Importance of in-person hands-on learning in wilderness medicine.

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Distance learning, also known as online learning and distributive education, has become increasingly popular over the last several years. Coursera, an online learning platform that offers access to online courses and degree programs, reported an increase of 48 million registered users and 113 million enrollments since 2020[1]. Synchronous and asynchronous online courses in wilderness medicine also increased in popularity during this time. At the beginning of the COVID-19 pandemic, the Wilderness Medicine Education Committee (WMEC) schools were unable to offer courses in-person and issued certification extensions of up to one year to participants. In some cases, these extensions required on-line work and in other cases they did not. All WMEC schools noticed a significant deterioration in students' proficiency during recertification courses following these extensions. Even students who completed on-line modules for their extensions performed patient assessments and physical skills at a below-average level compared to their peers who did not require extensions prior to recertifying. As a result, the WMEC has recommended a minimum number of in-person hours based on the certification level being acquired. These recommendations may be accessed **here** and will also appear in the updated standards documents for each course type.

In lieu of real-life experience to draw upon, in-person learning in wilderness medicine allows opportunities for hands-on immersive scenarios that mimic the stress and physical demands often required when responding to a patient in critical condition. This is known as Stress Exposure Training (SET). Coupled with quality and timely feedback, these experiences build a valuable framework for future decision-making under stress. Decision making and critical thinking occurs in the prefrontal cortex of the brain. As Deb Ajango argues,

> "we are presented with an emergency that requires immediate action, the prefrontal cortex kicks into action by conducting a lightning fast "search" of sorts, scanning its databanks for prior knowledge that might be helpful. Relevant memories, impactful experiences, and applicable trainings pop up as search "hits," and each of these options are quickly assessed for their potential as viable options. If no "hit" is found, that is; if a person has no prior experiences or relevant training, then no alternatives pop up, and like the spinning computer icon, the person remains frozen (bewildered) as the brain considers what to do." [2]

A wilderness medical provider with no patient care experience and who was trained entirely online will not have the capacity to perform ideal life-saving interventions under stress.

Hands-on learning is also essential for developing physical skills such as splinting, lifting, moving, and extricating patients. A study conducted by the University of Chicago and DePaul University that used brain imaging to assess how physical experience enhanced understanding of angular momentum can be applied to wilderness medicine pedagogy. The study examined "whether [a person's] understanding of angular momentum differed depending on whether they had (a) physically experienced consequences of manipulating the bicycle wheels or (b) observed consequences of the wheels' changing angular momentum via the laser dot on the wheel."[3] Activation of sensorimotor brain regions added kinetic detail, involving all the senses, to inform the thought process in those who physically experienced angular momentum. This kinetic detail provided valuable context for learning. Upon assessment, the group who physically experienced manipulation of the bicycle wheels outperformed the group who observed a demonstration. In other words, hands-on practice and feedback provides the bodily experience required for students to learn these skills in a manner that can be reproduced effectively.

Hybrid courses are also very effective course models and have become popular in wilderness medicine education. Online learning allows the students to work through the lessons often at their own pace. These courses typically include asynchronous e-learning modules that allow students to work at a pace and on a schedule that works for them. This is especially beneficial to those who do not do well absorbing material in a fast-paced learning environment. In addition, most platforms build automated feedback into activities providing students an opportunity to review why an answer is incorrect. Students can also go back and review the activities as they see fit and better prepare for the in-person course component. In-person class time provides the opportunity for the physical application of the concepts and skills demonstrated in online activities which foster greater understanding.

Students and employers must also consider the expectations of external groups, especially those that require certification. Collectively, WMEC sponsors expect that students have a significant amount of hands-on training and assessment. Many sponsors of wilderness medicine courses see the value of in-person instruction and assessment including the National Registry of Emergency Medical Technicians (NREMT) and American Heart Association (AHA). When renewing a provider's license, the NREMT requires that the skills competency of all active EMS providers is verified by their service's training officer via skill competency examination and/or via direct observation on the job.[4] Skill competency must meet both the NREMT and state standards. Providers that are "inactive" do not need to submit a skill verification, but they are not authorized to use the

certification.[5] While the AHA permits remote skills testing in their layperson courses, the Basic Life Support course requires that students attend an in-person skills session as part of the certification requirements.[6]

The WMEC endorses wilderness medicine education that is held in-person or involves a combination of on-line coursework and in-person instruction. Wilderness medicine courses that use asynchronous or synchronous online learning as their only platform are unable to provide the learning environment needed for developing skill proficiency and the ability to perform in stressful situations. As a result, the WMEC believes that it is not an adequate training platform for students. The WMEC encourages students and employers to think critically about the importance of in-person hands-on learning and to choose a training model that includes in-person learning with opportunity for hands-on training and skills development.

References

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