

Table 4. Simulator competence assessment studies.

Study	Setting and participants	Simulator	Procedure	Assessment method	Results	LOE
Moorthy (2004)	Single center, 7 novices, 7 intermediates (20-80 procs), 6 experts (>200 procs) performing VR sigmoidoscopy on the AccuTouch Immersion Medical simulator	AccuTouch	Sigmoidoscopy	Dual video assessment by blinded experts using standardized assessment forms and simulator performance parameters	Significant discrimination of skills levels by the global scores. Only "time in red-out" correlated with global scores and not for time, depth of insertion and mucosa visualized	⊕⊕⊕○
Phitayakorn (2009)	23 Experts perform a single colonoscopy task on the GI mentor II	GI Mentor	Colonoscopy	Performance parameters results with their range are demonstrated as an attempt to set a benchmark	Considerable variety in performance on the simulator among experts	⊕○○○
Sarker (2010)	37 Trainees (<100 procs) and 18 consultants (>500 procs) performing both patient-based and simulator-based EGD and sigmoidoscopy, GI Mentor	GI Mentor	EGD and sigmoidoscopy	Assessment of patient-based endoscopy by blinded experts using video recordings, simulator-based assessment only by composed outcome measures of the simulator itself: mucosal score and time score	Construct validity was good for the patient-based assessment (P=0.000-0.002) but not for the simulator based outcome parameters (P=0.263-0.701)	⊕⊕⊕○
Elvevi (2012)	Single center, 12 novices in colonoscopy, GI Mentor	GI Mentor	Colonoscopy	Competency level assessment at the start of training and after 60 patient-based colonoscopies using 2 GI Mentor colonoscopy modules	Only time to cecal intubation improved significantly during simulator assessment. The simulator is considered not useful for competency assessment	⊕⊕○○