White paper

Hybrid learning

The next step in transforming medical education

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Healthineers

What drives the change in education?

The COVID-19 pandemic has driven digitalization in every aspect of our lives. In our professional lives, we all got used to working and collaborating remotely – and by now, everyone has become an expert in video conferencing. In the entire educational sector, remote classes and courses became the new normal as well.

There are many good reasons why the remote aspect is here to stay. To a large extent, it has proved to add a high level of convenience and flexibility. In addition, not having to travel has both economic and environmental benefits. What's more, the new generation entering the workforce is digital natives with certain expectations of what should be possible and what should be the norm regarding digitalization.

So, it seemed natural for us to take the next step in how we offer education in the healthcare environment – and to go from Blended Learning to Hybrid Learning. The difference between these two learning categories might be small. But we believe that it will make a big impact on our strategy and how our customers perceive us.

Challenges for workforce development in a changing world

- Changing requirements and expectations regarding digitalization due to the COVID-19 pandemic

- Evolution of technologies changes work-related tasks and requires continuous upskilling and reskilling

- Changing competence requirements for employees

- Employees working from home pose new requirements for managers because they have to digitally manage their staff

- Learning and working are interwoven, and learning happens in the flow and at the speed of life

- On-demand performance support for employees and workplace learning incl. knowledge transfer become more important

- Workforce development must increasingly support informal learning and needs more flexible and dynamic solutions

- Learning content must be adapted to the work situation and be increasingly personalized

Contents

Why learning has to change – a general view

In the healthcare sector, medical technologies and standards of care are continually changing. To stay on top of their game and be able to provide high-quality care, healthcare professionals have to commit to lifelong learning. In turn, the competitiveness of a clinical institution depends on its ability to manage and develop its medical staff.

Offering individualized learning and training has already become a key feature in successfully recruiting and retaining skilled employees. The reasons are obvious: people learn differently – bringing their own experience, knowledge, and goals into the learning process. And they have their own learning speed. But being based on a common learning pace, traditional classroom trainings ignore the individualities of learners.

Leaning, however, should be active and personal. Proactively involving participants is key for their motivation and learning success – whether in self-organized planning of their learning processes or in the context of instructor-led learning phases. Digitalization adds individuality, flexibility, and gamification to the learning process.

Did you know?

68%

of employees say training and development is the company's most important policy.[1]

40%

of employees with poor training will leave the company within the first year.[1]

The digital transformation of education

Digitalization and emerging technologies increasingly allow companies to change their learning culture from a more centralized and seminar room-focused approach to more informal and self-determined learning. The aim must therefore be to adopt these new technologies and to integrate them meaningfully into learning offerings.[2] In 2018, the eLearning BENCHMARKING Study made the following findings:

- "As a result of digitalization, human resource development will gain in importance." 79.6% of those surveyed agree with this statement.[2]

- 92.6% of the companies surveyed share the view that personnel development in the digitalization requires more flexible and dynamic solutions.[2]

- Human resources development must support informal learning more strongly in the future, 90.2% of those surveyed share this insight.[2]

Latest technologies that drive the change in education

Let's take a closer look at some of the technologies used in education today. Each one has its benefits – and limitations. For blended or hybrid learning concepts, it's all about getting the right mix of the different technologies available.

Virtual, Augmented, and Digital Reality
are immersive technologies that present information in an engaging and interactive way. By simulating an imaging system or OR environment, for example, they allow users to gain hands-on experiences in a safe setting – without blocking valuable resources in a clinical institution. Also, extra information can be added by connecting further digital content.

AI-based solutions
help create an ever-greater personalized learning experience – including global classrooms, chatbots, personalized education content, tracking a student's progress, and much more. There are no limits to the imagination. The global AI usage in education is estimated to have an annual growth rate of 45% and is predicted to reach $5.80 billion by 2025.[3]

Learning Experience Platforms
are online portals that provide cloud-enabled access to educational material, at any time and from anywhere. They provide students with a plethora of content and education managers with the required tools. Besides offering personalized content, Learning Experience Platforms can also support cooperation and exchange between participants worldwide.

Simulation
is a form of experimental learning. It allows users to gain experience and practice complex skills by using a model of a real system, for example. This means they gain insights and hands-on experience in a safe environment. Also, students can reset a simulation and try an alternative approach. Another benefit is that instructors can gather measurable data on the progress of students.

Gamification
adds game-based elements to the learning process – such as dynamic interfaces, competitive rules, level badges, or progress-tracking leaderboards. Offering students an immersive and highly engaging learning experience, it helps increase students' motivation. Because learners learn better when they're also having fun.

Webinars
provide easy access to online lectures – from anywhere. Participants in a live webinar can ask questions. But webinars can also be recorded and watched later at a convenient time. Also, features such as screen sharing sessions, chats, file sharing, and many others help bolster the learning experience and keep students more engaged in the material they are learning.[4]

Mobile learning, podcasts, etc.
offer access to learning materials via mobile devices like smartphones, tablets, and laptops – and provide concise bits of information. They allow students to learn content whenever it's convenient for them, for example when commuting. Also, students can learn at their own pace because they can pause and replay parts when needed. This makes education more accessible for students.

Microlearning
is small learning units that can be easily integrated in the daily routine. As a result, students can continually deepen their knowledge. The advantage is that the short learning units take up only a few minutes, focus on the essence of one topic, and thus catch a student's attention much better than one long lesson or a chapter in a book.

Social engagement
means interaction between fellow learners – even in real time. It can be used to motivate students to get involved, improve their overall experience, and help them learn to get good grades.[5] Especially in our remote times, social engagement should not be neglected. Strong social connections and networking have never been more important.

Four overall trends influencing education

There are many external trends and forces that influence how education is delivered – whether in a region, country, or even on a global scale. The COVID-19 pandemic, as one example, had an immense influence on education worldwide. Let's take a look at some of the trends that have an impact on education.

Social trends

Education always takes place within a social context – and the learning experience of an individual is shaped by the interactions with class members and trainers.

A current social trend is **remote working/learning**: Due to the COVID-19 pandemic, many facets of social life have become remote in nature, from personal events to business meetings – and some might remain remote. Remote modes of higher education will live on in some form or another in a post-pandemic future. The challenge will be to provide innovative technologies and approaches, so training and learning activities will be socially and emotionally supportive as well as flexible enough to cater to the different needs of students while increasing the skill set of the individual learner. Students will also need to acquire new skills to be equipped for digital working and remote learning, so they can thrive in independent virtual environments.[6]

Technological trends

The disruptions and rapid changes during 2020 and 2021 forced much of teaching and learning to be done remotely – making digital technologies even more vital to education.

One technological trend is the **widespread adoption of hybrid learning models**: These have gained in importance and are likely to leave an indelible mark, fundamentally transforming traditional approaches to higher education. Hybrid learning models that allow great flexibility between remote and in-person experiences will help institutions minimize disruption and achieve continuity of course delivery. This shift has accelerated the adoption of new learning technologies and tools, with videoconferencing, team-based platforms, and virtual classrooms becoming essential components.[6]

Economic trends

Clinical institutions of all sizes must adhere to a strict budget. And even though personnel is their largest investment, funds for education and training are limited and they need to make the most of their money.

One economic trend is the **remote aspect of remote and digital learning**: In its early phase, the COVID-19 pandemic brought global travel to a standstill – including work-related travel. Corporate travel faces a slower return than leisure travel, and reasons for traveling have been reevaluated based on their impact on the bottom line and the environment, as well as on how well they can be replaced by now widely adopted tech platforms.[7] Companies acknowledge the increased productivity due to limited travel. The same is true for education, since attending classes remotely and making use of mobile self-learning tools translates into time and cost savings for employers – and shortens the time employees are absent from work.

Environmental trends

With climate stability and environmental sustainability as the challenges of our day, adopting a sustainable practice is key in the planning and execution of training and education.

One of the biggest environmental trends is **climate change**: The amount of commuting and traveling has a big impact on the environment. The global community has now the chance to build a post-pandemic world dedicated to sustainable development goals (SDGs).[6] By traveling less and offering hybrid learning concepts, institutions and their staff can contribute to climate protection by reducing their carbon footprint.

Taking the next step to Hybrid learning

When reading about digital education, learning, or eLearning, two terms keep popping up: Blended learning and Hybrid learning. Blended learning refers to the didactically meaningful combination of classroom training, eLearning, and immersive and social learning into a single strategy. The same is true for Hybrid learning, but there is a fine difference between these two learning strategies.

Blended learning focuses on a set ratio and defined combination of offline and online instruction[8] – and both teacher and students must be physically present in the same location.[9] This means that Blended learning is **location-dependent**, and that both teacher and students are either all onsite or online at the same time.

Hybrid learning, on the other hand, introduces a higher level of flexibility. It seeks to find a flexible balance of online and offline that promotes the best experience, even down to individual students.[8] Students can decide where they learn from – the only requirement is that all students are present and that there is a combination of remote attendees and in-person learners.[9] This means that Hybrid learning is **location-independent**, and that teacher and students can be both onsite and online at the same time.

Blended learning has been slowly evolving over the last years, powered by digitalization and technological advances. The COVID-19 pandemic delivered a seismic jolt that greatly accelerated this evolution and forced educational institutions to become inventive and flexible – and to create an array of new hybrid course models to cope with a truly unique situation. Technology, as always, has offered ways to meet the challenges of a fast-paced move into the online dimensions of Hybrid learning – from exploiting XR (Extended Reality) to utilizing Blackboard tools and Zoom.[10]

> Blended learning is location-dependent and clearly separates between asynchronous and synchronous learning methods as well as between offline and online learning media. These borders become blurred and vanish with the highly flexible Hybrid learning concept, which is location independent. Here, different methods and media can be used by the different learners simultaneously.
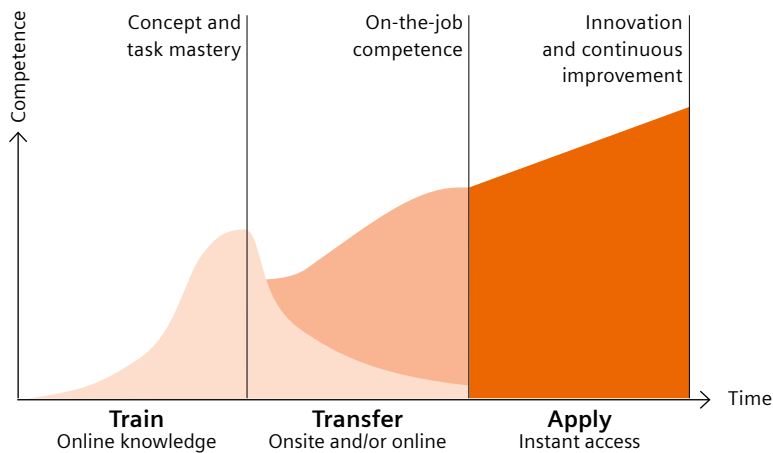
The common ground: adding digital experiences

What both Blended and Hybrid learning concepts have in common is that flexible options are added to on-premises and online content. These can include:

- An instructor-led virtual classroom that delivers the personal feedback of face-to-face lessons but online, with the convenience of learning from anywhere

- Real-world, practical applied projects that not only develop hands-on skills, but are immediately applicable to company initiatives

- Online social sharing for interaction between fellow learners, even in real time

- Online teaching assistants who are available 24/7

- A Learning Management System (LMS) that enables management to monitor employee progress and assist when necessary

- Adaptive learning features that enable learners with existing knowledge or skills to skip ahead and begin training at the level appropriate to their knowledge

- Gamification that adds game-like elements to the learning process such as dynamic interfaces, competitive rules, level badges and progress-tracking leaderboards

Gottfredson, Conrad; Mosher, Bob (2015): Technology to rescue. TD Magazine Vol. 69 (Issue 8), p. 46-51

To increase competence over time, learners first have to train and acquire knowledge – and then use this knowledge and put it into on-the-job practice. Subsequently, they have to keep applying their knowledge and continuously improve it.

Reasons why an interactive offering is important

In a classroom setting, whether onsite or online, the goal is to gain knowledge, but that doesn't equal competence. When someone knows something in theory, that does not necessarily mean they can put it into practice. And medical staff need more than knowledge – they need the competence to put it into daily practice.

So, knowledge is not the primary goal of learning. It's rather a prerequisite for the development of competence. Students can only develop competences when they have gained skills and can apply existing knowledge in a self-organized solution to challenges. In doing so, experience is gained and connected with personal emotions – it acquires practical relevance. By linking new information with existing knowledge, students can actively create new knowledge. For the development of suitable learning offerings, the differentiation between knowledge in a closer sense and competence in a broader sense is important, since different forms of learning processes are derived from it:

Knowledge in the closer sense is information, technical and factual knowledge, and theory. Standard knowledge and theory do not necessarily require high-quality classroom training. This type of knowledge can be easily conveyed through appropriately designed reading materials or in a more appealing way through eLearning modules. It is crucial that learning modules are designed to be of high quality in terms of both content and learning experience.[11]

Competence in the broader sense – such as proficiency in technical skills and their application in daily work, as well as attitudinal and behavioral characteristics – arises when learners evaluate information and relate it to their own experience. By being emotionally involved, this knowledge also becomes actionable.[11]

Hybrid learning imparts both knowledge and competence. Because with Hybrid learning, it's not about certain technologies or didactic methods being superior to others. It's all about finding the ideal mix and combination – and to link the advantages of different options to reach defined learning goals as well as efficiency criteria. Experience has shown that such optimizations are only possible if a flexible combination of the different technologies is being used.[12]

Why Hybrid learning is the ideal solution for upskilling employees

93 %
of education professionals agree that **a personalized approach to learning would be more beneficial** for learners than conventional models.[13]

86 %
of people state that **learning in the flow of life** is very important.[14]

Hybrid learning improves competences with a mix of personal, remote, and virtual learning formats and is very adaptable compared to a single-method approach. The following five reasons outline why Hybrid learning is the ideal solution for upskilling employees.
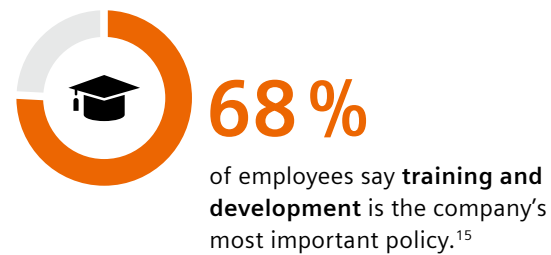
1 Greater flexibility

One of the advantages of Hybrid learning is that not all class members have to be physically present in one location. By definition, Hybrid learning is a mix of onsite and online presence. This offers a higher level of flexibility for employers and education managers. For example, a large clinical institution with several sites that may be spread across a region or even countries can offer one class on a specific topic – and all interested employees can easily participate without having to travel at all.

2 Increased safety

Due to the COVID-19 pandemic, personal safety has become important and a key issue. Wearing a mask, keeping a certain distance to other people, and refraining from shaking hands is the new norm around the globe – as well as limiting the number of people who can gather inside or even outside. With Hybrid learning, institutions can easily put health and safety of their staff into focus. Employees don't have to travel anymore, and the number of people present in a physical room can easily be limited.

3 Higher accessibility

Hybrid learning makes education more accessible for learners on a global scale. Before, learners couldn't participate in a class that took place at a certain time and location if they couldn't travel. Now, it doesn't matter where they live and work and where the training takes place. If they can't travel, they simply participate online. Also, a large institution with several distant locations can offer its employees just one central training instead of one at each location – saving both time and costs.

62 % of learners globally agreed that **learning is the key to success** in their career.[16]

68 % of employees say **training and development** is the company's most important policy.[15]
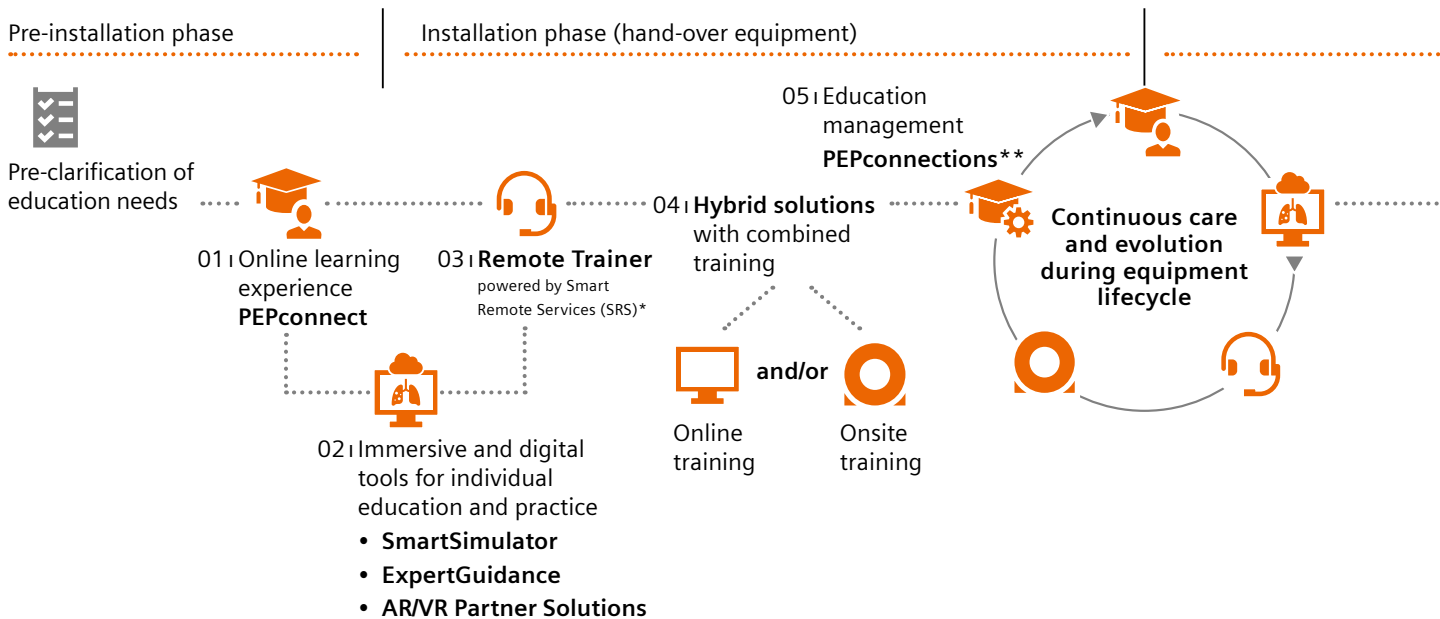
4 Personalized learning

Organizations need to train more than just one employee – and each staff member has a different learning style. With Hybrid learning, trainings can be much better adapted to each student's learning style. For people who learn visually or by reading on their own, online video delivery for self-study may be the best method. Social and audio learners can benefit the most from live, virtual training guided by an expert. Meanwhile, hands-on practice in applied learning projects can satisfy kinesthetic and logical learners. In addition, learners can access course content from anywhere and at any time, using the device of their choice – whether a mobile phone, laptop, or tablet.[17]

5 Better student engagement

By including different technologies and gamification, Hybrid learning concepts are highly engaging and immersive – which can result in improved learning by involving multiple senses. According to Dr. Edgar Dale's Cone of Experience model, students tend to remember what they learn better if different passive and active senses such as reading, hearing, seeing, speaking, and doing are involved in the learning process. Through a wide range of training delivery methods that include multimedia, presentations, expert guided training, classroom workshops, real-life projects, gamification, and more, Hybrid learning achieves higher levels of student engagement.[17]

Integrating latest developments in education to build an effective and flexible learning offering

Pre-installation phase | **Installation phase (hand-over equipment)**

Pre-clarification of education needs

01 ı Online learning experience **PEPconnect**

02 ı Immersive and digital tools for individual education and practice
- **SmartSimulator**
- **ExpertGuidance**
- **AR/VR Partner Solutions**

03 ı **Remote Trainer** powered by Smart Remote Services (SRS)*

04 ı **Hybrid solutions** with combined training

Online training **and/or** Onsite training

05 ı Education management **PEPconnections****

Continuous care and evolution during equipment lifecycle

During the pandemic, companies have made a significant shift toward skill building. In fact, 58% of organizations state that closing the skills gaps is a higher priority since the pandemic. And of five key actions to close these gaps – hiring, contracting, redeploying, releasing, and building skills within the current workforce – skill building is more prevalent now than it was in the run-up to the pandemic.[18]

Siemens Healthineers helps healthcare providers improve workforce productivity with automated laboratory and diagnostic imaging processes that relieve physicians of routine tasks. Furthermore, Siemens Healthineers standardizes and automates workflow steps to relieve the burden on staff and provides solutions to increase the skills of existing staff, while helping solve staffing and performance challenges with dedicated workforce solutions.

Our learning strategy –
customized to meet the needs of the learner
Hybrid learning solutions from Siemens Healthineers enable institutions to offer a variety of education formats that improve the competences and experience of their workforce – anytime and anywhere. Hybrid learning is an evolutionary approach to application and equipment training that consists of five components (see figure above), which are based on a pre-clarification meeting and will be individually tailored to each customer's needs.

Pre-clarification of education needs
A standardized customer questionnaire is usually used to evaluate the training needs of a customer. This, combined with a personal meeting, allows identification of key areas for staff education to offer a customized education package prescribed to increase specific skills.

01 ı Online learning experience
PEPconnect provides access to extensive online material in a customer online training platform, which is free of charge. This can be helpful, for example when training basic knowledge of technology before onsite training. The training is self-paced and can be done whenever and wherever there is an Internet connection. The learning material can be repeated as often as needed and shared with colleagues. For customers, a bespoke PEPconnect group can be created with educational content that focuses on their needs. PEPconnect provides more than 19,000 engaging learning activities – including eLearnings, webinars, job aids, virtual classroom, and more.

02 ı Immersive and digital tools
Immersive technologies like Augmented Reality, Virtual Reality, or simulated environments provide a hands-on approach in a safe environment for practical skills development. SmartSimulator, for example, lets clinical staff train and practice on a virtual medical device from Siemens Healthineers, helping enhance confidence.

Lifelong learning

Onsite training "on-the-go" through SHS-trained workforce with **FlexForce Coach**

Instant access to education via online training, virtual classroom, webinars

With our education portfolio, we're now taking the next step to integrate the level of flexibility needed that evolves from a Blended learning strategy into a Hybrid learning one. This means that we can offer customized education and workforce solutions that meet the new needs of clinical staff in a post-pandemic world.

It also helps keep daily operations up and running because no real systems are being blocked for training and education. Another example is ExpertGuidance, a mobile Augmented Reality training application designed to increase operational efficiency and decrease the time to proficiency regarding equipment onboarding and clinical workflows. It helps optimize clinical operations because staff can train complex procedures and workflows in a safe, virtual environment.

03ı Remote Trainer
Remote Trainer is a personalized service where experts from Siemens Healthineers interact with clinical staff remotely via the secure Smart Remote Services (SRS)* connection to train them on equipment and clinical applications from Siemens Healthineers – using audio, video, and chat functions. With Remote Trainer, individual remote training courses are scheduled in shorter sessions that are convenient to each learner, thereby making equipment and staff available to maintain their daily operations during peak patient times.

04ı Hybrid solutions with combined training
After providing a solid foundation with the first three pillars, the staff can start onsite or online training with increased knowledge and experience that can be cascaded to their colleagues. Whether delivered in person or remotely by an Application Specialist, or even a FlexForce Coach, the

development of practical skills through competence is achieved, directly on the instrumentation.

05ı Education management with PEPconnections
With workforce management solutions, employers can help continue the advancement of their staff. PEPconnections** is a workforce management solution where education managers can add their own content, assign education based on individual needs, and oversee progress in alignment with their practices – all on their own.

The cycle: Lifelong learning
The learning cycle never stops. After any learning event, there is the need for continuous learning. As new technologies keep evolving, upskilling and reskilling employees becomes part of everyday work life. Instant access to education via online training, virtual classrooms, or webinars is key to meeting the speed of changes – and for employees to manage their ever-changing workplace.

*Connection to Smart Remote Services (SRS) infrastructure is required. SRS has advanced security measures in place and is compliant with the ISO 27001:2013 Standard for Information Security.
**Subscription required. Availability of subscription depends on country.

Summary

In a post-pandemic world, the aspiration to drive innovation so that people can live healthier lives is more valid than ever before. With our adapted education offering, Siemens Healthineers is well set up and positioned to meet the new needs and demands of learners around the globe. With our Hybrid learning approach that mixes onsite with online training and includes innovative technologies such as Virtual Reality and Augmented Reality, we tremendously enhance the level of flexibility in education. Furthermore, the five pillars of our education portfolio result in auto- matically repeating the material; repetition, as is widely known, is the key to learning and building competence.

Success Stories*

Due to a technologist testing positive for the coronavirus, the handover onsite training for a 3T MAGNETOM Vida scanner had to be quickly moved from onsite to online.

"The face-to-face and distance learning has been very effective. The technologists are more involved in the acquisition during the remote training, and they have more control and can work on the system while being supervised by the application specialist. There are less errors in the acquisition of sequences because the technical parameters are verified in real time by the application specialist. The remote link to the application specialist also avoids too many people being in the same room at the same time. The technologists had access to the screen simultaneously with the application specialist, which was very convenient for them."***

Professor Sébastien Verclytte,
Neuroradiologist and Head of Radiology Department,
Hôpital Saint Philibert, Lomme, France

Because the COVID-19 lockdown prevented Application Specialists from Siemens Healthineers from reaching the customer site, the handover customer training had to be adapted to remote training.


During the COVID-19 pandemic, training had to be delivered remotely to technologists to enable them to use the SOMATOM Definition Edge to its full potential from day 1.

"This training met our expectations; we could reach the prescribed goals timely according to prepared schedule. Problems beyond the scope of the training could be discussed and solved remotely. Virtual training seemed to be real, except for the practice with real patients. With the support received from the training team we could confidently learn the new scanners functionalities and apply this knowledge in a virtual work environment using the Smart Remote Services. Even though full virtual training is not as perfect as the on-site training, this training was very helpful and effective in this pandemic situation."***

Mya MyaChaw Su,
Chief Imaging Technologist, Palace Hospital,
Mandalay, Myanmar

"The remote features provided by Siemens Healthineers are integral during this time to ensure staff safety, and in the case of Virtual Cockpit Light to enable DI staff based outside the ER to easily assist and troubleshoot with technicians operating the CT in the ER."***

Julie Audet,
Assistant DI Manager, Charles LeMoyne Hospital, Longueuil,
Quebec, Canada
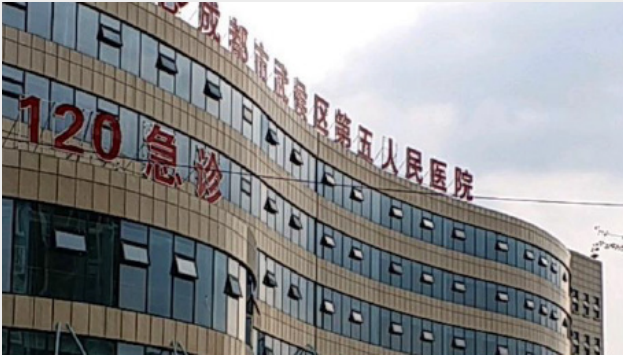
Technicians with a very busy schedule and changing work locations were difficult to reach and bring together to one space to introduce them to product fundamentals.

Because the Daegu region was a COVID-19 hotspot, the Application Specialist couldn't reach the customer site and had to teach the staff remotely how to operate their first new Dual Source CT scanner.

*"Through this remote training approach, more participants were able to attend the training. This proved to be highly efficient. We could solve problems at hand quickly. Training time was flexible, which was very important to us."*****

Deng Jia,
CT Technician, Fifth People's Hospital,
Wuhou District, Chengdu, P.R. China

*"Although it was not easy for the Application Specialist to reach us as a result of the travel restrictions, I had hoped that we would be able to operate the CT scanner as soon as possible because of our experience with the SOMATOM Definition AS+. However it was not easy to create and optimize scan protocols on the newly installed dual source system, SOMATOM Force. By using Smart Simulator and SRS, protocols were created in advance and imported to the scanner, enhancing operations from day 1 already. Real-time monitoring and support for trouble shooting queries was easy when connected via SRS. When using these online solutions, I felt Apps was sitting aside of me"*****

Mr. Kim,
Technician, Yeungnam University Medical Centre (YUMC),
Daegu, South Korea

Because of the travel restrictions during the COVID-19 pandemic, the three Atellica support representatives from Meditop, one of our business partner had to be trained without traveling onsite.
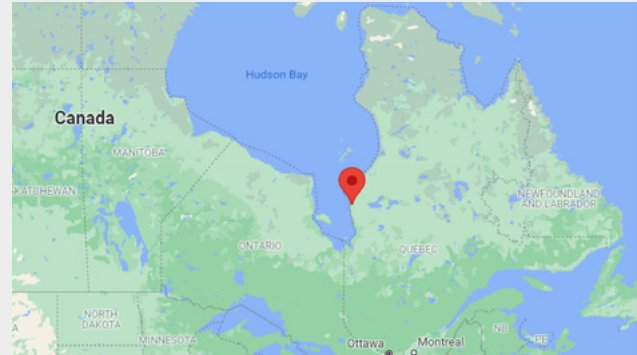
The MOBILETT Elara handover training had to be performed fully virtually using PEPconnect assigned training modules and remote sessions with SmartSimulator as follow up.

"The combination of Digital Synchronous Training (Simulcast), digital materials in PEPconnect, personalized contents, professional instructor and coach, and digital environment created unique digital learning experiences. Siemens Healthineers Digital Training Solutions boosted the training effectiveness, increased our staff confidence in maximizing the system potentials, and lowered overall training costs. We would highly recommend Siemens Healthineers Digital Synchronous Training to others."***

Mr. Sarayut Ruangkasem,
Business Development Manager of Meditop Co., Ltd.,
Wang Thonglang, Bangkok, Thailand

"We have a couple of installations in that remote area, but we have to fly there. If we want to reduce the costs for the customer, I think it is a great alternative if we can offer virtual education options, especially in these cases in which the customer has prior experience with FLC software-based systems."***

Helene Chouinard,
Siemens Healthineers Applications Service Manager,
Canada

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