Utilizing Blended Learning for Customer Support During the COVID-19 Pandemic: An Experience from the UK and Ireland

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With thanks to Karen Hackling-Searle, Head of MRI, Cobalt Health

Introduction

The coronavirus (SARS-CoV-2) pandemic continues to spread, confronting MRI staff around the world with unprecedented clinical and operational challenges [1]. As radiographers and radiologists innovate to deal with this extraordinary situation, they must also continue to care for their patients [2].

The urgency and complexity of the current situation allows us to provide support using the existing training portfolio of blended learning [3]. Beginning MRI scanning with a new vendor is already challenging, but in the current context of lockdown, self-isolation, and staff sickness, the benefits of blended learning and remote support really come to the fore [4].

Globally, governments are implementing self-isolation, social distancing, and working from home whenever possible in order to reduce the spread of the disease and to minimize morbidity and mortality rates and demands on healthcare resources including the National Health Service & Health Service Executive (HSE) Ireland public hospitals [5]. The objective is to reduce the R (reproduction number) of coronavirus (SARS-CoV-2) and thus reduce its spread [6]. The R value is the average number of people that one infected person will pass the virus on to [7]. At Siemens Healthineers, we are aware of the urgency and complexity of the current situation, and we are working hard to use digital services to provide the best possible support to healthcare providers during COVID-19.

Blended Learning

With the aim of minimizing on-site attendance to that which is absolutely essential, the UK & Ireland Customer Services Applications & Education team escalated and intensified the provision of Blended Learning packages for customer training to help providers meet the challenge of the coronavirus pandemic [4].

The key was and is to successfully plan and manage a bespoke training package that enables the delivery of a viable remote training solution for our customers.

The customer

Cobalt Health (Cobalt) is a medical charity, primarily supporting people affected by cancer and dementia. They deliver exceptional quality diagnostic MRI, CT, and PET/CT services for over 75,000 patients each year at their imaging centre in Cheltenham and research imaging centre Birmingham and through a modern fleet of mobile MRI and CT scanners that travel throughout the UK.

1 MRI clinical leads Jono Humphris and Zoe Wray practicing social distancing in front of 1.5T MAGNETOM Sola.

They fund and participate in and support research on a local, national, and international level and provide unique education events for medical professionals on a national and international basis. They work collaboratively with the NHS and other carefully selected and respected industry partners to pioneer significant advancements for the benefit of patients now and into the future.

As a charity, Cobalt believes that everyone should have access to the best medical imaging for their diagnosis, supporting clinicians to make a clear diagnosis and produce appropriate and personalized treatment plans for precision medicine [8, 9]. This focus on precision medicine is consistent with the aims of Siemens Healthineers.

At the imaging center in Cheltenham, a 1.5T MAGNETOM Sola with *syngo* MR XA20 software has just been installed to help the facility stay at the forefront of diagnostic imaging. The Institute of Translational Medicine Imaging Centre in Birmingham houses a 3T MAGNETOM Skyra pTX, and the staff also have access to a relocatable 1.5T MAGNETOM Aera.

The challenge

The COVID-19 situation poses unprecedented challenges for customer training. Many hospitals are restricting access for any external personnel, including staff from Siemens Healthineers, unless absolutely essential. On March 3, the UK government warned that a fifth of the national workforce could be absent from work during the SARS-CoV-2 peak [10], which has implications for both the customer workforce and the MRI applications workforce.

As we confront these new challenges, both personal and professional, we must not lose sight of the fact that our customers are facing even bigger challenges and obstacles.

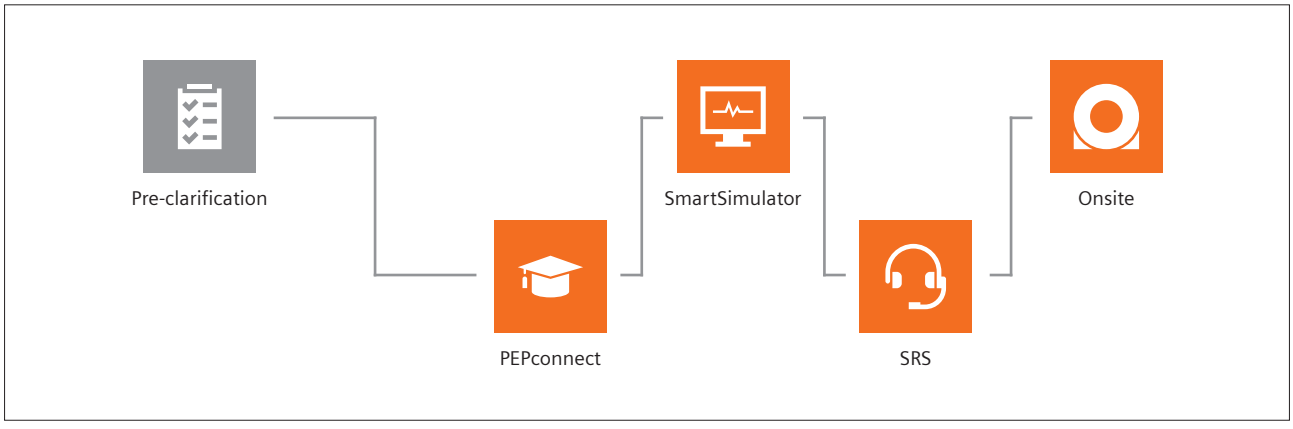
Recent travel restrictions, containment measures, and redeployment of imaging staff to other modalities such as CT have resulted in customers cancelling the majority of onsite visits and training for MRI applications. In addition, the UK Siemens Healthineers Academy has also been closed for classroom courses. Though this may pose great difficulties, it does not negate the need to continuously support our customers. Now more than ever, we must find new and innovative ways to deliver on our promise of outstanding customer support and education.

The need for transitioning from onsite to online training has never been higher or more crucial. Remote training allows us to be more flexible and, most importantly, to more easily adapt to the ever-changing needs of our customers during the pandemic.

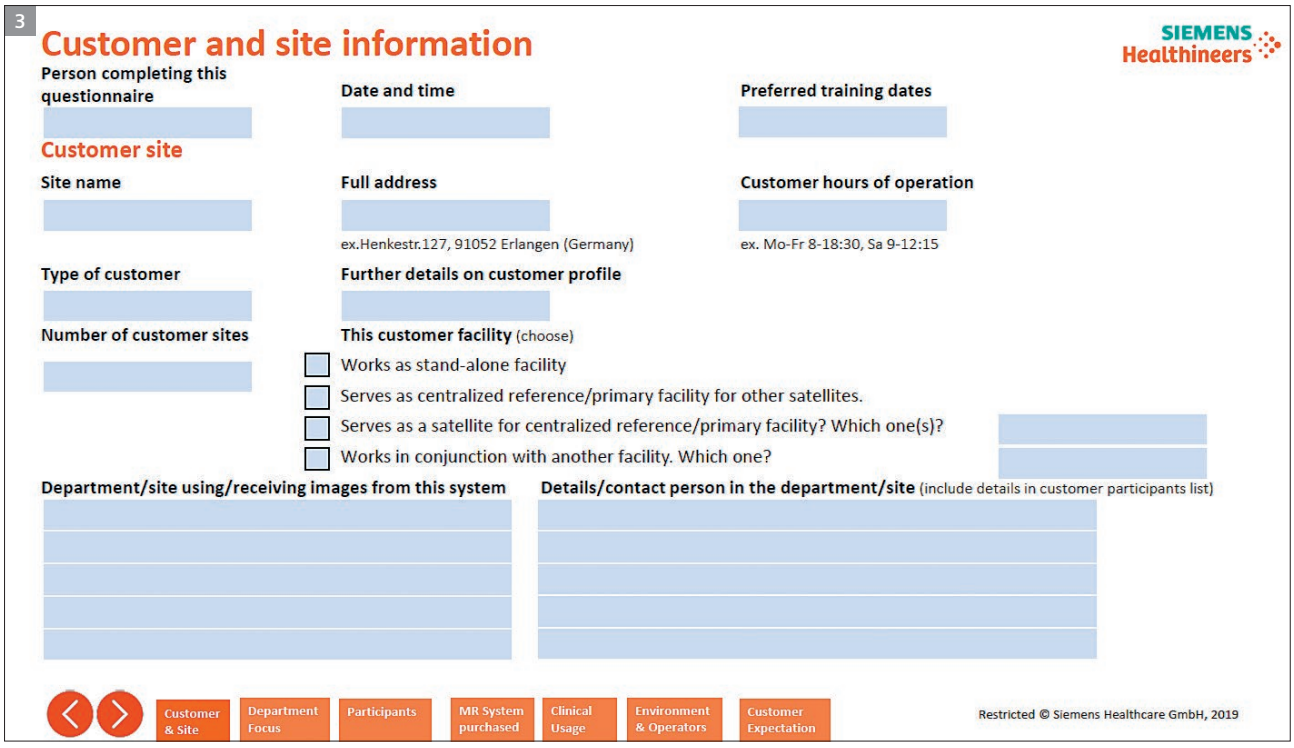
With this goal in mind, the Customer Services MR Education & Applications team began offering a COVID-19 Blended Learning package to help successfully plan, manage, and execute a remote training package for customers.

Blended Learning consists of four pillars

Blended Learning is an evolutionary approach to applications training that consists of four pillars (shown in Figure 2), which are based on a pre-clarification meeting.



2 The four pillars of Blended Learning: PEPconnect, SmartSimulator, Siemens Remote Service (SRS), and Onsite support.



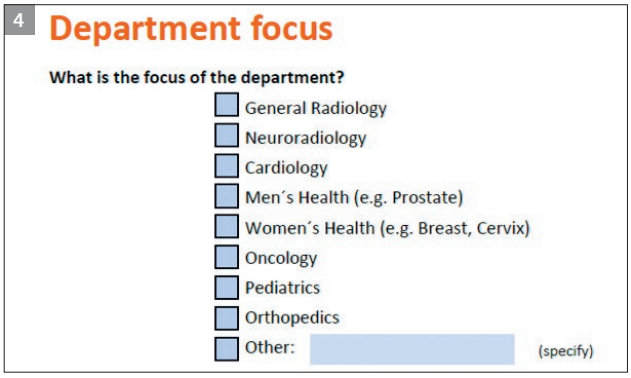
The pre-clarification meeting

This was undertaken using a piloted standardized customer questionnaire (Fig. 3).

Further questions enabled stratification of Cobalt Health specialties and workflow requirements (Fig. 4).

This in-depth discussion took place on Christmas Eve, before SARS-CoV-2 was first reported by UK media. Following discussions with her team, Head of MRI Karen Hackling-Searle highlighted the following key areas for customer training:

- BioMatrix Technologies
- Protocol building
- Parallel imaging techniques
- Multi-parametric prostate dynamic contrast imaging
- Image optimization – parameter changes and how this compares to current vendor
- Simultaneous Multi-Slice (SMS) and Compressed Sensing (CS)



The Cobalt radiographers were very experienced in MRI but many had not used equipment from Siemens Healthineers before. The Blended Learning package therefore included classroom places at the UK Siemens Healthineers Academy [11]. However, due to the distance from Cobalt Health and for customer operational capacity, the initial plan – prior to SARS-CoV-2 – was to deliver this using the Mobile Imaging Academy and implementing SmartSimulators in the customer's education room.

The first pillar: PEPconnect

PEPconnect provides access to extensive online material in a customer online training platform, which is free of charge. This was helpful, for example, in demonstrating the aim of Biomatrix Technologies before onsite training. It also helped the participants learn about the objectives of parallel imaging techniques, Simultanous Multi-Slice (SMS), and Compressed Sensing. The training is self-paced and can be undertaken at any time and wherever there is an internet connection. The learning material can be repeated as often as needed, and can also be shared with colleagues. For the customer, a bespoke PEPconnect group was created with educational content that focused on MAGNETOM Sola and XA20 software so that Karen could manage the learning of her large team of 30 MRI radiographers. Figure 5 shows early adoption and use of the PEPconnect group by staff in early January.

In addition, the availability and reminders of new COVID-19 information on PEPconnect provided critical information for online education (Fig. 6).

The Cobalt Health PEPconnect group enables the team to look at imaging protocols / techniques and examination workflows to help them become operational as quickly as possible.

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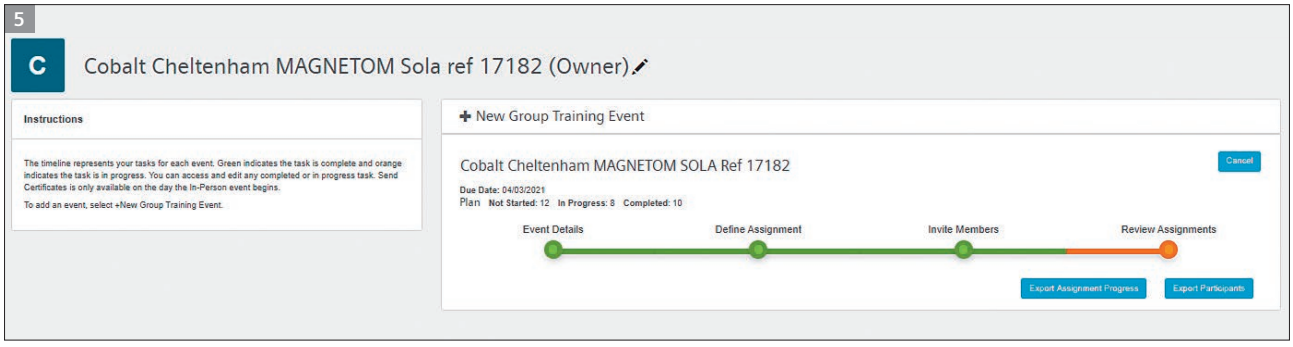

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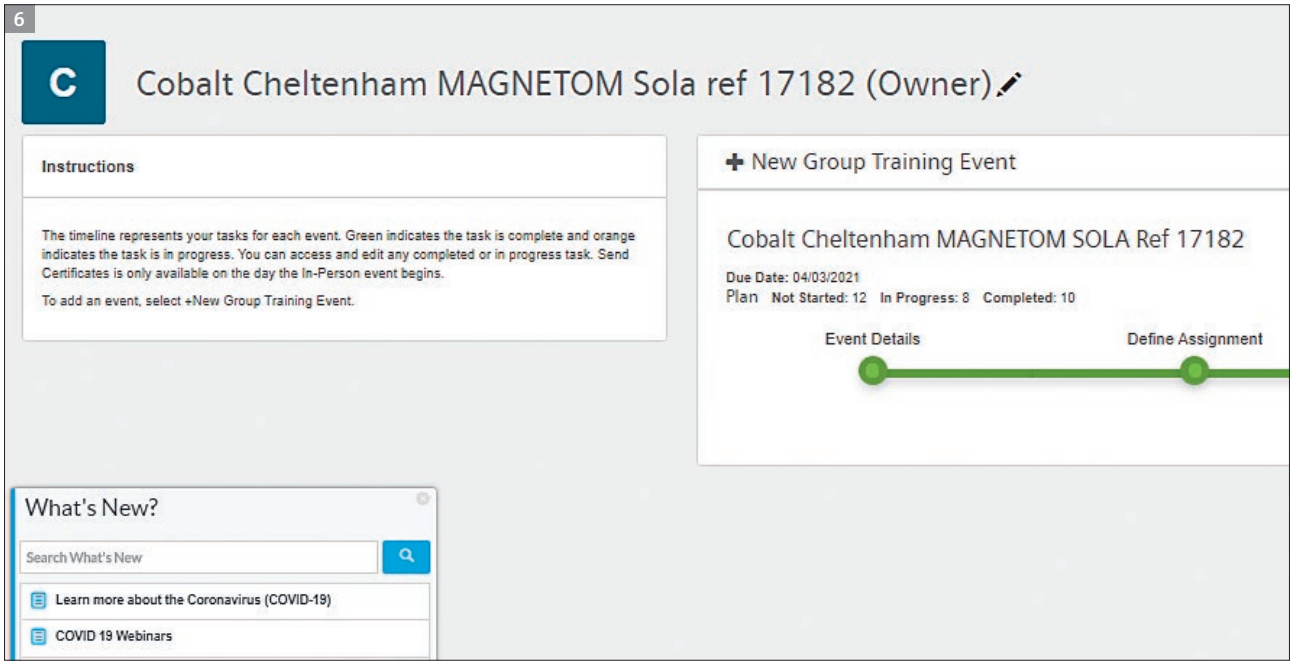

The UK began its lockdown on March 23, and Ireland phased its lockdown in between March 12 and 27 [12]. For staff who were self-isolating at home and therefore unable to visit the imaging centre, PEPconnect allowed them to continue their professional development by learning about COVID-19 and the use of their own MRI systems (Fig. 7).

↗ https://pep.siemens-info.com/en-us/coronavirus-covid-19

This was crucial at the time of an upcoming new system installation. In addition, the customer could specifically access decontamination documents via the UK version of the page "The role of Siemens Healthineers in the COVID-19 pandemic" (Fig. 8). This was cascaded to staff by one of the MRI team leads at Cobalt.

↗ https://www.siemens-healthineers.com/en-uk/press-room/press-features/pf-covid-19.html#07105259_EN_GB

In addition, the Cobalt team had access to the MR user community at Siemens Healthineers, MAGNETOM World ↗ www.siemens.com/magnetom-world. This included the information in the Clinical Corner for planning and considering alternative clinical approaches, e.g., for their objective of multi-parametric prostate dynamic contrast imaging. They were also able to download protocols from this worldwide community of MAGNETOM users in preparation for the new system [13]. In summary, the PEPconnect group videos and guides facilitated an easier transition to using the SmartSimulators in Pillar 2 by providing familiarity.

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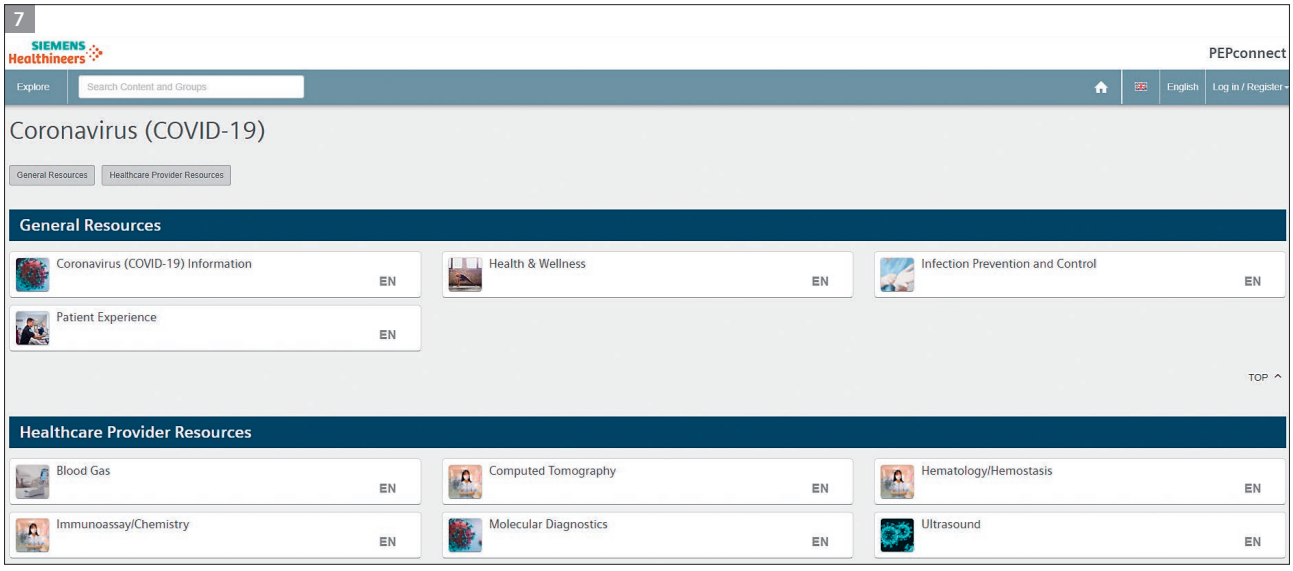

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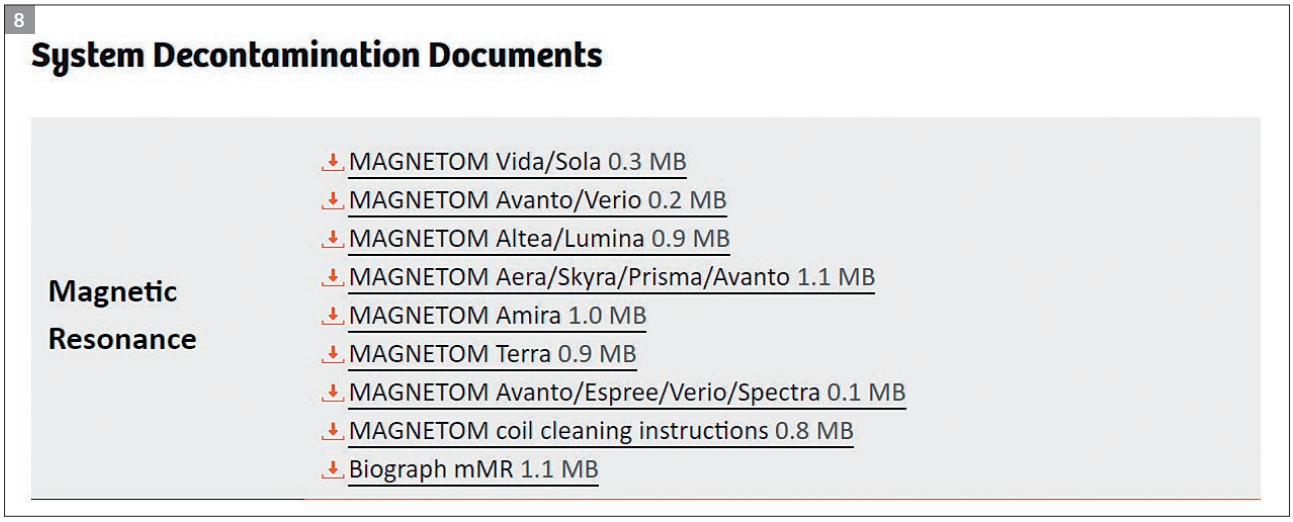

The second pillar: SmartSimulator

SmartSimulators running XA platform software were used on February 11 and 12 to deliver classroom training in the customer's education room (Fig. 9). This was just five days after the third case of SARS-CoV-2 infection was confirmed in the UK [14]. The UK Siemens Healthineers Academy course introducing MAGENTOM Sola was delivered for the first time with a cloud-based SmartSimulator (Fig. 10) to the four key users on the Cobalt team.

Changing from onsite to remote training delivery

There were extensive discussions between Karen at Cobalt Health and Siemens Healthineers throughout the day of March 16. The topic was whether the planned second part of pre-application training using SmartSimulators scheduled for March 17 and 18 would go ahead as planned with an applications specialist on-site. A decision was made with the customer to deliver the training remotely using the SmartSimulators and a PowerPoint presentation given via Microsoft Teams. A training plan was disseminated and instructions were sent to the customer explaining the remote course delivery with Microsoft Teams and the SmartSimulators.

The decision to transfer the training to a remote format rather than on-site proved to have been the right one: On the evening of March 16, the UK government advised everyone in the UK to avoid "non-essential travel and contact with others, to curb coronavirus, as well as to work from home if possible" [15].The two-day remote virtual training using SmartSimulators allowed

1. delivery of the Academy classroom course XA DotCockpit (Fig. 11);
2. hands-on, targeted, and bespoke exercises to meet customer workflows (Fig. 12);
3. Dot Engine simulator suites to see workflows in the scan queue;
4. free time to gain familiarity and confidence using the software.

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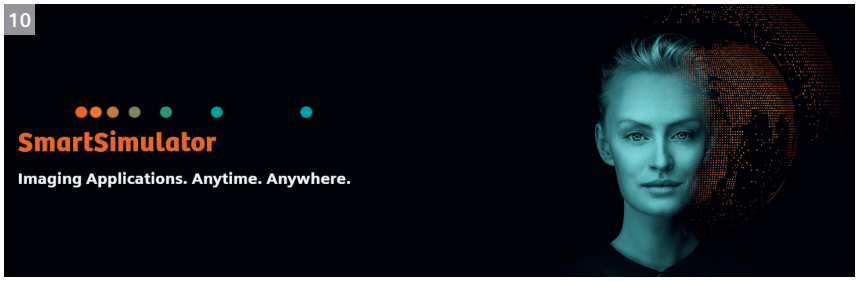

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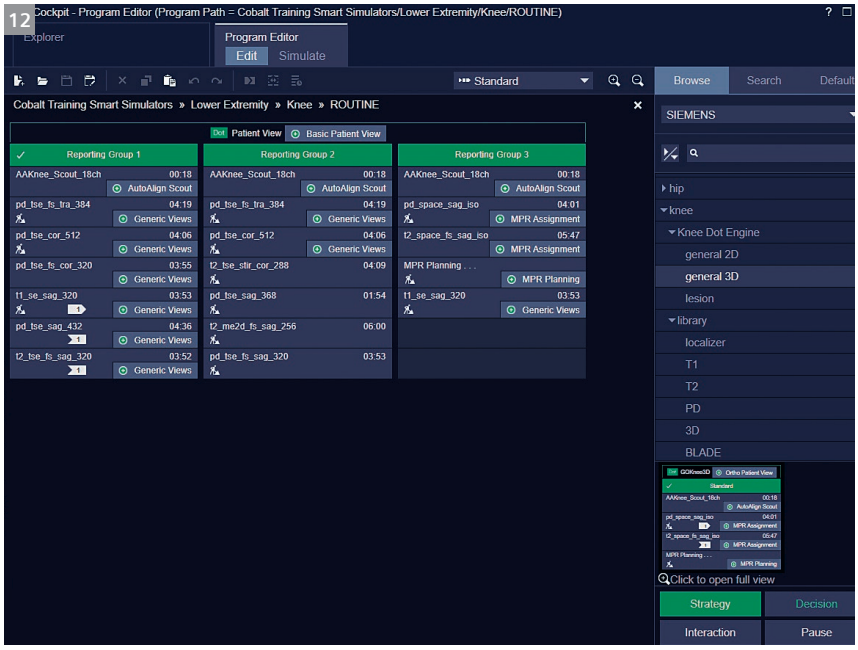

The general format involved the following:

1. Presentation of the theory using PowerPoint via MS Teams
2. Provision of a guided demonstration via SmartSimulators
3. Hands-on customer session on using SmartSimulators, with exercises; trainer could provide guidance and answer questions by viewing the participants' SmartSimulators
4. A Q&A session

Potential challenges for virtual remote training
Working with Karen and the team, we identified the following potential challenges:

- Internet connection – needs to be checked in advance via a customer IT check session
- Microsoft Teams connectivity – needs to be checked in advance via a customer IT check session
- SmartSimulator – needs to be checked in advance via a customer IT check session with two SmartSimulators for the trainer and a trainee; during training, the technical support team is available but may need time to resolve
- Monitor / headset / microphone / speaker setup – needs testing and familiarization within IT check session

This led to the development of the following structure (Fig. 13).

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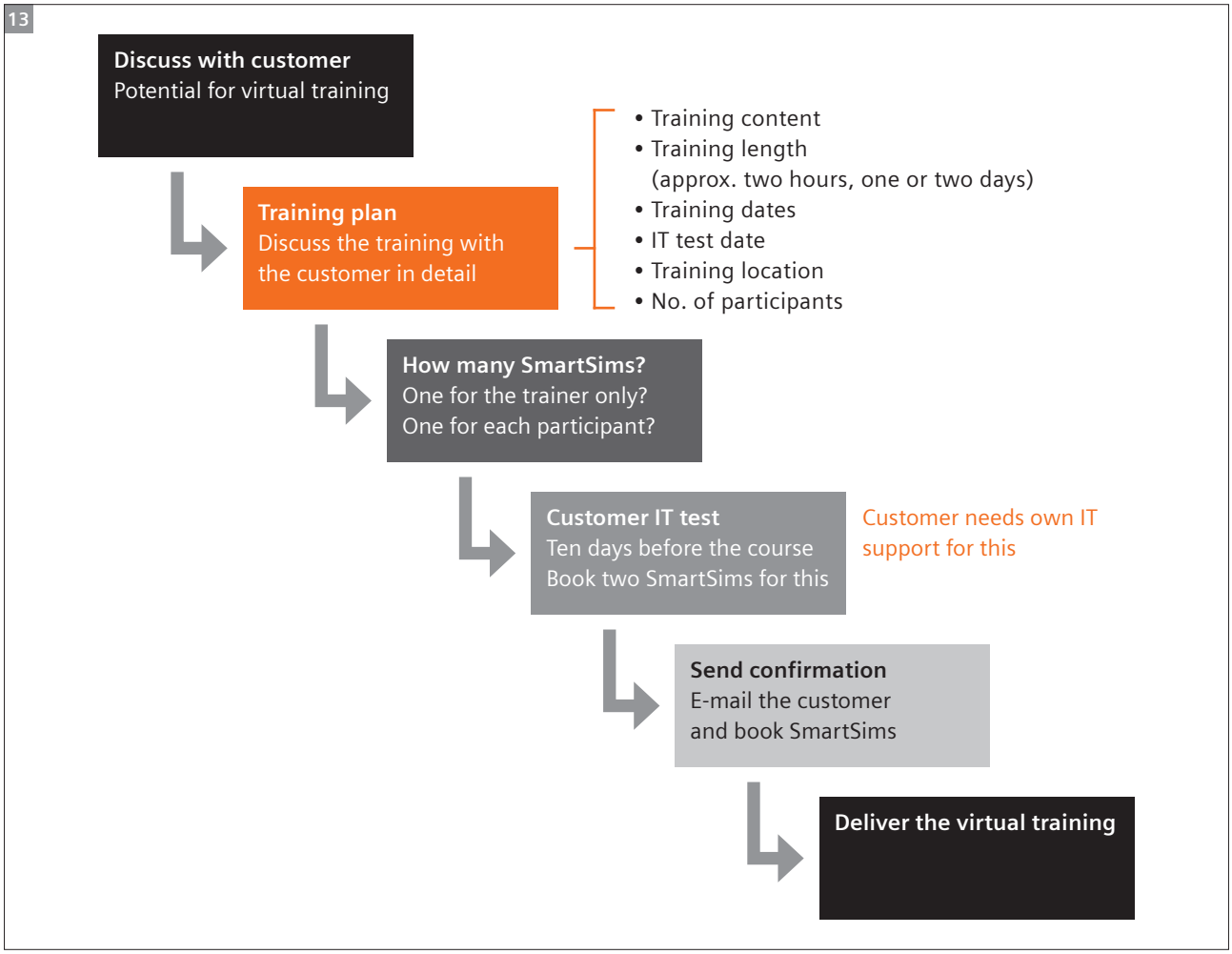

Feedback
The SmartSimulators were very well received for the way they allowed users to build protocols and then see how strategies and decisions would behave when scanning (Fig. 14). For example, participants could see how strategies could be used for different reporting groups nationally. The customer was able to compare the session with the onsite training that used SmartSimulators in February and was very pleased with the remote training solution provided at short notice. It was felt that the training was of the same quality.

"The virtual training worked really well. I don't think anything was lost without face to face. It is important to ask for help if you don't follow. If the instructor was in the room, I think they would spot if someone was struggling very quickly, but this could be missed in the virtual world. The trainer was very good at waiting for a response from everyone to say they were happy before moving on the next topic."
Ruth Pearson, Cobalt Health MRI Clinical Lead

"I think the simulator was excellent, and it was good to get some hands on practice. The simulator was a really good way of introducing the Dot Cockpit concept and had an excellent opportunity to think and practice how we would like to set up protocols. I think a blended approach to learning is good to ensure that all learning styles are catered for. After the training we received I did feel well prepared for the on-site applications training."
Liz Loele, Cobalt Health MRI Clinical Lead

"From my perspective as the Head of the department, it was easy to set up the training and liaise with the Siemens team. The team were open to our needs and flexible, particularly as Coronavirus developed into a pandemic at the same time the training program was to be delivered. Remote training was a perfect solution to this and enabled the continuation of the training without cancellation, whilst at the same time we were able to ensure staff and Siemens colleagues were safe and socially distanced and non-essential travel guidance adhered to! With a little tweaking to smooth out some of the communications challenges, remote training is a serious contender to bring teams together for training and collaboration. It is so much more efficient, time and cost saving."
Karen Hackling-Searle, Head of MRI, Cobalt Health

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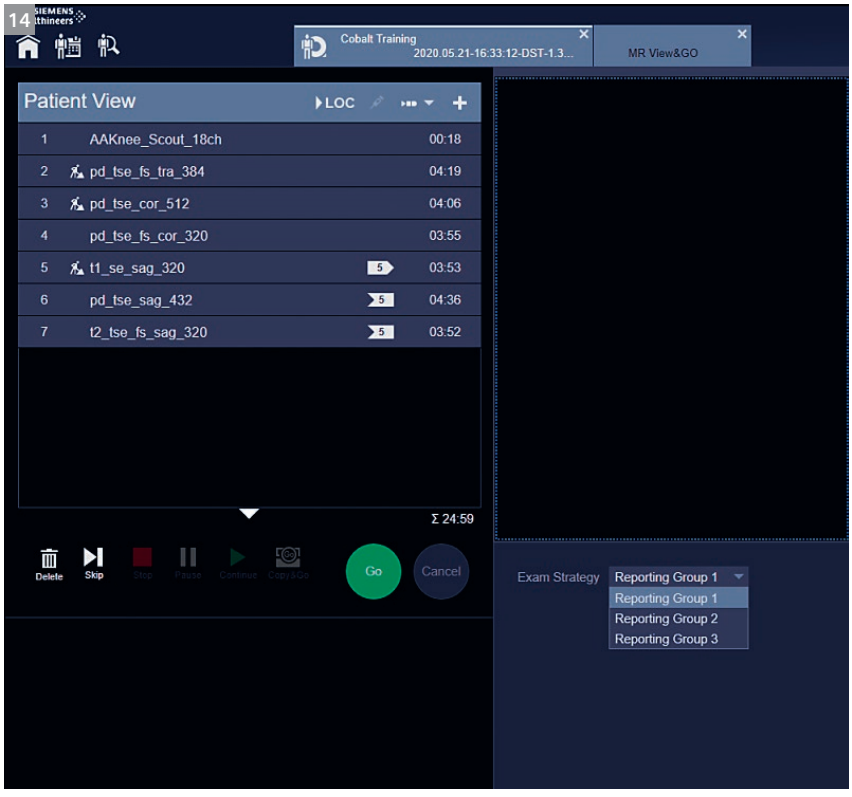

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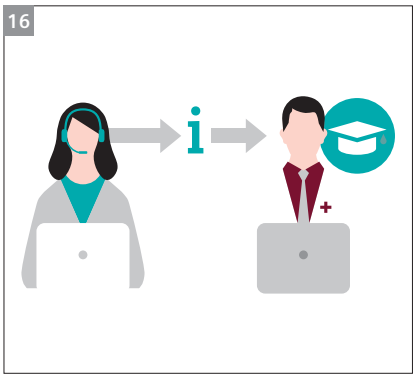

The third pillar: Smart Remote Service (SRS)

SRS is a proven way of delivering both Remote Assist for real-time interaction between clinical staff and clinical application experts (Fig. 15), and Remote Trainer allows for a more structured remote education performed on customer equipment (Fig. 16) [16].

In the context of COVID-19, remote scanning assistance can minimize the number of onsite training days to help reduce the R number and conserve valuable resources of personal protective equipment (PPE) needed for front-line staff. In addition, MR protocols can be prebuilt or sent to the customer and directly imported into the scanner if required to reduce initial set-up time. Cobalt's key national role in providing COVID-19 CT services for NHS England and the Nightingale field hospitals has meant that many MRI staff have been redeployed. Consequently, a plan for SRS training has been provided to support the customer in prebuilding protocols before the start of the clinical service and has been made easier through training for Pillar 1 (PEPconnect) and Pillar 2 (SmartSimulator).

The fourth pillar: Onsite training

The customer's local risk assessment of the small control room in the context of SARS-CoV-2 and social distancing meant that on-site applications had to be postponed until the 8th of June. In addition, the specialist MRI radiographers were still being redeployed to cover self-isolation and the increased capacity needed for COVID-19 CT scans. With the first three pillars, we provided a solid foundation that will allow the staff at Cobalt Health to start on-site training with MAGNETOM Sola (Fig.17) with increased knowledge and experience that can be cascaded to their colleagues.

Summary

The aspiration to drive innovations forward so that people can live healthier and longer lives is more valid today than ever before. By stepping up our remote offerings earlier and as a partner to support Cobalt Health, we have enabled flexibility for the benefit of its patients.

The pie charts (Fig. 18) show a paradigm shift in how MRI training was delivered in the UK and Ireland as a result of SARS-CoV-2. They reflect the two months before restrictions began, and the two months directly after.

The four pillars of Blended Learning lead to an automatic repetition of the material – and, as we know, repetition is the key to learning. By covering the theory and basics (buttonology) with the first two pillars, SRS and Onsite training can concentrate on deepening the knowledge and customizing the workflows or scan protocols to the needs of the customer. Onsite training can be continually supported by PEPconnect, SmartSimulator, and SRS. This learning approach shifts parts of the training into a different form, which has added value for the customer. For example, further SmartSimulator training could be provided to customers working from home.

There are also sociological benefits of providing remote applications support and training. If one application specialist travels to the site, they might interact with many people – for instance, at gas stations, train stations, or airports; on public transport or on flights; in hotels or restaurants; and of course during staff interactions on a hospital visit [5]. These situations all have the potential for virus transmission, and could therefore significantly increase the R value [7]. Blended Learning can potentially reduce local R values [7]. In addition, using PEPconnect and SmartSimulators for staff in self isolation can further reduce the R value. Therefore, training at home through these solutions will become even more valuable as the UK and Ireland begin to ease their lockdown.

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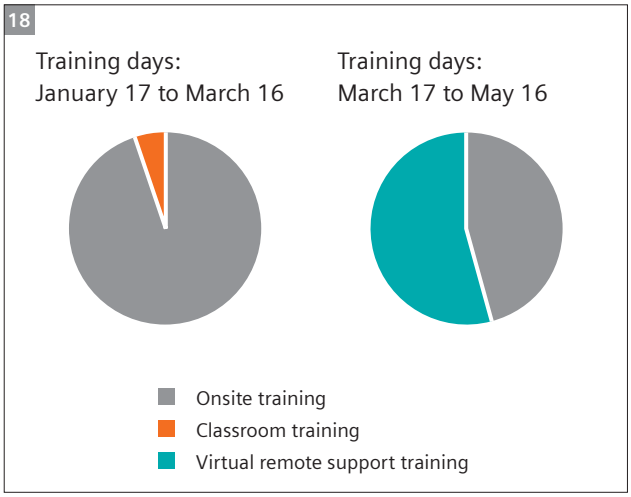

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