

# **Characterizing and Developing Middle School Students' DGOA (Data Gathering, Organization, and Analysis) Skills During Science Labs**

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## **Abstract of master thesis**

This thesis characterizes, in the context of middle school physics education, four aspects of students' scientific inquiry skills – data gathering, organization, and analysis (DGOA) – and their skill at identifying experimental errors. This is an important topic since inquiry skills and the ability deal capably with experimental results play an important role in the development of meaningful science learning. Learning science through inquiry can foster critical thinking in general and the preparation of scientifically-literate citizens.

Ninety-seven 9th grade students and three teachers from two different middle schools participated in a multiple-week intervention during the 2008-09 school year. The data sources were written lab reports, interviews, and classroom observations.

The results indicate that the intervention we developed had a positive impact on the students' DGOA skills, since these significantly improved throughout the intervention.

Regarding data gathering, at the beginning the students seldom repeated measurements and often forgot to use units. Both these aspect improved throughout the intervention, despite the increased complexity of the experiments. Regarding data organization, the students began with no organized and consistent manner of recording their data, but at the end they organized all their data in tables that included headers, units, repeated measurements, and some also included place for averages. Regarding data analysis, the students began the intervention by reaching conclusions that were not necessarily logical outcomes of their results. At the end they reached relevant conclusions and stated them clearly as an association between two variables.