



Introduction

The objective of the study is to evaluate behavioral parameters on the outcome of tests after training in a virtual learning environment.

Materials and Methods

In September 2011 76 freshmen started the professional bachelor program for Dental Hygiene at the InHolland School, Amsterdam, 66 (M10, F56) of them participated in the study. From November until January students trained using instruments for tartar removal, followed by a test with two opportunities (DH1 and DH2). From April until May the participants followed a manual dexterity training on the MOOG Simodont Dental Trainer, a haptic dental trainer.

	nov	dec	jan	febr	mar	april	may	jun				
DH												practise
SIM												test

After an introduction the students practised the assigned procedures guided by the automatic assessment of the Simodont without supervision of a teacher. The students had two opportunities to pass the test on the Simodont (SIM1 and SIM2). The parameters time spent, number of attempted exercises and starting date during training and testing were stored in a database.

The relationship between results on dental hygiene (DH) and the simodont test (SIM) was investigated as well.

	DH1 +	DH2 +	DH -			
SIM1 +	5	4			A	n=25 (F24, M1)
SIM2 +	6	10			B	n=37 (F28, M9)
SIM -	5	32	4		C	n=4 (F4)



Results

The results showed a difference between groups A, B and C in total time spent before SIM1 ($F_{2,36}=3.76$, $p=0.0029$). The post hoc analysis revealed that the mean drilling time in group B was significant lower than in group A. Also a significant difference was found between the m/f ratio between group A and B. ($\chi^2=4.56$, $df=1$, $p=0.033$). Females showed better performance than males.

Students who passed the DH2 test, less often passed SIM1 test than students who passed DH1 test. Students who failed the DH2 test also failed the SIM2 test.

The SIM2 group drilled less days then the SIM - group but the drilling time before the second test was higher for SIM2 then SIM -, which means that the SIM2 students drilled longer in less days. This difference can also be seen for the drilling time before the first test.

Conclusion

- The test on the Simodont discriminates between students on their behavior. Students who spent more time training show better results on the test.
- Female students spent more time practising before the first test than male students and performed better on the first test.
- The students who failed for the perio instrumentation test also failed the Simodont test.
- Virtual reality is an ideal research environment as all information on process and results can be stored in a database. Multi center studies can be easily performed using virtual reality trainers.

