Transforming the Healthcare Simulation Spectrum:
Now, Next and Beyond

19 - 21 October 2022 | Academia, Singapore

S3 CONFERENCE 2022

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Unleash Visual Strategies from Experts: Eye-tracking Technology to Enhance Procedural Skills & Knowledge Transfer in Physician Simulation Training

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Introduction and Aim

Introduction

Eye-tracking technology is a technology that allows people to see where a person is looking. The unconscious visual and behavioral pattern in performing a task from experts rooted in knowledge, experience, and practice distilled, which were tacit knowledge that hard to transfer. Eye tracking technology can reveal the visual strategies to novices behind the observable behavior. Novices can understand a task by following the tracking gaze of experts and facilitating the skills transfer.

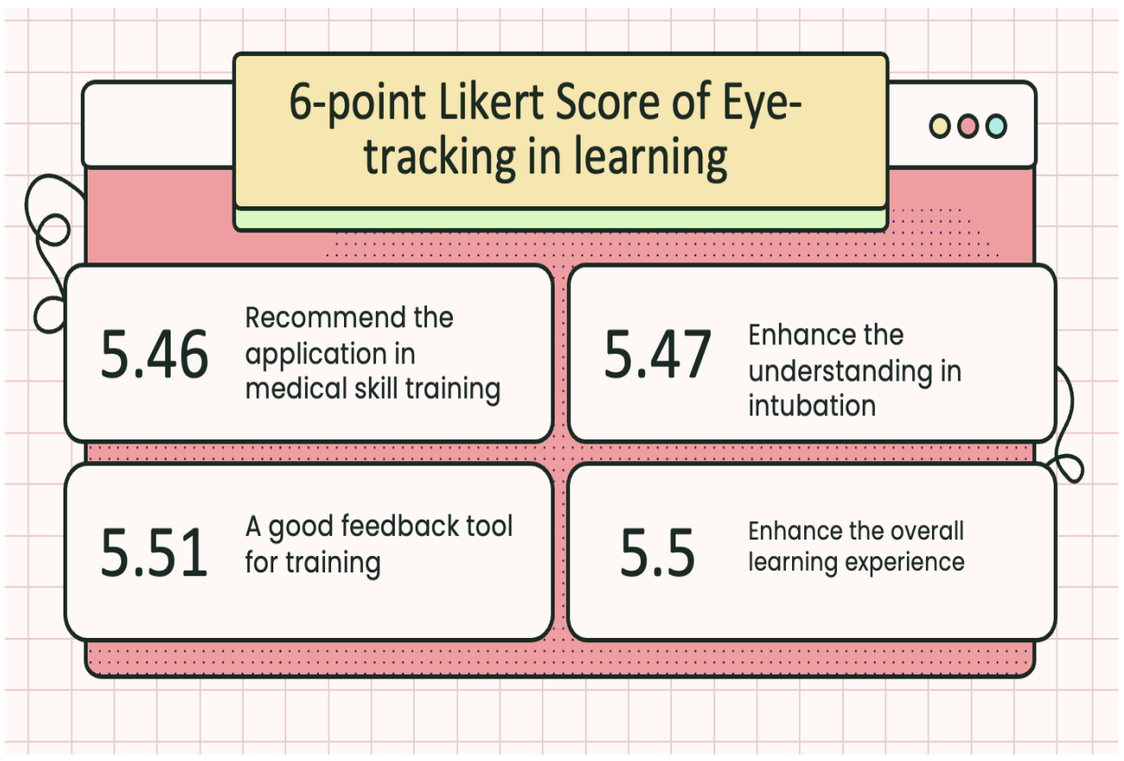
Core Medical Skills Course for Basic Physician Trainees (CMSC-BPT) was developed to enhance bedside procedural skills via different skill stations and scenario-based simulation training. This training course provides structured training to all basic physician trainees and maintains quality in patient care. In the past, the skill transfer was done by demonstration and return. The understanding of the instructor's focus area is limited.

Aim

To determine if eye-tracking technology can enhance participants' learning experience by visualizing the instructor's visual attention in a video laryngoscope-assisted intubation procedure.

Methods

An expert trainer wore the device to perform intubation. His/her visual attention focus was shown on a screen, so all participants can observe that and learn the visual patterns from experts simultaneously. Afterward, all participants proceed to the intubation skills practice session. All participants filled in 6 questions concerning using the eye-tracking device in a learning experience with a Likert scale of 6 at the end of the course.



Results

Three classes of CMSC-BPT were held from 7 to 14 August 2021, and 131 doctors completed the training.

Saccade path of an expert:

The user-focused gaze in each movement is shown on the screen. The importance of each intubation step can be shown on the screen, which is "Vital sign monitor", "Manikin (patient), and "Video laryngoscope screen".

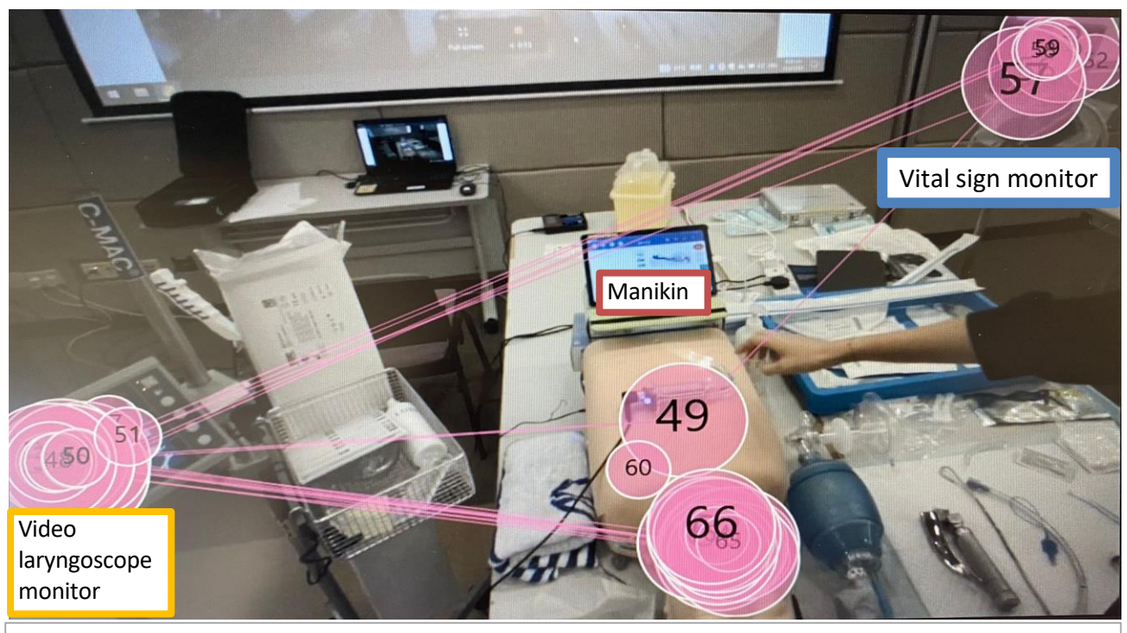


Fig 1: The simultaneous eye movements (saccade, shown in the lining) and the sequence (shown in number) of an expert during intubation were analyzed and illustrated. The bigger circle demonstrated a longer fixation time. The experts demonstrated the intubation in a pattern with continuous assessment in a focused approach. The expert visual pattern was consolidated by experience that can be revealed by eye-tracking technology to accelerate learners' learning.

Eye-tracking technology showed the potential to facilitate novices in understanding the visual strategies of a procedure and enhance procedural skills transfer.

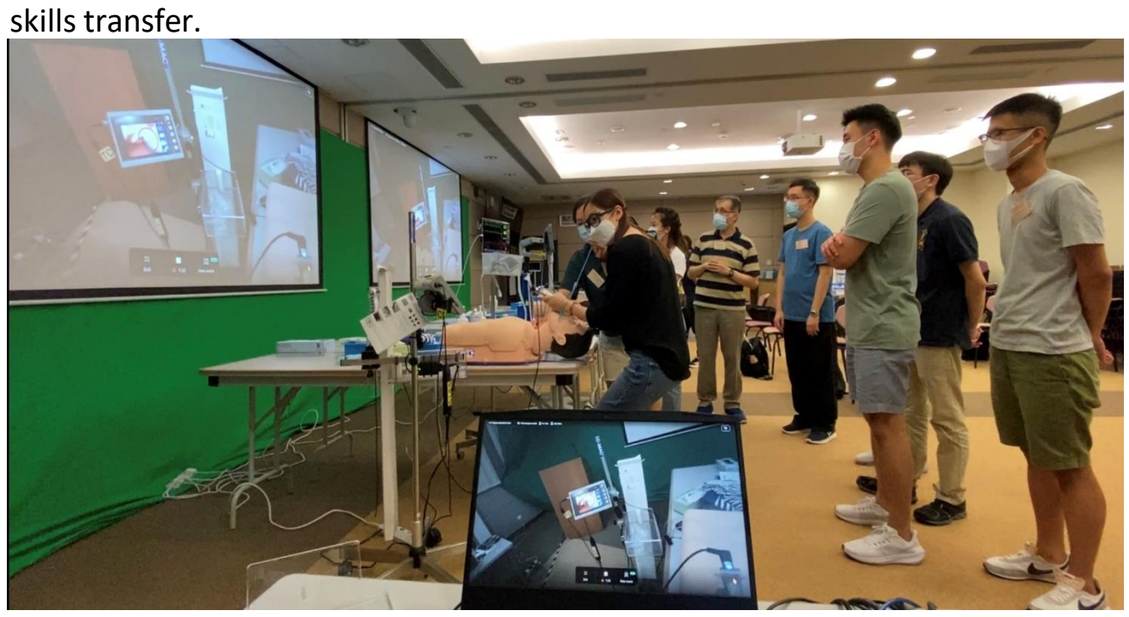


Fig 2: Expert trainer wearing eye tracking device and performing intubation in one go. The trainee can visualize the visual pattern and visual strategies of the expert. The coordination of the procedure including the visual pattern was visualized and broadcasted on a real-time basis to the trainee for better understanding.