How to Maximize Groups and Reduce Costs in Self-regulated Procedural Simulation?

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Context: In self-regulated procedural simulation, learners regulate their time and goals and decide which simulator they want to use. Instructors provide feedback and guidance, but most of the times, do not demonstrate the entire procedure.

Problem: How many and which simulators to buy? For how many participants?

In an environment supporting autonomous practice of multiple procedures, current needs assessment hardly predict learners’ use of simulators. Educators cannot make informed decisions about the optimal ratios of simulators to answer learners’ needs.

Aim:
- Measure participants’ time of use of simulators using a practical and transferable method.
- Use and share this information with other programs to optimize material and human resources.

Methods: In this practical action research, we designed 90-minute self-regulated procedural simulation trainings for internal medicine residents (R1 to R5). Participants self-reported each simulator they used using standardized paper logbooks.

Paper Logbooks used by participants

- Type of simulator used
  - US-guided jugular vein catheterization
  - US-guided femoral vein catheterization
  - US-guided subclavian vein catheterization
  - US-guided thoracocentesis
  - Lumbar puncture
  - US-guided paravertebral
  - All simulators

Time of arrival (h:mm)

Time of departure (h:mm)

Simulators of core procedures in internal medicine

- US-guided jugular vein catheterization
- US-guided femoral vein catheterization
- US-guided subclavian vein catheterization
- US-guided thoracocentesis
- Lumbar puncture
- US-guided paravertebral
- All simulators

Results: Based on the ratios calculated from time of use, the number of simulators was strategically reduced from 22 to 14. The utilization rate of simulators in phase two increased from 35.5 to 76.6 %, while accommodating 12 participants/group instead of 8.5.

Take-home messages:
- By calculating the time of use of simulators in self-regulated practice you can strategically increase group size and/or buy new simulators based on empirical data.
- Expresseed as ratios of simulator/participant, this information can be shared with similar programs to inform purchase decisions.

How to do it at your institution?
- Gather a large number of simulators for few pilots sessions (ask for demos, ask other programs).
- Or, have a very small number of participants for the pilots sessions.
- Then increase the number based on the ratios you measured. Your most popular simulator (highest ratio) will be the limiting point.