Codebook for dataset: Training transfer validity of virtual reality simulator assessment

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**Population.** Demographic population of the sample. 0=pilot, 1=expert, 2=student.

**Group.** Experiment group. Experts assigned to control group. Control group received the HMD VR treatment. Students assigned by matched pairs assignment based on Quiz A score. Pairs assigned to either 3D VR or HMD VR. 1=control, 2= HMD VR, 3=3D VR.

**Age.** Self-reported age in years.

**Sea service.** Self-reported sea service in years as employee in a sea service rotation. Students reporting mandatory military seagoing service reported the amount of time registered with the maritime authority or their self-assessment of how long they served on board a vessel.

**Certificate.** STCW Certificate of Competency (CoC) as Engineer Officer or Certificate of Proficiency (CoP) as Engine Rating. 0=no certificate, 1=Class 1 CoC (Chief engineer officer), 2=Class 2 CoC, 3=Class 3 CoC, 4=Class 4 CoC, 5=Engine Rating CoP.

**Console experience.** Self-report on a 5-point scale of familiarity with gaming consoles. Anchors 1=minimal, 3=used from time to time, 5=used excessively.

**HMD experience.** Self-report on a 5-point scale of familiarity with Head mounted Display virtual reality. Anchors 1=minimal, 3=used from time to time, 5=used excessively.

**Sep familiarity.** Self-report on a 5-point scale of familiarity with separator systems. Anchors 1=Don’t know what it is, 2=familiar with theory, 3=Have seen system in real life, 4=have operated system in real life, 5=substantial real-life experience.

**Quiz A.** Knowledge test with multiple choice 20 questions on separator systems and design. Ranging from very easy to very difficult. Test was given before the initial 2D desktop training commenced.

**Quiz B.** Knowledge test with multiple choice 12 questions on separator systems and design. Ranging from moderate to very difficult. Test was given after 2D desktop training, but before VR assessment (experiment treatment).

**Time delay 1.** Days between 2D desktop training and VR assessment.

**Time delay 2.** Days between VR assessment and Transfer exercise.

**L11-1.** First training attempt with 2D desktop simulator. Automated data collection parameters: Time (s), Achievement (0-35 score), Alarm count (n of times system was in an alarm state), Error (n of errors detected).

**L11-2.** Second training attempt with 2D desktop simulator. Automated data collection parameters: Time (s), Achievement (0-35 score), Alarm count (n of times system was in an alarm state), Error (n of errors detected).

**L11-3.** Third training attempt with 2D desktop simulator. Automated data collection parameters: Time (s), Achievement (0-35 score), Alarm count (n of times system was in an alarm state), Error (n of errors detected).

**L11-4.** Fourth training attempt with 2D desktop simulator. Automated data collection parameters: Time (s), Achievement (0-35 score), Alarm count (n of times system was in an alarm state), Error (n of errors detected).

**L11-5.** Fifth training attempt with 2D desktop simulator. Automated data collection parameters: Time (seconds), Achievement (0-35 score), Alarm count (n of times system was in an alarm state), Error (n of errors detected).

**M11.** VR assessment condition with the same environment in either Head Mounted VR or 3D desktop VR. Automated data collection. Achievement score and Error corrected with observation. Cues, Instruction and Intervention recorded by observation. Technical parameters: Time (seconds), Achievement (0-29 score), Error (n of errors detected or observed). Observational parameters: Cues ( n of times trainee asked for a cue), Instruction (n of times trainee asked for instructions), Intervention (n of times instructor had to intervene unsolicited).

**MMPX.** Transfer exercise with real life separator system. Observational data collection only.

Knowledge (0-26 score), knowledge test by placing name tags on the correct system component.

Time (seconds), gross time for procedure.

Heat time (seconds), heat up time for oil, this would vary case by case independent of performance and must be deducted from gross time to find the net time for performing the procedure.

Achievement (0-30 score). Instructor rating of procedure performance.

Error (n). Instructor rating of errors.

Cues (n). Times trainee asked for cues.

Instruction (n). Times trainee asked for instruction.

Intervention (n). Timed instructor had to intervene unsolicited to avoid damage or harm.

**MSLQ 1.** Motivation scales of the Motivated Strategies for Learning Questionnaire in Norwegian given before the 2D desktop training. None of the sub-scales contains reversed items.

IGO – Intrinsic Goal Orientation: Items 1, 16, 22 & 24.

EGO – Extrinsic Goal Orientation: Items 7, 11, 13 & 30.

TV – Task Value: Items 4, 10, 17, 23, 26 & 27.

CLB – Control of learning beliefs: Items 2, 9, 18 & 25.

SELP – Self-Efficacy for Learning and Performance: Items 5, 6, 12, 15, 20, 21, 29 & 31.

TA – Test Anxiety: Items 3, 8, 14, 19 & 28.

**MSLQ 2.** Motivation scales of the Motivated Strategies for Learning Questionnaire in Norwegian given before the VR assessment. None of the sub-scales contains reversed items.

IGO – Intrinsic Goal Orientation: Items 1, 16, 22 & 24.

EGO – Extrinsic Goal Orientation: Items 7, 11, 13 & 30.

TV – Task Value: Items 4, 10, 17, 23, 26 & 27.

CLB – Control of learning beliefs: Items 2, 9, 18 & 25.

SELP – Self-Efficacy for Learning and Performance: Items 5, 6, 12, 15, 20, 21, 29 & 31.

TA – Test Anxiety: Items 3, 8, 14, 19 & 28.

**MSLQ 3.** Motivation scales of the Motivated Strategies for Learning Questionnaire in Norwegian given before the Transfer exercise. None of the sub-scales contains reversed items.

IGO – Intrinsic Goal Orientation: Items 1, 16, 22 & 24.

EGO – Extrinsic Goal Orientation: Items 7, 11, 13 & 30.

TV – Task Value: Items 4, 10, 17, 23, 26 & 27.

CLB – Control of learning beliefs: Items 2, 9, 18 & 25.

SELP – Self-Efficacy for Learning and Performance: Items 5, 6, 12, 15, 20, 21, 29 & 31.

TA – Test Anxiety: Items 3, 8, 14, 19 & 28.

**IPQ.** Igroup Presence Questionnaire given as the manipulation check after the VR assessment.

General Presence: Item G1.

Spatial Presence: Items SP1, SP2R, SP3, SP4 & SP5.

Involvement: Items INV1, INV2, INV3R & INV4.

Realism: Items REAL1R, REAL2, REAL3 & REAL4

Note 3 items are reversed. To normalize these, compute into new variable with the syntax =(8-X)

Quantifications and computed variables (.sav file only)

**IPQ\_SCALE.** Mean of all IPQ items.

**L11\_1\_Eff through L11\_5\_Eff**

Effectiveness, points obtained per minute. Syntax L11\_X\_Score/(L11\_X\_Time / 60)

**L11\_1\_Acc through L11\_5\_Acc**

Accuracy. Syntax L11\_X\_Score/(L11\_X\_Score+L11\_X\_Error)

**L11\_1\_Ach through L11\_5\_Ach**

Achievement, percentage of full score. Syntax Syntax L11\_X\_Score/35\*100

**M11\_Ach.** Achievement, percentage of full score. Syntax M11\_Score/29\*100

**M11\_Eff.** Effectiveness, points obtained per minute. Syntax M11\_Score/(M11\_Time / 60)

**M11\_Acc.** Accuracy. Syntax M11\_Score/(M11\_Score+ M11\_Error) \* 100

**M11\_Aut.** Autonomy, score divided on interactions. Syntax (M11\_Score / (1+M11\_Cues + M11\_Ins + M11\_Int)) / 29 \* 100

**MMPX\_Ach.** Achievement, percentage of full score. Syntax MMPX\_Score / 30 \* 100

**MMPX\_NTime.** Net time, time duration without external factors. Syntax MMPX\_Time- MMPX\_Heat

**MMPX\_Eff.** Effectiveness, points obtained per minute. Syntax MMPX\_Score / (MMPX\_NTime / 60)

**MMPX\_Acc.** Accuracy. Syntax MMPX\_Score / (MMPX\_Score + MMPX\_Error) \* 100

**MMPX\_Aut**. Autonomy, score divided on interactions. Syntax (MMPX\_Score / (1+MMPX\_Cues + MMPX\_Int + MMPX\_Ins)) / 30 \* 100

**MSLQ1**. Mean of all MSLQ1 items.

**MSLQ2**. Mean of all MSLQ2 items.

**MSLQ3**. Mean of all MSLQ3 items.

**MSLQ scales.** Mean of each scale of all three MSLQ collections.