or trainer in online social learning is critical. Learning needs to be directed, with clear, shared assignments, topics and goals.*
>
> **Donald Clark, CEO, WildFire Learning**

> *It's important to note that in some international settings, cultures and established hierarchies may challenge the level of social interaction and participants feeling able to be fully open.*
>
> **Gaëlle Delmas-Watson, Founder and Principal Consultant, SyncSkills**

In developing social connections, observing and reading digital body language is key to understanding the emotional state and engagement of participants.

> *When delivering a virtual class, many facilitators rely on webcams as the primary way to observe participant body language. However, the tools in the platform, such as chat, whiteboards, and open microphone also allow us to 'see' attendees. Observing 'digital body language' in the use of these tools – for example who is participating in the chat, or not, or who is more comfortable using the microphone – is a vital part of understanding how participants are feeling or engaging.*
>
> **Jo Cook, Director, Lightbulb Moment Ltd**

**Recommendations and reflective questions for practice**

Naturally, L&D professionals should encourage both learners and facilitators to develop connections to one another throughout classes:

- Think about how to build social connections between individuals and the group, before, during and after a virtual class.
- Consider the essential factors for learners to feel included and valued in a virtual class. What reasonable adjustments may be needed? Are these explored during the sign-up or induction process?
- Effective facilitators notice and use multiple social cues and digital body language to create engaging learning. To what extent are they skilled in such interactions in the virtual class environment?

### Co-operative or social-collaborative learning

One of the most widely studied learning strategies, 'co-operative' or 'social-collaborative' learning is when two or more learners collaborate to share thinking and ideas, to enrich the learning and achieve a common goal. This often enables them to master more complex topics than they might do individually. A popular approach is the 'jigsaw method', which chunks up content, assignments, or topics that groups then collate into a whole. Learners are put into groups and assigned topics to research. They then follow a mixture of activities, including:

- studying a topic alone
- presenting to their group members who have studied other topics
- synthesising insights and information with learners from other groups who have studied the same topic
- reporting back to their 'home' group.

As well as benefitting from others' knowledge and insight, these methods benefit learners by being active learning processes.

> *Generated work by the learner is better than simply reading text and also gives context for subsequent recall. Active, generative learning creates meaning between what they already know and new knowledge, and then between new concepts and principles that are seen for the first time.*
>
> **Donald Clark, CEO, WildFire Learning**

**Recommendations and reflective questions for practice**

- Consider how learners can be empowered by working in groups on tasks which are then presented to peers. Think about synchronous activities such as 'breakout rooms' and asynchronous group tasks undertaken and then brought into the virtual setting.
- Set research or a problem-solving challenge which learners can work on and report their findings back to the virtual class.

### Classroom discussion

Discussion is key for interactive learning, in contrast to a 'one-way traffic' facilitation approach. Learners can discuss a topic with each other and the facilitator, often prompted by open questions (rather than closed questions with right and wrong answers). While research is limited, one standout study found discussion to have a large positive impact on individual learners' comprehension, critical thinking and ability to reason.

One implication for virtual class facilitators is that they must consider the balance of time spent in presentation and discussion to ensure there is a decent amount of quality interaction with and between learners. This may require more careful planning for virtual classrooms than in face-to-face settings to ensure all learners are engaged in using the technology. Things to focus on may include:

- limiting presented material by prioritising quality over quantity
- allowing adequate time for discussion so that it isn't tokenistic
- providing positive feedback to encourage learner input
- using open rather than closed questions.

*Practitioners must ensure learners are seen and heard, and this reinforces many of the engagement techniques we know work from in-person environments. Use inclusive methods such as using learner names when acknowledging contributions and giving praise for contributing. In doing this, practitioners need to fully understand what the technology can do, and pick the right tools for the right task, not just defaulting to cameras and microphones.*

**Gary Cookson, Director, EPIC HR Ltd**

**Recommendations and reflective questions for practice**

- Consider the facilitator role in each session, including whether multiple facilitators will be more effective in facilitating meaningful discussion for the learners.
- Think about how valuable discussion points can be captured – record the session for later review, make notes in the chat, or use collaborative tools such as interactive whiteboards.
- Always acknowledge learners – use their names and value their contributions.
- Consider creative discussion techniques – for example using breakout rooms – to foster discussion and interaction between manageable group sizes.
- Upskill facilitators and learners as necessary to be confident and competent in the online environment – for example to use breakout rooms or collaborative tools productively.

## Reciprocal learning and peer tutoring

Reciprocal learning allows learners to take the role of facilitator to develop clearer argumentation and deeper understanding of a topic. The act of facilitating is itself an excellent way of learning. The approach works by using cognitive learning techniques, such as summarising, questioning, clarifying and predicting. Research consistently shows that the approach helps people to develop academic, social and behavioural skills.

A related method is peer tutoring, where high achievers aid the facilitator by giving support to lower achievers. As well as helping the lower-achieving learners, this again helps the learners who are acting as facilitators.

> *As with the case in face-to-face learning, we must move from a 'sage on the stage' content presentational approach to a facilitated one in which participants are empowered to lead and shape activities. However, that's challenging if the facilitator and participants aren't fully familiar with the platform and tools. Time must be invested in establishing the knowledge and skills for learners to lead.*
>
> **Michelle Parry-Slater, L&D Director, Kairos Modern Learning**

**Recommendations and reflective questions for practice**

- Plan virtual classes to include learner-led activity, for example learner-facilitated breakout rooms or activities in which learners present, summarise and question certain topics.
- Think about the extent to which learners are prepared and able to lead activities. What skills may need developing? How might they be encouraged or enticed to take a lead?

# 8 Assessing in virtual classrooms

Testing learners is usually considered first and foremost as an activity at the end of learning or after it takes place, but research shows that it can be very useful *within it, as an active part of the learning process*. In particular, scientific research shows that testing – and also more general feedback – can be used for two reasons. First, to monitor classroom activity and learning, and make adjustments, as necessary. And second, for learners to reinforce learning through practice.

## Feedback

As one of the most powerful learning techniques, feedback refers to an interaction and information that allows a learner to confirm, add to, overwrite or restructure their knowledge and beliefs. It can be given both ways, from facilitator to learner and vice versa. In either case, it enables learners to see the gap between what they understand about a topic and what is intended to be understood.

While many studies clearly indicate that feedback can be a very effective learning tool, some types have a greater impact in the context of virtual classes than others. For example, feedback from learners to facilitators is more powerful when it concerns what learners know, where they make errors and where they have misconceptions. Feedback to learners from facilitators works most effectively when it focuses on correct rather than incorrect responses, and targets learning content rather than commenting on learners themselves, which can damage self-esteem.

Expert practitioners highlighted the importance of two-way feedback in virtual settings, where it is easier for both facilitator and learner to lose track of progress.

*There is an important principle about designing in regular checkpoints to see if the approach is adding value or if there is sufficient room to reflect on what is being covered. Feedback is a two-way thing; learners should be giving feedback to the instructor throughout the session by explaining what is working for them and what is not, so that the instructor can make whatever changes are necessary to improve the experience.*

**Gary Cookson, Director, EPIC HR Ltd**


Indeed, it was noted that the virtual class environment can cause feedback to be missed accidentally. This makes it even more important that virtual class facilitators take the time to attend to the needs of learners; having additional support in the session may help.

*Facilitators spending time to give feedback about comments and questions in chat or whiteboards will create a much deeper level of engagement from their participants making them feel valued. Facilitators who accidently overlooked the chat leave their group feeling despondent. Having a second person supporting the facilitator by monitoring chat, saving whiteboards and poll results and other technical aspects is key to ensuring facilitators can recreate a similar rich experience to face-to-face training.*

**Gaëlle Delmas-Watson, Founder and Principal Consultant, SyncSkills**

**Recommendations and reflective questions for practice**

- Consider whether virtual class facilitators need upskilling so that they can provide and/or elicit effective feedback about the learning process.
- Consider the value of an additional facilitator in the virtual class to provide support in monitoring, highlighting, and responding to learner feedback
- Plan the structure and timing of virtual classrooms to allow space for learners to feed back about what they are struggling with, as well as what they have grasped or achieved.
- Reflect on how you can incorporate feedback to or from individual learners in virtual class environments, both synchronously in the session and asynchronously by following up afterwards.

## Formative evaluation

Formative evaluation is when facilitators assess learners' knowledge, skills or progress *before* or *during* the learning process. It sits in contrast to summative evaluation, which assesses learners' progress at the end of a learning process. Formative evaluation gives important feedback to facilitators about what learners have and have not yet taken on board and potentially the strengths and weaknesses of learning materials or delivery. Several strong studies show that formative evaluation has a positive effect on learning outcomes.

> *Practitioners need to think about how they get reassurance that the learning is being transferred and embedded throughout the virtual classroom and not just at the end.*
>
> **Gary Cookson, Director, EPIC HR Ltd**

> *In virtual class settings, formative evaluation can be easily undertaken with a poll, whiteboard or using external evaluation tools such as a survey system. This will enable both learners to reflect on their progress but also for facilitators to evaluate and adjust their instructional strategy for the specific needs of a group.*
>
> **Gaëlle Delmas-Watson, Founder and Principal Consultant, SyncSkills**

**Recommendations and reflective questions for practice**

- Use assessments proactively during the learning process and activities – don't leave them until the end of a session, or series. Brief and signpost learners that 'formative assessment' activities will be a part of supporting their learning progress.
- Consider what tools you can use in virtual classes to gain learner feedback, both openly and confidentially.
- Use information to modify the learning process and/or tailor content to people's needs.

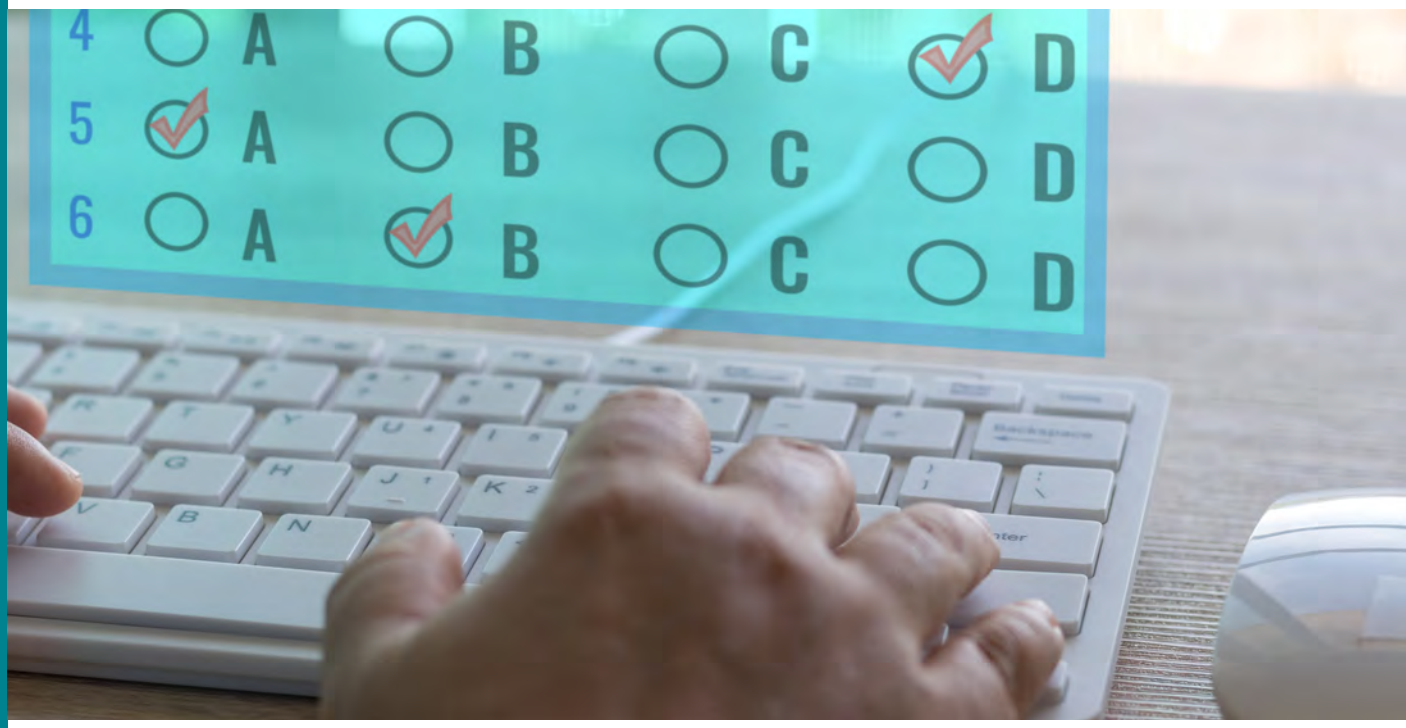
## Test-enhanced learning or retrieval practice

Recalling information from memory, such as when taking a test, allows learners both to assess their prior knowledge and embed learning. This is termed test-enhanced learning

or retrieval practice. A solid body of research shows that it substantially helps learning – indeed, we can learn more from retrieving information than from having it presented.

The benefits can come not only from testing, but from tools like flash cards and open quizzes. In virtual classrooms there are various opportunities for creatively testing learners' knowledge, such as polls or creative feedback and quizzing systems such as Kahoot, Slido, Mentimeter, Quizizz or Quizlet.

> *Questioning and thought-provoking activities produce better long-term memory recall: the 'testing effect.' Frequent quizzing and testing can therefore be a powerful and potent online learning method.*
>
> **Donald Clark, CEO, WildFire Learning**




**Recommendations and reflective questions for practice**

- Embed learning tests and quizzes as a natural part of the virtual class, both during and after the session.
- Consider testing learners on knowledge or information presented from previous learning sessions, as well as that from the current session. The methods or approaches facilitators adopt are not the only determinants of how effective virtual classrooms are. Our review identified six widely researched 'moderating' factors that can have a pronounced impact on learning outcomes, both in the face-to-face and virtual setting.

# 9 Conclusion

## A strong body of knowledge

Virtual classrooms are an established area of research and fortunately, because the same basic cognitive processes are at play, we can also draw on the huge body of research on L&D and education more widely. Learning facilitators should take note of this evidence. Clearly the application of L&D approaches is different in a virtual context – they will need to be adapted and facilitators and learners will need to get to grips with new digital technologies – but they remain valid.

Virtual classrooms are a subset of digital learning: they are synchronous, with learners and facilitators interacting 'live'. We have focused on virtual classrooms in this review in particular because of the huge rise in their use since the start of the COVID-19 pandemic.[8] As mentioned in the introduction, we've not specifically covered asynchronous digital learning, in which learners can work through material in their own time, but that is also an important area.

## Key evidence-based recommendations

From the solid research base, we can confidently recommend several aspects of virtual classrooms to prioritise and a number of specific methods to use.

### Designing and adapting L&D content

One core principle to follow is to reduce the cognitive load of learners where possible, so that they can focus on acquiring the skills or knowledge of the core learning objectives. Another general principle is that media richness and multimedia can help learning a great deal, but they must be intuitive to use and must not split learners' attention and distract them from the target learning.

We also have a number of evidence-based approaches or techniques that can enhance virtual classrooms. These include:

- Scaffold content so learners can master one area before moving on to another.
- Provide worked examples, so learners can focus on how solutions work without having to waste energy on trial-and-error problem-solving.
- Give well-structured direct instruction, including presenting or teaching new material.

It is also important to adapt learning content and provision as necessary, drawing on feedback from both learners and facilitators, and on 'formative evaluation' (assessing learners before and during learning sessions).

### Preparing learners

Learners benefit hugely from being clear about the learning goals or objectives at the outset. We should also not assume learners have good learning habits – spending time developing meta-cognitive strategies that help them *learn to learn* and *think about thinking* pays dividends.

### Social processes

We are social creatures and learning benefits from being a social process. Interaction and group cohesion are aspects of virtual classrooms that facilitators should strive to develop and maintain. A range of approaches can help, including classroom discussion, reciprocal teaching or peer tutoring, and co-operative or social-collaborative learning.

### Practice and reinforcement

L&D provision is as much about delivery as it is about content. We need to avoid 'injection education' (in effect an approach of: *there's your content, job done*) and see learning as

a process that takes time. Approaches that help with this are spaced practice – giving learners time to absorb new learning – and test-enhanced learning – giving them the opportunity to practise retrieving new learning.

### Next steps: developing a strategy for virtual classrooms

Many organisations have invested in *physical* infrastructure to support face-to-face learning. L&D professionals should similarly consider what investment they might need in *digital* infrastructure to support virtual learning.

More specifically, in helping ensure their virtual environments are conducive to effective learning, we recommend that L&D professionals consider:

- Do learners have access to a diverse range of learning approaches and are virtual classes designed flexibly? Try to avoid a one-size-fits-all approach.
- To what extent and how can techniques commonly used for face-to-face learning be applied to virtual learning?
- Do virtual learning facilitators need to be upskilled to ensure they are confident in using the various learning approaches?

## 10 Notes


1 Blackwell, M., Daly, J. and Lancaster, A. (2019) *Professionalising learning and development*. London: Chartered Institute of Personnel and Development.

2 Lockman, A.S. and Schirmer, B.R. (2020) Online instruction in higher education: promising, research-based, and evidence-based practices. *Journal of Education and e-Learning Research*. Vol 7, No 2. pp130–52.

3 Davis, D., Chen, G., Hauff, C. and Houben, G. (2018) Activating learning at scale: a review of innovations in online learning strategies. *Computers & Education*. Vol 125. pp327–44.

4 Ambrose, S.A., Bridges, M.W., DiPietro, M., Lovett, M.C. and Norman, M.K. (2010) *How learning works: seven research-based principles for smart teaching*. Hoboken, NJ: John Wiley & Sons.

5 Hattie, J. (2012) *Visible learning for teachers: maximizing impact on learning*. London: Routledge.

Hattie, J. (2015) The applicability of visible learning to higher education. *Scholarship of Teaching and Learning in Psychology*. Vol 1, No 1. pp79–91.

6 Cohen's d is the standardised mean difference. For more discussion of effect sizes, see the scientific summary accompanying this report.

7 Lira, E.M., Ripoll, P., Peiró, J.M. and González, P. (2007) The roles of group potency and information and communication technologies in the relationship between task conflict and team effectiveness: a longitudinal study. *Computers in Human Behavior*. Vol 23, No 6. pp2888–2903.

Martínez-Moreno, E., Zornoza, A., González-Navarro, P. and Thompson, L.F. (2012) Investigating face-to-face and virtual teamwork over time: when does early task conflict trigger relationship conflict? *Group Dynamics: Theory, Research, and Practice*. Vol 16, No 3. pp159–71.

8 Crowley, E. and Overton, L. (2021) *Learning and skills at work survey 2021*. London: Chartered Institute of Personnel and Development.

CIPD

Chartered Institute of Personnel and Development
151 The Broadway London SW19 1JQ United Kingdom
**T** +44 (0)20 8612 6200 **F** +44 (0)20 8612 6201
**E** cipd@cipd.co.uk **W** cipd.co.uk

Incorporated by Royal Charter
Registered as a charity in England and Wales (1079797)
and Scotland (SC045154)

Issued: October 2021 Reference: 8179 