Learning Technology Research Project into Mobile-Centred Learning

An examination of the educational effectiveness of microlearning delivered to tablets and smartphones and the related behaviours of learners.
Executive summary

Introduction

With the recent advances in the digital technologies available to learning and development professionals, there is a growing concern that the technology has outpaced the ability to utilise it effectively.

The Learning Technology Research Project sought to investigate and ascertain areas of best practice for training using tablet and smartphone devices (modern mobile phones), and how these might be harnessed in conjunction with the recent advances in tracking technologies using the Experience API. We believe the confluence of these technologies is sufficiently important to challenge the traditional format of eLearning and raise questions about how best they could be used to train and support individuals in multiple different usage scenarios.

Project Methodology

The Learning Technology Research Project was launched in November 2016 with the aim of investigating learner behaviours, their preferences, and the educational effectiveness of training programmes delivered via mobile devices. The specific topic chosen for the training was one designed to be of interest to the audience and was entitled “Modern Learning Technologies”. A team of researchers and advisors was drawn from Agylia and the University of the West of England, providing combined expertise across the digital distance learning field.

A total of 349 volunteers joined the programme and downloaded a mobile learning and communications App, facilitating online and offline use. During a 13-day period, 13 short microlearning modules were pushed out at spaced intervals. These were announced to participants by a controlled mix of in-App and email notifications. The learners’ interactions, assessment results and survey responses were tracked and analysed.

Standard “out-of-the-box” Agylia Learning Management System (LMS) and App functionality was used to target, deliver and track all the multimedia content, and provide gamification elements and discussion forums (see www.agylia.com).

Summary of key findings

The key findings centre on the need to provide learners with relevant, timely training and support. At the top of the learners’ list is ease of use, with intuitive user experiences and attractive user interfaces a must. With learners accustomed to the polished and highly refined user interfaces and user experience offered by consumer oriented Apps like Facebook, Twitter, Snapchat, Instagram and many others, their UI/UX expectations are higher than ever before. Any user experience that falls below this level is immediately disadvantaged and runs the risk of rapidly underwhelming learners and turning them off the solution.

Short spaced learning pieces focused on a single or limited number of learning objectives (often referred to as “microlearning modules”) are an educationally powerful and popular form of training delivery. To make the most use of learners’ time, personalised content selections that reduce the mass of available information to the items most useful to the individual learner, are increasingly important.
The mobile delivery of communications, learning and performance support materials proved very popular and is likely to become even more so. Participants enjoyed their ready availability and were keen to access learning at a range of times and from different locations.

Conclusions:

The timeliness and accuracy of content is still vital. However, the form that the content takes, the ease of use and the ability to find the short, sharp piece of content, which is relevant to the individual, is even more crucial. In today’s information rich, time poor environment, speed of access and convenience is of the essence. Link this to extreme ease-of-use and the ubiquitous access offered by mobile devices and a new model of learning emerges to complement the traditional approaches.

Key to this integrated approach to are small, focused pieces of learning that take advantage of attractive user interfaces, plus mobile delivery with offline use options, content that’s been selected for the learners with their particular needs in mind and intelligent use of spaced-learning intervals. Add to this, rapid reference access and the comprehensive tracking of the full learner journey, both inside and outside the walls of the LMS, and there emerges a holistic new approach that puts learners and their needs right at the heart of the learning programme.

The key lesson is not a complex one. Don’t rely on the annual in-depth training event that your learners are expected to remember for the next year. Instead, put the learners at the centre and give them an individually personalised collection of content. In other words, what they need, when and where they need it, in as convenient and easy a way as possible. Then you stand a good chance of really making a difference.
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Introduction

Smartphones and tablets have brought portable computing power to the majority of individuals in our society, changing habits and consumption patterns significantly in just a few years. Advances in the technologies available to educators to host, manage, target and track content usage have provided educators and the publishers of digital content with a range of new capabilities. These significant changes in the digital learning landscape have combined to raise questions on the best way to utilise them effectively.

“Smartphones have overtaken laptops as the most popular device for getting online, Ofcom research has revealed, with record ownership and use transforming the way we communicate”.  

The Learning Technology Research Project investigated and ascertained areas of best practice for training, using tablet and smartphone technologies, and how these might be harnessed in conjunction with recent advances in tracking technologies and use of the Experience API. The confluence of these two technologies was considered sufficiently important to challenge the traditional format of eLearning and raise questions about how best they could be used to train and support individuals in many different usage scenarios.

The study therefore sought to deliver a range of training and educational materials to learners in different formats and with a variety of interactions and learning activities. To keep the research project within timescales and cost budgets, all features of the learning programme were strictly limited to the features available “out-of-the-box” within the Agylia LMS, as at October 30, 2016. These included:

- A range of different content types and formats
- Full BYOD (bring-your-own-device) support
- Experience API tracking (Tin Can)
- Mobile delivery to native Apps for online and offline use
- Content and user targeting
- Phased module release
- Fully responsive HTML5-based content
- Gamification
- Social forums
- The use of both automated email and in-App push notifications

The study applied different approaches and compared results to identify the educational effectiveness and popular reception of the approaches used. The ultimate aim was to improve the use of tablets and smartphones for educational, training, reference and support purposes.

The LMS tracked how participants used the App and which devices they used, as well as when (and for how long) they used the devices. It also tracked how and when participants accessed individual items of content and for how long – together with quiz, assessment and survey results. This tracking data provided a rich set of quantitative data that was combined with qualitative information gained from short online learner surveys.
Research design and method

The two key research areas for the project were:

- What are the most educationally effective ways to package, time and deliver training?
- What are the best formats for mobile-based learning in order to satisfy the learner and encourage learner engagement and use?

The method chosen to gather information to answer these questions was through participation in a real microlearning programme on the topic of modern learning technologies, delivered to participants’ own smartphones and tablets through an App.

Project methodology

Participation in the study was voluntary, with people recruited from the learning and human resource professionals’ community and the wider management community, predominantly in the UK and the USA. The language of the study was business English and the audience was self-selecting. Data use permission was requested from participants and anonymity outside the research team was guaranteed.

A total of 349 adults enrolled in the study and they were provided with their choice of an iOS or Android native App which they downloaded free of charge from the relevant public facing App store. The Apps could be run on either their own tablet or smartphone, or could optionally be installed on both.

Having downloaded the App, learners registered with their chosen email address, to which a verification code was sent. A programme of 13 pieces of educational content was then made available to participants at intervals. A mix of in-App push notifications and emails was used to alert learners to the release of the next piece of content. For the purposes of the study, traditional online access to the modules from laptops and PCs was deliberately disabled though system configuration changes, encouraging learners to download the content onto their chosen mobile device. They were then able to consume the content, even when offline, and return to it again whenever they wished. The LMS’s inbuilt gamification engine was configured to provide a “leaderboard” showing the percentage of programme completion and various activity awards. The features of the learning programme were deliberately limited to the features available “out-of-the-box” within the standard Agylia LMS.

The content was created by Agylia staff in the form of multiple short microlearning modules built using responsive HTML5 and consisted of a combination of videos, text, images, on-screen interactions, quizzes and surveys lasting between three and five minutes each. The tool used for creating the content was the Adapt Framework, modified with the addition of an Experience API adapter.

Learners were allocated to different groups and the LMS was used to centrally store the pieces of microlearning, manage learners, and then to target and distribute different combinations of content at different times and spaced intervals to the learning Apps of the test groups. The LMS also sent notifications to learners with different messages at different times. Using the integral Experience API capability, interactions with the App and content, including all assessment and survey results, were fully tracked for later reporting by the LMS.
Participant recruitment

A large number of individuals, who were considered to be potentially interested in the topic, were invited to take part through a combination of emails, web promotion, LinkedIn and Twitter. The invitees were situated mainly in the UK, USA and EU countries, but also in other English speaking regions.

Note: requests were not a statistically representative sample and the respondents were self-selecting volunteers.

The 349 participants who enrolled in the Learning Technology Research Project were surveyed to discover how they had found out about it.

![How did participants find out about it?](image)

*Figure 1: How participants found out about the Learning Technology Research Project*

Participant sign-on process

A full analysis of the 349 people who chose to participate is, in itself, informative and is contained in section 6 of the “Presentation of findings”.

The enrolment procedure was as follows:

- Participants were directed to their choice of the Apple (iOS) or Android public facing App stores
- They downloaded the Learning Technology Research Project App, free of charge, to their choice of smartphone or tablet
- The technology supported downloads to multiple devices, including a combination of smartphones and tablets of either operating system, or both
• Participants were then invited to follow in-App instructions to register with an email address and password, which created an account for them on the central LMS
• At this stage, the App was empty of all content except the “start here” module
• Their email address was verified by an email sent to that address carrying a verification link
• Participants’ permission was sought and obtained to use the project results for research purposes. It was confirmed to them that their results would be anonymised and would not be identifiable to individuals beyond the research team

About the training programme

Participants were placed into 12 user groups and modules of content were then pushed out from the central LMS over a two-week period. The content was sent at various time intervals, which differed depending on the individuals’ assigned group membership.

The 13 microlearning modules distributed were of varying durations, ranging from three to five minutes.

Modules contained a variety of activities that included videos, text, images, animations, short lectures, on-screen interactions, games, external activities, assessments and surveys. All content modules were created in responsive HTML5 format in order to optimise the user experience on devices with different screen sizes.

Usage patterns and timings, together with assessment and survey results, were tracked by the LMS using the Experience API, which underpins the LMS’s inbuilt learning record store (LRS).
The system’s inbuilt points-based gamification system was configured and used as a “programme completion tracker”, which displayed the overall percentage of programme completion on a leader board, together with the medals, trophies and badges awarded to participants for their various achievements.

A discussion forum was set up for participants to discuss any topics they liked amongst themselves. There was also a second forum, an “ask-the-expert” environment where participants could pose questions to a panel of four experts.

A follow-on qualitative survey was undertaken as a final stage in the project to gain more feedback from participants on how they felt about their experiences during the study.

The timetable for the Learning Technology Research Project was as follows:

- Design and scoping of the research project with UWE: May – June 2016
- Design and creation of the learning modules: July – Sept 2016
- Invitations distributed to potential participants: Oct 2016
- Learning Technology Research Project launch to all participants: Nov 2016
- Content distributed from central platform and participant learning programme set running: 10 Nov – 22 Nov 2016
- Final post-Learning Technology Research Project survey conducted: 10 Dec 2016
- Analysis of results and report preparation: Jan 2017 – Apr 2017
- Initial findings overview released at Learning Technologies Show 2017: 2 Feb 2017
- Final report published: 12 May 2017
Presentation of findings

The Learning Technology Research Project generated a wealth of data across a range of areas. For convenience, the key findings available for public release have been grouped under the following six headings:

1. What learners like and dislike.
2. How and where do learners consume content?
3. Learner engagement and completion rates.
4. Educational effectiveness, knowledge transfer and knowledge retention.
5. Which features of mobile-based learning and microlearning are actually useful?
6. Analysis of participants and their mobile devices of choice.

1. What learners like and dislike

The likes and dislikes of users are not always considered when designing online learning; this is especially the case for mandatory compliance training. The research team wanted to discover the importance of getting the learner experience “right” – that is, encouraging learners to use and return regularly to the App and their learning assets and boost completion rates (below). The study examined what participants considered good or bad, enjoyable or irritating, about the learning programme. Instant feedback was requested during the microlearning in the form of rapid touch screen surveys.

![Figure 3: Examples of the appearance and style of the Learning Technology Research Project App](image)

- App design and ease of use was the single largest factor, with 35% of participants identifying this as the most important consideration in what they liked about the training programme.
- 17% identified bite-sized content as the most important factor.
- 17% identified varied content to be the most important feature.
8% considered the ability to work via the Apps offline to be the most important feature. Bite-sized content format in a variety of easy-to-use types was found to be more important to learners than having useful content.

Comment: This is the first and perhaps most surprising result of the study. We are in an age of microlearning. Whilst the content of the training is vital, short duration and varied presentation types were considered even more important to encourage learner engagement. This underlines the need to pay close attention to the user experience, production values, and to keep learning short, succinct and to the point.

90% found it easy or very easy to consume content within a mobile learning App. The ability to carry content around with you, either downloaded onto a portable mobile device, such as a smartphone or tablet for use offline, or available to browse to online via such devices, is a major usability advantage for many learners and this percentage finding is notable.

Comment: Employees often do not use the LMS unless they have to, so user experience and user centred design is fundamental to successful learning experiences and to encourage learner engagement and repeat use. Mobile App-based delivery offers an easy-to-use and attractive user experience, as well as the flexibility to study when and where you want, not just when and where you have connectivity.

Figure 4: Summary of feedback received on the App user experience
2. How and where do learners consume content?

Understanding how, where and when users choose to consume content gives valuable insights into how we can best support them and meet their preferred learning patterns.

- 69% of participants returned to the App once or more per day.
  
  Comment: Mobile devices are ubiquitous, nearly always kept close and are regularly referred to. Combined with the ease of use of the App, this underlines the value as a powerful and useful training aid, and just-in-time support tool.

- 76% of participants completed module(s) away from their regular place of work.
  
  Comment: This is a significant percentage. People have less time, more distractions, and an increasing need for styles of learning which can be done outside the normal place of work.

- More than 11% completed module(s) whilst travelling.
  
  Comment: Use whilst commuting is an important facility for a subset of staff who found it particularly useful, but it was not for everyone.

- 66% completed module(s) at home.
  
  Comment: If it is easy to access and if people consider the learning experience to be useful and/or enjoyable, then they will be willing to use training materials, even outside the normal working situation and working hours.

- 23% of usage was at weekends with a big usage increase of 52% on Monday following weekend content release. Most people chose not to complete learning at the weekend, but tried to catch up as soon as the working week started.
  
  Comment: Whilst many people are inclined to access content on weekday evenings if it is available, it is less popular to distribute content to learners over the weekend. Perhaps it is better to let people have their time off.

- 17% fewer attempts were made on previously released non-completed modules after a new module was released.
  
  Comment: If you get the content spacing wrong, people will tend to skip past those that they missed rather than spend the time working through them to catch up. Combine this with the findings on weekend working and this detail of programme design becomes important to maximise completion.
3. Learner engagement and completion rates

Digital learning and support is, by its nature, a largely automated service with relatively high fixed costs of system set-up and content creation, and low ongoing marginal costs of delivery. One of the most important features of successful provision is the level of learner engagement and subsequent programme completion achieved.

- 61% of participants (based on module access, excluding extreme data outliers and those classed as curious “window shoppers”) completed the training programme.

  **Comment:** This is considered high for a voluntary, non-work mandated, extended programme of learning.

- 80% cited interesting content and/or a desire to improve their knowledge as their reason for completing the programme.

  **Comment:** In the absence of compulsion, the quality and level of interest in the content is the key motivator for people sticking with a voluntary learning programme. This underlines the need for personalised content selections to make it relevant to individuals.

![Why participants completed the programme](image)

**Figure 5: Why participants completed the programme**

- 9% of participants named the points-based leader board and awards as the main reason they finished the training programme.

  **Comment:** Gamified approaches are not for everyone but, for a significant proportion of learners, they can engage and increase completion levels.
The user experience of using the App and content was popular and no one cited this as a reason for dropping out.

Comment: A well designed UX in itself may not encourage learners to complete a training programme, but an awkward clunky one will certainly provide a barrier and put people off.

Only 2% considered a completion certificate to be a significant motivating factor in completing the programme.

Comment: Most learners are not impressed by certificates for the sake of them. For a certificate to be motivational, it needs to be perceived as carrying some related value.

79% of participants had in-App notifications enabled and 75% found them either useful or very useful.

Comment: Used carefully, in-App notifications provide a popular, powerful and attention-grabbing form of communication on mobiles for bringing reminders and news to a learner.

76% of those who dropped out cited pressures on their time and workload as the reason.

Comment: People are time poor and have to prioritise, either consciously or unconsciously. Short, concise learning materials delivered in a convenient way will help, but some people will always be just too busy. Again, this underlines the importance of perceived relevance for the learner – personalising the selection of content to make it more relevant and timely for the learner is important to make best use of their time.

18% of those who dropped out felt that a daily schedule of content release was too much.

Comment: This again points to the importance of getting the spaced learning intervals right – too slow and learners lose momentum, too much and they can feel overwhelmed.

4. Educational effectiveness, knowledge transfer and knowledge retention

The most important feature of any learning programme is how well it communicates the learning objectives and how well these stick with learners. The features of mobile learning include the ability to deliver learning materials over a period of time, providing a spaced learning curve. They are portable and easy to access, can provide just-in-time access and a ready post-learning reference.

71% knowledge retention, measured by correct quiz and assessment responses, was achieved though spaced learning – the delivery of content in small modules spread over a period of time.

Comment: Approaches and systems should take advantage of “spaced learning”. Mobile technology is a great enabler for this.

Knowledge retention was increased to 84% through the use of repetition and re-questioning across modules.
Comment: Use of microlearning for reinforcement, whether in the form of content repeated periodically, quizzes or other memory joggers, significantly improves knowledge retention.

- Only 21% of participants believe a 40-minute eLearning course is acceptable for use on both laptops and smartphones.

Comment: Breaking learning into multiple short duration pieces of training, presented in a usable and attractive format, is easier to digest than a single long piece of eLearning. This is essential when delivering to smartphones in particular.

- 21% of participants visited used the discussion forums to extend their knowledge and understanding, but usage was low (see Section 5 below).

Comment: There is a lot of interest in discussion forums as a way of stimulating knowledge sharing. However, just setting a forum is not enough to encourage wide participation.

- Module 8: “Preferred content types for use on mobile devices” was the most popular, with 77.6% finding it either useful or very useful. This was followed by Module 9: “How can performance support tools be provided on mobile devices” (77.3%) and Module 2: “Behaviours of learners, overcoming the forgetting curve” (77.0%). See Appendix A for a full list of modules and preference rankings.

Comment: The top three modules of interest indicate a real desire among learning professionals to understand what really works in the field of mobile and microlearning.

5. Which features of mobile-based learning and microlearning are actually useful?

There’s now a range of interesting opportunities with the available off-the-shelf learning technologies. However, there was found to be a gulf between participants’ expectations and aspirations, and the reality of how people use the technology in practice. This may suggest a gap between vendors’ hype and the real-world obstacles to success and may indicate that, for some of these technologies, there might be more limited usage scenarios. As with all such learning technologies, care needs to be taken to match the right solution to the right need.

- 7% of participants believe “social” should be restricted to non-work activities.

Comment: There is a wide belief that social forums are relevant and useful in a work-based learning environment.

- 71% say user-generated content will be very useful for their organisation.

Comment: There is a high level of desire to tap into the knowledge and experience of the learner audience to supplement centrally created learning materials.

- 69% of total participants visited the discussion forum and 21% visited multiple times. However, only 6% contributed by starting topics or leaving replies. Results were similar with the second “meet the expert” forum.
Comment: Although the number of forum visitors and comment read rates were high, relatively few participants actively contributed. This suggests that, unless such forums are closely tied into items of learning content, or are specifically job related – and therefore seen as practical help to individuals – then they are perceived as unrelated topics of general interest and are less popular.

![Discussion forum use](image)

**Figure 6: Usage of the main discussion forum**

- 65% played the games that were included in the programme as part of the content modules, and learnt something from them; 27% found them very useful. We did not find any significant age group preference.

  Comment: Games to play as part of the content are popular and break up the learning into different activities, but they are hit or miss. Some groups find them more useful than others.

- 76% of participants said mobile learning could be useful for two or more scenarios within their current organisation, with just 9% saying it would not be relevant.

  Comment: There is a real appreciation of the benefits of mobile learning in many use scenarios, with more being identified all the time.

- 76% expressed an appreciation that learning activities performed outside the confines of the LMS/App environment still need to be tracked and recorded.

  Comment: This underlines the significance of the latest Experience APIs as important technological enablers, allowing this comprehensive tracking to take place.

6. **Analysis of participants and their mobile devices of choice**

The combination of the data tracking and survey approach generated significant amounts of data. The findings provide a valuable insight into who participated and how they chose to access the training programme.
79% accessed the learning materials via Apps installed on their smartphones; 21% on their tablets; 17% installed the App on both their tablet and smartphone.

Comment: Whilst smartphones are clearly the preferred device for mobile learning, significant numbers opted for either tablets or both, underlining the need to provide comprehensive flexibility and freedom of choice for learners.

![Participant operating systems](image1)

**Figure 7: Split of participants by iOS and Android device types**

![Content interactions by mobile device type](image2)

**Figure 8: Devices used to interact with content**
73% recognised that a BYOD policy provided the major benefit of learner choice, but 77% thought that at least some employees would object to using their own devices.

Comment: BYOD is seen as providing major advantages to the employer and the learner, but strategies need to be used to overcome possible learner reticence.

A total of 349 individuals downloaded the Learning Technology Research Project App and registered it for use.

The biggest participant group by age was the 40-49 group, closely followed by the 50-59 group. In total, 68% of all participants were over 40-years-old.

Comment: There is a surprisingly keen interest and acceptance of mobile learning across the age spectrum – it would be a mistake to think it was limited to millennials.
 Whilst the age profile of participants may be influenced by the self-selecting nature of the volunteer audience, it is considered likely that the preponderance of older age groups underlines the willingness of these age ranges to adopt and utilise mobile technologies – so mobile device use is not an exclusive predilection for millennials.

It’s likely that the gender breakdown is influenced by the gender split of staff and middle and senior executives in the Education, Learning and Development and Human Resource Management communities – and the preponderance of those communities amongst the participants.
69% of participants were based in the UK.

Comment: The strong preponderance of UK participants reflects the profile of the audiences invited to join the Learning Technology Research Project. It also reflects the publicity achieved in the participant recruitment process, rather than indicating different intrinsic levels of interest in the topic in the different regions.

The largest group of participants (39%) were either sole traders of some form, or small organisations with less than 100 staff. This not considered surprising given the nature of the Education, L&D and HR communities. The next largest group (19%) came from bigger organisations employing more than 20,000 staff. Again, this is not surprising considering the appeal of large-scale digital learning solutions to the larger organisations, where the economies of scale make these types of solutions practically and financially very attractive. There was a notable “spike” in the number of participants (17%) from mid-sized organisations of between 1,000 and 5,000 staff.

Comment: Further investigation indicated a particular interest in the use of mobile technologies for learning within the 1,000-5,000 size of employer, which may be at least partly due to factors of organisational culture.
The largest single participant group was in the training and education industry (39%), which reflects both the nature of the project as well as the topic chosen as the subject of the training programme. The next largest group was in the financial services sector (13%). Of this group, most were from a banking background. There were no respondents identifying themselves as being from either defence or utilities companies.

Comment: The lower levels of participation from people in some sectors may indicate increased levels of “learning culture” conservatism.
Conclusions

The original concern that prompted this research project was that, with the many new software features and functionality available to learning and education professionals, there was a shortage of guidance on what actually works and works well in practice. How should we use all these great innovations in the software solutions that are available to us?

The key findings are in some ways surprising.

The timeliness and accuracy of content is still vital. But the form that the content takes, the ease of use and the ability to find the short, sharp piece of content which is relevant, is even more crucial. In today’s information rich, time poor environment, speed of access and convenience is of the essence. Link this to ease of use and ubiquitous access modalities, and a new model of learning emerges to complement the traditional approaches.

This includes small focused pieces of learning which take advantage of attractive user interfaces, mobile delivery with offline use options, and intelligently thought through spaced learning intervals. Add rapid reference access and the comprehensive tracking of the full learner journey and there’s the emergence of a holistic new approach which puts learners and their needs right at the heart of the learning programme.

The use and popularity of discussion forums was a little disappointing. Many visited the discussion areas but a relatively small number of people became active participants. Discussion threads directly attached to individual items of content, or presenting comments and content as part of a personalised social feed, may overcome this by making the discussion comments more focussed, so encouraging their use. But the lesson here appears to be that people are more interested in doing the learning activity than in engaging in loosely related forum conversations.

The use of gamification, both as part of the LMS platform itself and also within individual pieces of content loaded onto the platform, is promising with some audiences but will need to be used wisely to avoid turning off as many people as are turned on.

The key lesson is not a complex one. Don’t rely on the annual in-depth training event which your learners are expected to remember for the next year. Instead, put the learners at the centre and give them what they need, when and where they need it, in as convenient and as easy a way as possible.

Then you stand a good chance of really making a difference.
Appendix A: Module topics and perceived usefulness to learners

List of individual topic modules making up the complete learning programme delivered as part of the Learning Technology Research Project:

<table>
<thead>
<tr>
<th>Module</th>
<th>Topic</th>
<th>Usefulness*</th>
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</thead>
<tbody>
<tr>
<td>1st</td>
<td>Start here: App use guide</td>
<td>-</td>
</tr>
<tr>
<td>2nd</td>
<td>Module 1: Introduction</td>
<td>10th</td>
</tr>
<tr>
<td>3rd</td>
<td>Module 2: Behaviours of learners, overcoming the forgetting curve</td>
<td>3rd</td>
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<tr>
<td>4th</td>
<td>Module 3: Options for social learning to support and engage the learner</td>
<td>6th</td>
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<tr>
<td>5th</td>
<td>Module 4: User generated content strategies</td>
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<tr>
<td>6th</td>
<td>Module 5: Use of gamification to encourage learning and engagement</td>
<td>11th</td>
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<tr>
<td>7th</td>
<td>Module 6: Use of mobile technologies for corporate communications</td>
<td>12th</td>
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<tr>
<td>8th</td>
<td>Module 7: Traditional online learning contrasted with offline learning options</td>
<td>8th</td>
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<tr>
<td>9th</td>
<td>Module 8: Preferred content types for use on mobile devices</td>
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<td>10th</td>
<td>Module 9: How can performance support tools be provided on mobile devices</td>
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<tr>
<td>11th</td>
<td>Module 10: The options for tracking and analytics</td>
<td>4th</td>
</tr>
<tr>
<td>12th</td>
<td>Module 11: Automatic triggering of learning and support content on mobile devices</td>
<td>9th</td>
</tr>
<tr>
<td>13th</td>
<td>Module 12: Effective use of assessments and surveys</td>
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<tr>
<td>5th</td>
<td>Module 13: Augmented reality and virtual reality</td>
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</tbody>
</table>

* Usefulness was scored by participants on a range of 1 to 4 on the completion of each module, and then ranked across the 13 modules. All modules were considered either useful or very useful by more than 63% of the audience, with the most useful one scoring 78%.
Appendix B: Review of content creation tools used

A number of different authoring tool options were considered for creating the learning modules, and it soon became apparent that the available tools for responsive content are all immature, each having different drawbacks.

The requirement was for mobile ready, responsive content which could include multi-media interactive elements, quizzes, surveys and assessments in a fully responsive way. In this context, responsive means the ability to automatically change the layout of the content on the screen, depending on the screen size and orientation (landscape or portrait).

Options considered ranged from cloud-based solutions to the latest versions of the more expensive off-the-shelf software solutions. Consideration was given to “Gomo”, but reliability and tracking issues were encountered which would have slowed the project down. “Storyline” has the benefit of multi-format publishing options and a range of tracking capabilities, but the user experience was not quite what was wanted. We considered using Agylia’s own internal software developers to produce custom in-house responsive HTML5 templates, but project timescales and developer time being at a premium meant that this was not considered practical for this project.

The tool ultimately chosen was the “Adapt Framework”. This is a free open-source development tool for creating HTML5 eLearning content that can be delivered via web server or learning management systems.

Adapt produces one course that will run on multiple devices – that is, PC or laptop – through to tablets and smartphones, without the need for having to set different resizing breakpoints for the devices. The solution is not cloud-based, so if authors are potentially working with sensitive content and need to work in a locked-down safe environment, this is possible with Adapt. Some bespoke software development work was required to ensure that the Experience API tracking worked properly.

Adapt also allows the learner to break away from the standard size eLearning aspect ratio and enables content that users can consume more like a website by scrolling through it. This is considered a much better UX when using a phone as the viewing device.

There are limitations with a tool/framework that is free, but the open-source nature of the Adapt Framework means that there is a growing pool of developers submitting their findings and their solutions back into the framework, which will strengthen it in the future.
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