

SunSet: Scrub Nurse Non-technical Skills Training System

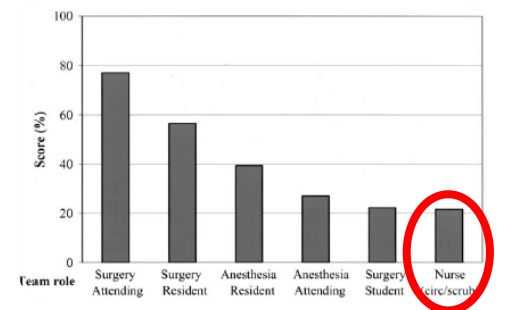
MediCIS LTSI, Inserm/UR1
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CONTEXT & OBJECTIVES

- Develop and assess a new generation of immersive virtual reality based training system for non-technical skills
- Assess Situation Awareness (level 1), a most critical NTS for accurate decision, efficient communication and appropriate leadership [1]

Category	Element
Situation awareness	<ul style="list-style-type: none"> Gathering information Recognising and understanding information Anticipating Acting assertively
Communication and teamwork	<ul style="list-style-type: none"> Exchanging information Coordinating with others
Task management	<ul style="list-style-type: none"> Planning and preparing Providing and maintaining standards Coping with pressure

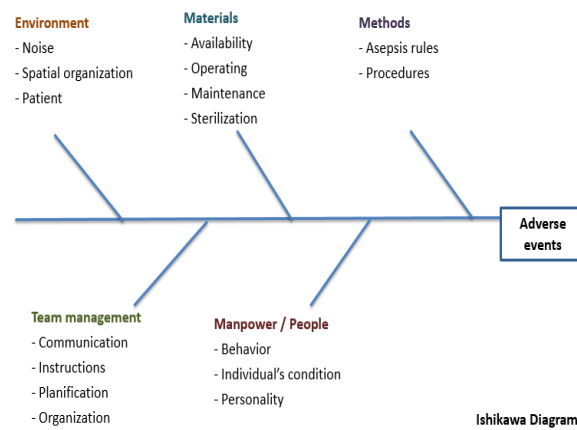
Scrub nurses non technical skills [2]



Situation awareness in the OR [3]

PROGRESS

- Create NTS based training scenarios :
 - Operating room (OR) of errors
- Perform experiments
 - Conduct simulation sessions with scrub nursing students
 - Protocol (2 conditions): low vs high mental load
- Mental load induced by the noise level in the operating room, increased by the time pressure induced by the presence of a timer

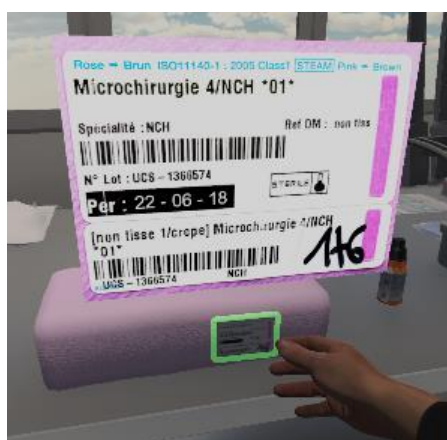


Analysis: typology of errors

Date	Intervalle	Début	Équipement	Spécificité	Préparation	Risq	Nature de l'Év	Début	Typologie de l'Év
	Patient file	Label sheet name of another patient	patient file				Mistaken identity	Error in patient file	Management report
	Images	Name	Images of patient before and after surgery	Patient file			Mistaken identity	Error in patient file	Management report
	Installation	Head facing the wrong way	Left side	Patient			Side error	Surgical positioning	Environment path
		Subal plate incorrectly positioned	On left arm/houlder	Patient			Baring type traffic	Related to the use of electrical devices	Environment path
		Absence of an instrument	Not in inventory/signaling missing				Interruption of continuity of care		Materials available
		Absence of an instrument	Section table missing	Instrumentation table			Interruption of continuity of care		Materials available
		out of date batch of antibiotic	Expiration date prior to day	Circulating nurse's table			Infection risk		
		Outdated ampoule (saline or lactated)	Expiration date prior to day	Circulating nurse's table			Infection risk		
		Expired compression	Expiration date prior to day	Table			Infection risk	Possibility to non sterile medical device	Methods support
		Unidentified intravenous package	Package missing from unit (spoil) and side table (spill)	Circulating nurse's table			Infection risk	Possibility to non sterile medical device	Materials available
		Non-sterile cap	Personal packaging	Instrumentation table			Infection risk	Possibility to non-sterile medical device	Materials available

Scenario: selection of errors

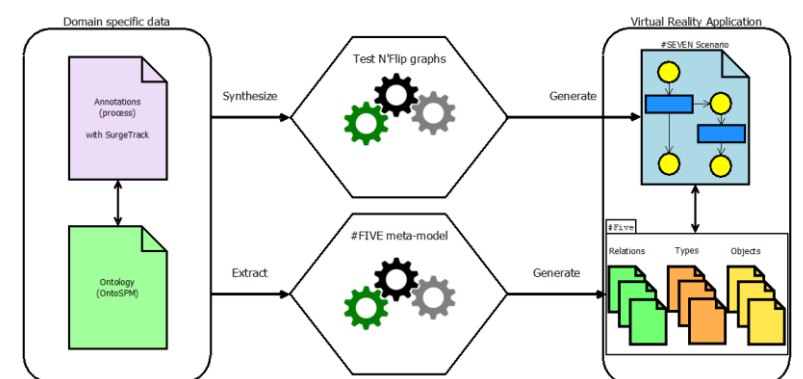
VIRTUAL REALITY APPLICATION



- Controlled dynamic environment (background sound, clock)
- Multi VR platform application (from HMD to large immersive screens)
- Interaction with each object in the environment (assemble, fill, unpack, cut, ...)
- Virtual collaborators can interact with the user or the environment
- Integrated in-application assistance
- Demonstration mode with video recording
- Application based on our own interactions engine #FIVE[4] and scenarios engine #SEVEN[5]

NEXT STEPS

- Develop a second scenario to develop and assess social skills (communication or teamwork)
- Metrics for automatic/semi-automatic performance evaluation
- Based on ontology and process annotations, automatic generation of #SEVEN scenario using Test N'Flip graphs and #FIVE interactions using SPARQL queries and a #FIVE meta-model
- Maintaining link between ontology and annotations in the virtual reality application for logging and reporting.



Synthesize Virtual Reality application from domain specific data

Application: immersive interactions

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