

中文題目：發展重症心臟照護網站以提升臨床訓練及學習的效率

英文題目：Build website about cardiac care unit to improve the efficiency of clinical training and learning

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Background: The report of cardiovascular diseases cares in Taiwan showed suboptimal result for guideline-based clinical practice. Besides, because COVID-19 had broken out in Taiwan, the clinical setting had needed more flexibility in ward rounds and teaching time for the trainees to be familiar with disease knowledge. Furthermore, the urgent changing symptoms and hemodynamic variables of patients in coronary care unit (CCU) lead to considerable stress for the trainees. These trainees would feel anxiety and less motivation of learning afterwards. Thus, there is an urgent need to develop an online-assisted learning system to provide residents with effective clinical learning and then provides a cost-effective and timely approach to learning access.

Rationale: The “triple-loop reflective self-regulated learning model” is based on Zimmerman’s model to connect learners’ motivation, metacognition, reflection, and behavior, and incorporate learners’ autonomy and their diverted emotions affecting their self-regulation skills application. The model can be divided into three parts. The first, sense of responsibility, curiosity and sense of belonging induce residents to increase motivation of learning. The second, the people evaluate these learning environments including their own ability, effort, and the benefit from the learning task, thus generate positive or negative emotions and adopt corresponding self-regulated learning (SRL) strategies. The third, when they take a result learned from this learning task for clinical application, they will find that it may be consistent or discrepant, thus have multi-level reflection. The single-loop reflection means learners try to correct their performance into the ideal blueprint. The second-loop reflection means learners apply learned metacognitive understanding, such as transferring, consolidation, integrating, and harmonizing. The triple-loop reflection, which learners promote and adjust the learning systems to facilitate learning efficacy and efficiency.

Methods: We developed embedded on-line curriculum for residents who receive training of CCU in Kaohsiung Chang-gang Memorial Hospital according to the learning mode. The training program declared “Bundle care, Bundle learning and Bundle checklist”, to facilitate the learners to generate more motivation, reflection, and workplace cooperation. The “Bundle care” concluded checklists of six care bundles: heart failure, acute coronary syndrome, carotid stenting, intra-aortic balloon pump (IABP), extracorporeal membrane oxygenation (ECMO) and targeted temperature management

(TTM), to facilitate the trainees' evaluation by themselves. The "Bundle learning" was the sequential explanations of why those care bundles designed, the background core knowledge and how to apply those bundles, to facilitate the trainees' the deeper understanding for broader application. The "Bundle checklist", not only incorporated entrustable professional activity (EPAs) format to help the trainees reflect their promotion in each domain knowledge, but also formed as a common language to facilitate mutual supervision between the CCU nurses and trainees of the content and quality of patient care. The "Bundle care, Bundle learning and Bundle checklist" represented the rationale of "Single-loop, Second-loop and Triple loop" of our reflection on the "Template, Understanding, and System" of our curriculum.

Evaluation:

Six self-evaluated EPAs checklists of the six care bundles and semi-structured interviews included inquiries about participants' motivational, emotional, metacognitive, and reflective process were designed to evaluate out trainees. Total nine trainees were inrolled.

Results:

The present findings offered an evidence-driven report of how an online website developed based on triple-loop reflective self-regulated learning model to support clinical learning. Like the initial study aim, our participants experience more drive for learning due to professional identity and learner centered setting, better preconditioning for new learning environment, good self-efficacy to overcome challenging clinical problem, and stress relieving. Besides, they also executed many self-regulated learning skills, such as gaining motivation from increased self-efficacy and learner-centered setting, cognitive strategies such as comparison, internalization, time and resources management, review to achieve global picture, goal setting, organization and determination, and further metacognitive strategies including focused and serious searching, readjust learned knowledge and transferal of learned conclusion into other clinical field. Compatible with the improvement of pre-trained and post-trained self-evaluated EPAs checklist in each bundle, the learners also agreed with improved patient care ability. They also generated multi-level reflection, such as using reflective conclusion and the SRL skills to promote their ability from personally to socially, for example, increasing confidence, knowledge and skills or strengthening social network via sharing learned knowledge and reflection to colleagues.

The pre-and-post self-evaluated EPA sheets of CCU bundles revealed the trainees' care ability promoted one level up from "under the direct supervision" to "indirect supervision" by the teacher in most bundles and showed considerable progression in the most two commonly exposure care bundles: "Acute heart failure" and "Acute coronary syndrome". Besides, EPA sheets indicated that the pure online learning experience failed to replace actual patient care experience by the trainees'

perception. Two resident doctors refused to self-evaluate the EPA of "target temperature management" because they did not encounter patients who received hypothermia therapy during their CCU training course.

Conclusion: This research identified the influence of an online website developed based on triple-loop reflective self-regulated learning model on the trainees in their CCU training course. The learners' reflections of single-loop to conform learners' practice into template, double-loop to reorganize learned metacognitive understanding, and triple-loop to correct initial or build up new learning system, enhance the breadth and depth of learning and promotion from individual to social. The EPA checklist of each bundle care had the function of recalling detail elements, evaluation of the learners' professional development and synchronization of patient care for CCU colleagues.

