



## MASTER OF SCIENCES IN ENGINEERING

**Collaboration between the Faculty of Engineering of the Universidad Autónoma del Estado de México (UAEM) and the Laboratoire d'Informatique, de Robotique et de Microélectronique de Montpellier (LIRMM) of the Université de Montpellier (UM)**

### **INVESTIGATION: TRAINING AND LEARNING THE LUMBAR PUNCTURE GESTURE USING VIRTUAL REALITY**

Researchers: BME. Monserrat Ríos Hernández (UAEM), Dr. Juan Manuel Jacinto Villegas (UAEM), Dr. Nabil Zemiti (UM), Dra. Adriana H. Vilchis González (UAEM).

### **EXPERT EVALUATION QUESTIONNAIRE**

#### **FIRST PART**

Instructions: The next questions have the objective of obtain information regarding your experience with medical simulators, and with virtual reality, if your answer is affirmative, please be descriptive.

Age: \_\_\_\_ Sex: \_\_\_\_\_

1. Have you ever used simulators (mannequins or computer simulators) for the training of medical procedures? (If not go to question 4)
2. What procedure did you learn with the simulator?
3. Briefly describe the simulator that you used.
4. Have you ever had problems when you performing a lumbar puncture? Describe them
5. Have you observed problems from students or physicians who perform a lumbar puncture?
6. Have you ever had experiences with virtual reality? Describe them



## SECOND PART

Instructions: Read the question in the first column and mark with an X the column that identifies you in greater proportion, there are 7 columns (from 1 to 7), where 1 is "Not at all" and 7 is "A lot", for example in the next question if the X is placed in the column marked with the number 6 it means that the time that passes between the actions I perform and the answer of the simulator are almost imperceptible.

Item	Not at all						At all
	1	2	3	4	5	6	7
When I play the game there is very little waiting time between my actions and the computers response						X	

Item	Not at all						At all
	1	2	3	4	5	6	7
When I play the game there is very little waiting time between my actions and the computers response							
Interacting with the simulator is fast							
The simulator I played usually load quickly							
Playing the simulator challenges me							
Playing the simulator challenges me to perform to the best of my ability							
Playing the simulator provides a good test of my skills							
How would you rate your skill at playing the game, compared to other things you do on the computer?							
When I play the game, the world generated by the game I play is more real for me than the "real world"							
The word "flow" is used to describe a state of mind sometimes experienced by people who are deeply involved in some activity. One example of flow is the case where a professional athlete is playing exceptionally well and achieves a state of mind where nothing else matters but the game; he or she is completely and totally immersed in it. The experience is not exclusive to athletics: Many people report this state of mind when playing games, engaging in hobbies, or working. Activities that lead to flow completely captivate a person for some period of time. When one is in flow, time may seem to stand still, and nothing else seems to matter. Flow may not last for a long time on any particular occasion, but it may come and go over time. Flow has been described as an intrinsically enjoyable experience.							
Do you think you have ever experienced flow in the simulator?							



Item	Not at all						At all
	1	2	3	4	5	6	7
Most of the time I play the simulator I feel that I am in flow							
I give myself pleasure by playing the simulator							
I can say that I particularly like this simulator							
I have a strong interest in this simulator							
Recommend the simulator I played to others							
Consider this game your first choice to train							
I can use this simulator many times							
How PERCEPTIBLE was the information coming from...							
1 Tactile (force o resistance in end-effector)							
2 Vision							
3 Auditory							
How much did your experiences in the virtual environment (LP simulator) seem consistent with your real-world experiences?							
How completely were you able to actively survey or search the virtual environment using vision?							
How consistent were experiences in the virtual environment, i.e., to what extent did you feel as though you were actually moving through lumbar puncture simulator?							
How interesting was your experience in the simulator?							
How much the simulator represents a lumbar puncture?							
Does the simulator realistically teach what it is supposed to teach?							

Instructions: For the next table select the columns which is closer a how do you feel. You have 7 columns, for example, if you chose 4th column in the first item (unhappy/happy), it means that I am not happy or unhappy, I am neutral, but if I select the first column it means that I am unhappy.

I am	1	2	3	4	5	6	7
	Unhappy						Happy
	Annoyed						Pleased
	Unsatisfied						Satisfied
	Melancholic						Contented
	Not deeply engrossed						Deeply engrossed



	Not absorbed intensely in activity						absorbed intensely in activity
I think that	My attention is not focused						My attention is focused
	I concentrate fully						I concentrate fully

### THIRD PART: USABILITY

Instructions: In the next table select one of the next columns for each item.

	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
I think that I would like to use this system frequently.					
I found the system unnecessarily complex.					
I thought the system was easy to use.					
I think that I would need the support of a technical person to be able to use this system.					
I found the various functions in this system were well integrated.					
I thought there was too much inconsistency in this system.					
I would imagine that most people would learn to use this system very quickly.					
I found the system very cumbersome to use.					
I felt very confident using the system.					
I needed to learn a lot of things before I could get going with this system.					

### FOUR PART: EXTRA

1. What improvements would you make to the simulator? \_\_\_\_\_

---



---



---



---

2. Comments: \_\_\_\_\_

---



---



---