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Title	Hospital training challenges during COVID-19 in Singapore: Radiographers' experience of continuing professional development in social distancing mode
Author(s)	Tay Yi Xiang, Rafidah Binti Abu Bakar, and Berinderjeet Kaur

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# 1 **Hospital training challenges during COVID-19 in Singapore: Radiographers'** 2 **Experience of Continuing Professional Development in Social Distancing** 3 **Mode**

## 4 **Introduction**

5 The COVID-19 pandemic is likely to have significant and unforeseen consequences  
6 on Continuing Professional Development (CPD) for years to come<sup>1</sup>. In view of the  
7 rapidly evolving situation together with nationwide recommendation, social  
8 distancing in particular, changes need to be made to the traditional model of CPD in  
9 order to maintain relevance and impact. More importantly, these must be  
10 implemented while maintaining safety and wellness of the learners and facilitators<sup>2</sup>.

11 In this rapid communication, we will be focusing on narrating the CPD challenges  
12 and experiences of radiographers in Social Distancing (SD) mode during COVID-  
13 19 at a hospital in Singapore.

## 14 **Discussion**

### 15 **Pre-COVID CPD**

16 At Singapore General Hospital, radiologists from various radiological departments  
17 together with 273 radiographers from the radiography department are organized  
18 under the Division of Radiological Sciences. The primary role of a radiographer is to  
19 acquire radiological images for subsequent interpretation by a medically qualified  
20 specialist – a radiologist. Notwithstanding the fact that both professions work

21 together within the same division, their role, education and training differ along with  
22 their respective CPD needs.

23 Traditionally, radiographers generally rely on face-to-face-interaction for CPD.  
24 Learning of new techniques and equipment, often requires radiographers to  
25 participate in radiographic procedures, direct observation, attendance at academic  
26 conferences, and simulation training. We had regular academic-focused time which  
27 consisted of weekly radiographers CPD, modality specific CPD sessions, and  
28 research journal club. In-house and external facilitators were invited to present on  
29 various topics relating from novel radiographic techniques, research, post-  
30 conference sharing to patient care and management.

### 31 ***CPD in SD Mode***

32 In the era of SD, meetings had been affected the most<sup>3</sup>. Physical meetings were  
33 discouraged, and all non-essential meetings had to be cancelled. Any essential  
34 physical meetings were kept as small as possible and the duration was shortened.  
35 Seating arrangements were spaced at least a metre apart with all attendees  
36 masked<sup>4</sup>. Like other times during a pandemic, CPD's role in improving quality and  
37 patient safety remains paramount<sup>5</sup>. At the initial phase, the presenters had to pre-  
38 record their individual CPD presentations and upload them to the intranet on a  
39 weekly basis. This was subsequently replaced by a teleconference format, held at  
40 the time-tabled slot for CPD as in the pre-COVID period. Similar to our radiologist  
41 colleagues, we utilized Zoom teleconference platform (San Jose, California) for live  
42 video stream.

43 In tandem, we also leveraged digital technology and trends by using social-media  
44 based platform - Workplace from Facebook (Menlo Park, California). With internet  
45 surfing separation enforced across Singapore healthcare clusters, there was a need  
46 for a mobile communication tool. Available as a mobile application, it served not only  
47 as a communication tool that connected all members within the division closed group,  
48 but also as a platform to encourage reading through articles, reflections and COVID-  
49 19 climate updates posted by radiographers and radiologists on a daily basis.  
50 Published journal articles from internal and external parties were available for  
51 viewing on the intranet. Webinar from experts conducted on a regular basis also  
52 provided important updates on the evolving situation and provisional knowledge.  
53 Last but not least, radiographers were encouraged to leverage platforms such as  
54 websites, blogs and YouTube where videos were readily and freely available to  
55 support their learning.

### 56 ***Quality Measures in SD Mode***

57 As the COVID-19 pandemic accelerated a global embrace of digital technology,  
58 there was a clear need to keep in pace with the digital trajectory in CPD.  
59 Teleconferencing was heavily utilized in replacement of physical meetings. The  
60 platform allowed facilitators to visualize attendees, see their responses, and enabled  
61 attendees to ask questions addressed to the facilitator. This provided a feeling of an  
62 in-person meeting from a safe distance<sup>2</sup> and encouraged audience interaction which  
63 was impossible in pre-recorded CPD sessions. Radiographers could be engaged  
64 from any location - within the campus, community facilities and even at home,

65 accessing simply by a smartphone or tablet. However, such format made it  
66 challenging for facilitators to identify participants based on their account user names  
67 – crucial during clinical rounds; involving sharing of confidential patients' medical  
68 history. To ease admitting of attendees and a better meeting experience,  
69 radiographers were reminded to follow the institutional Zoom meeting etiquette.

70 While the transition from pre-recording to teleconference was embraced by many, it  
71 was not without detractors – non tech-savvy mature radiographers often found it  
72 challenging to adapt and frequent disconnection due to poor internet connectivity  
73 made presentations out of sync. These were navigated with the hospital's investment  
74 in digital infrastructure and the support provided to the mature radiographers by the  
75 younger more tech-savvy radiographers.

76 Although the platform allowed recording of sessions, this function was disabled for  
77 security reasons – in line with the recommendations from the public report of the  
78 committee of inquiry into the June 27<sup>th</sup> 2018 cyber attack<sup>6</sup>. With no option of later  
79 review, radiographers had to be physically available during the specific period of the  
80 teleconference. This was extremely challenging as the recent surge in infections had  
81 stretched the healthcare system. Having an average attendance rate of 60  
82 radiographers during the live session, there was request to provide recordings of the  
83 sessions to the rest of the radiographers who were unable to attend. The CPD team  
84 overcame this limitation by using alternative screen recording softwares (Windows 10  
85 Game Bar, QuickTime Player, Screencast-o-Matic) to record the Zoom meetings.

86 The recordings were subsequently uploaded and made available in the  
87 radiographers' group on Workplace from Facebook, often in excess of 100 views.

88 As the outbreak unfolds, healthcare professionals have to remain updated on the  
89 virus and the gaps that remain. Inevitably, COVID-19 had intensified concerns  
90 about misinformation and there was a need to combat this infodemic. Strategy  
91 adopted to reduce any misinformation was to identify senior experienced  
92 radiologists/radiographers to review the appropriateness of publications– relying  
93 upon mainstream/ scientifically knowledgeable sources which provided reliable  
94 reporting.

95 Moreover, with the novelty of the virus resulting in a torrent of information coming  
96 through daily, it was vital to harness the strength of all and build up the Intel capability  
97 of the division. A team of experienced radiologists and radiographers were identified  
98 to support this initiative. An online repository of useful COVID-19 related papers were  
99 pooled by the respective sub-specialized radiologists and radiographers, with critical  
100 points summarized for sharing without information overloading. Regular  
101 teleconference journal club facilitated by both stakeholders to share these papers  
102 were also planned. The initial journal club session turnout was encouraging, with  
103 more than 120 participants from both professions engaging in synchronous  
104 interprofessional education.

105 With the large scale of this global outbreak, international collaboration was  
106 encouraged. For instance, to help radiographers globally to perform mobile chest  
107 radiography for COVID-19 patients, collaboration among various international

108 radiography professional bodies and multinational content teams were needed in a  
109 short timeframe<sup>7</sup>. One of the authors was invited and contributed in one of the  
110 content teams to develop educational materials and modules for chest radiography.  
111 This was a worthwhile initial effort to support our returning radiographers in their line  
112 of duty. Additionally, more materials in the form of e-learning were developed and  
113 published to support radiographers globally during the COVID-19 pandemic. The  
114 online format allowed radiographers to learn anytime, anywhere, and provided Just-  
115 In-Time Training for those radiographers who had been re-deployed from other  
116 imaging modalities to support the increase in mobile Chest X-ray examinations.

117 Following the re-deployment, this group of radiographers who had been out of touch  
118 with mobile radiography since joining their respective imaging modalities, coupled  
119 with the replacement of older mobile units (previously trained), required educational  
120 support for revision. Just-In-Time training for these radiographers included refresher  
121 cards for equipment operation and viewing of high quality radiographic technique  
122 videos. However, as these materials were not prepared before the COVID-19  
123 outbreak, this would serve as a timely reminder of the importance in the preparation  
124 of such resources. Fortunately, there were substantial amount of on-demand  
125 learning platforms available online from professional bodies and vendors in the form  
126 of webinars, literature-based course, video-based course and self assessment<sup>8</sup>.

## 127 **Conclusion**

128 The COVID-19 pandemic had pushed us to embrace a new norm of technological  
129 advancement for CPD while maintaining social distancing. Strategies for

130 implementation of CPD in SD mode could be found in table 1. As we adapt to the  
131 changes and address the challenges in the implementation, we need to identify the  
132 quality measures of our strategies. Radiographers should also explore alternatives,  
133 engage in international collaboration and participate in interprofessional  
134 collaboration. With no silver bullet in sight to end the pandemic, this will allow  
135 radiographers to continue with their lifelong journey of maintaining competence and  
136 improving professional practice.

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CPD Format	Tools	Radiographers' Experience
Teleconference	Pre-recording of presentation	<ul style="list-style-type: none"> <li>• Available on demand as compared to face-to-face sessions</li> <li>• Varying quality of recordings</li> <li>• No audience interactions</li> </ul>
	Live stream of presentation through Zoom	<ul style="list-style-type: none"> <li>• Preferred over pre-recording sessions</li> <li>• Improvement in accessibility – from anywhere</li> <li>• Encouraged audience interactions</li> <li>• Able to receive immediate responses during the question and answer sessions</li> <li>• More meaningful and enriching learning experience</li> <li>• Required good digital infrastructure</li> <li>• Required support for non-tech savvy mature audience</li> <li>• Sessions should be recorded and uploaded for audience who were unable to attend the live stream</li> </ul>
Social Media	Workplace from Facebook	<ul style="list-style-type: none"> <li>• Acted as a communication tool for the entire division</li> <li>• Improved connectivity as compared to intranet access</li> <li>• Mobile and readily accessible despite internet surfing separation – mobile phones</li> <li>• Encouraged reading</li> </ul>
	YouTube, Websites	<ul style="list-style-type: none"> <li>• Freely available</li> <li>• Supported learning</li> </ul>
	Webinar	<ul style="list-style-type: none"> <li>• Provided important updates on evolving situation and provisional knowledge</li> <li>• Content coverage by international renowned experts</li> </ul>
Other Health Communication	Articles, reflections, climate updates	<ul style="list-style-type: none"> <li>• Good source of information</li> <li>• Needed to rely upon mainstream/ scientifically knowledgeable sources to minimise misinformation</li> </ul>
	Online repository of COVID-19 related papers	<ul style="list-style-type: none"> <li>• Summary of essential points of the paper reduced information overload</li> <li>• Categorisation of papers enabled easy review and reference</li> <li>• Encourages interprofessional education/learning</li> </ul>
	Refresher cards	<ul style="list-style-type: none"> <li>• Enables Just-In-Time training when needed</li> <li>• Enable recap on previously learnt material</li> <li>• Potential for international collaborations</li> </ul>
	On demand education	<ul style="list-style-type: none"> <li>• Supplements Just-In-Time training</li> <li>• Available on-demand</li> <li>• Potential for international collaborations</li> </ul>

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150 **Table 1** Summary of the Radiographers' CPD experience in SD Mode

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