

Further information

Experiences

This teaching module has been tested twice and the experiences have been positive on both times. The students were Finnish pre-serve primary teacher students altogether about $N = 85$ on both times, and they studied in five groups (about 18 -20 students in one group).

Students' anxiety for science teaching and learning was asked twice: in a pre test and after the experiment in a post test (Tuominen 2007). Before the experiment the attitudes especially of the female students were quite negative to the science teaching and learning. One of the female students explained in the pre test how *"it is only formulas which nobody is explaining for me, science is frustrating"*. In addition 25% of female students explained before the test that there is nothing easy in science whereas 13% of men experienced science as an easy subject.

In analysing the results of the enquiry the participants were divided into three groups: group 1 ($n=24$, all females who only had studied the compulsory courses in science), group 2 ($n=27$, 9 males and 18 females) and group 3 ($n=28$; 6 males and 28 females). The science anxiety decreased during the experiment statistically significantly ($t = 7.6$; $p = 0.000$, Figure 1).

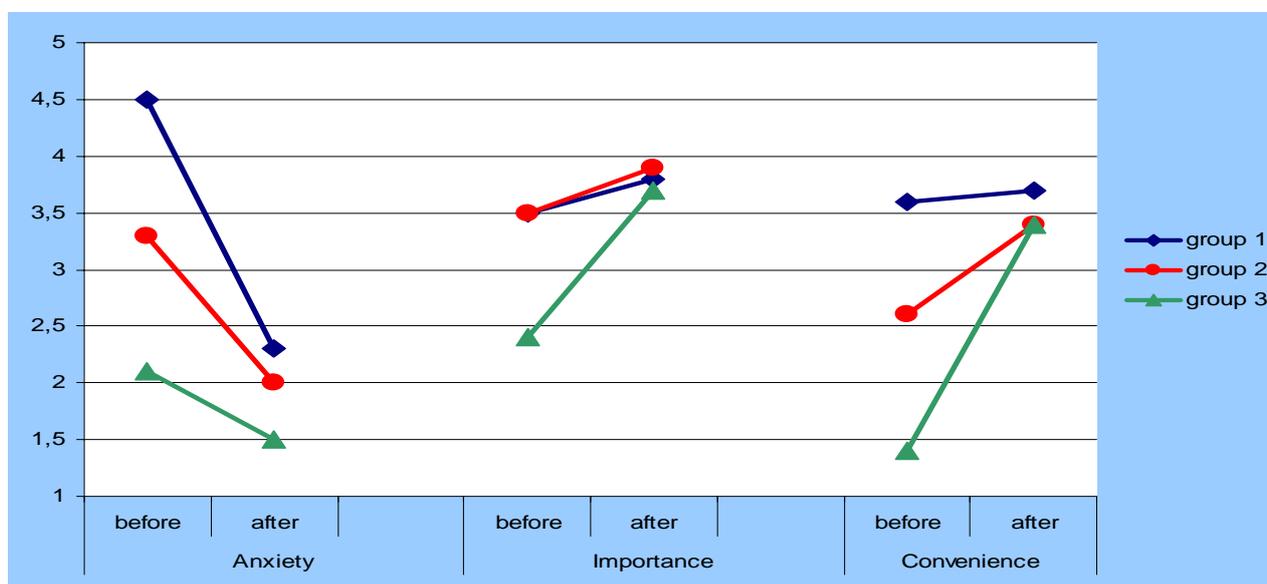


FIGURE: The means of science anxiety, science importance and science convenience before and after the experiment.

Examples of the students' comments after the experiment:

- "Interesting experiment, nice and practical"* (female student, 4)
- "It is really possible to find science meaningful"* (female student, 24)
- "Fun, interesting and concrete experience"* (female student, 46)

The **ScienceMath** Project: **Toy car - acceleration**
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“Science is still not interesting to me, but it was fun to make the experiments (female student 47)

“It is more fun with toys” (female student 64)

“Sometimes just boring repetition” (male student 70)

“Useful, creative, and formal” (male student 84)

“It is really possible to understand it, it is exact, and fun” (female student, 26)

“Learning by doing is fun, and you learn science by experimenting” (female student 10)

“Science is experimenting, counting, just fun “ (female student 16).

In addition for meaningful and fun many of the students explained that science is more useful than they had been thinking. According to the results it seems that using familiar objects, like toys, it is possible to make change for positive in students' conceptions, especially for female students.

Literature

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