ILIA STATE UNIVERSITY

PROFILES

Professional Reflection Oriented Focus on Inquiry-based Learning and Education through Science

ISU Report #3 on the PROFILES Students Gains Evaluation – Insights into the Analyses of the Levels of Education Differences for the Second (2014) Year Sample

Marika Kapanadze, Ekaterine Slovinsky – Ilia State University, Georgia

Aim and Purpose

Aim and purpose of this ISU (Georgian Team) report on the Students' Gains Evaluation is to present findings about the intervention differences between the lower secondary and upper secondary classes of PROFILES group at ISU in the frame of Work Package 7: "Evaluation of Students Gains". Evaluation means analysing the MoLE questioner data, which is collected during 2014 year.

General Question of Interest regarding this report

The general question regarding this report is: to find out how PROFILES intervention effects on students' motivation to learn science and if are there differences between lower secondary and upper secondary classes students' gains.

Design of the Students Gains Evaluation for the ISU Report #3

In order to answer the general question mentioned above, the working group at ISU chose a (treatment-) pre-post-test design/a treatment control group design. Therefore, data has been collected at the same time by Pre- and Post- questionnaire in the intervention classes and control classes as well.

SEVENTH FRAMEWORK PROGRAMME

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Supporting and coordinating actions on innovative methods in science education: teacher training on inquiry based teaching methods on a large scale in Europe

During the second trail of PROFILES intervention 10 different modules were implemented. Some of them were translated from PROFILES consortium partners and adopted, and some of them were created by the PROFILES teachers and ISU team.

Here is the total list of implemented PROFILES modules:

1. "Stumbling over Biodiversity"	Translated in Georgian and adopted /Science, Biology
2. "Preventing Holes in Teeth"	Translated in Georgian and adopted /Science, Chemistry
3. "Brushing up on Chemistry"	Translated in Georgian and adopted/ Science, Chemistry
4. "Traffic Accident: Who is to blame"	Translated in Georgian and adopted/ Science, Physics
5. "Cola and Diet Cola"	Translated in Georgian and adopted /Science, Physics
6. "Cheese making: which to use – modern technology or nature's way? "	Created by ISU team/ Science, Biology
7. "What material keeps information for a long time?"	Created by ISU team/ Science, Biology
8. "Is all that shines Gold?"	Created by ISU team/ Science, Chemistry
9. "Why jam, comfiture and salted products aren't spoiled for a long time?"	Created by ISU team/ Science, Biology
10. "Who likes Chocolate?"	Created by ISU team/ Science, Chemistry

Specific Question of Interest and Research regarding Report #3

In the context of the pre-post-test the students assess their regular and ideal classes, and after intervention of PROFILES, their PROFILES classes.

1. *How do* lower secondary and upper secondary classes *students (who take part in the PROFILES intervention of the ISU group) retrospectively assess their previous science education?*
2. *How* lower secondary and upper secondary classes *students of the PROFILES interventions of the ISU team perceived and assess the motivational learning environment of the „PROFILES lessons"?*

3. *Which wishes and priorities do* lower secondary and upper secondary classes *students link to their science education?*
4. *Which wish-reality-differences can be identified a) in the pre-test survey and b) in the post-test survey?*

   And last but not least:

5. *Which (statistically significant) changes can be identified in the students' feedback of the pre-post-test / in the treatment and control group surveys a) regarding the possibly different REAL-assessments of the students b) which (statistically significant) changes/differences can be discovered regarding the (calculated) wish-reality-differences (of the pre-test and the post-test analyses) c) which (statistically significant) differences can be discovered regarding the* lower secondary and upper secondary classes *students?*

These 5 research questions outlined in this context are supposed to help structuring the reporting of results achieved in the frame of the ISU Students Gains Evaluation(s).

Total sample of the ISU Treatment Group for the 2014 year

The total treatment sample of ISU evaluation for 2014 year consists of students from 19 different schools.

Table 1.PROFILES modules Sample for the ISU Students' Gains Evaluation Report #2

	No. of Students[1]					
	Lower secondary			Upper Secondary		
	REAL (Pre-Test)	REAL (Pre-Test)	IDEAL	REAL (Post-Test)	IDEAL	REAL (Post-Test)
Treatment Group	336	336	312	142	142	125
Control Group[2]	253	253	252	141	141	152

[1]Deviation regarding the numbers of cases (data set) for pre - and post- trails are caused by attendance the
[2]In addtion, ISU collected data for controll groups from 19 different schools.

Results and Findings of the ISU Treatment 2014 year Sample

a) Lower Secondary Classes Students Gains

Figure 1 provides the mean scores of the MoLE scales – differentiated by the pre- and the post-test treatment group analyses of the students' REAL-assessments and IDEAL-assessments of the ISU sample for lower secondary classes students.

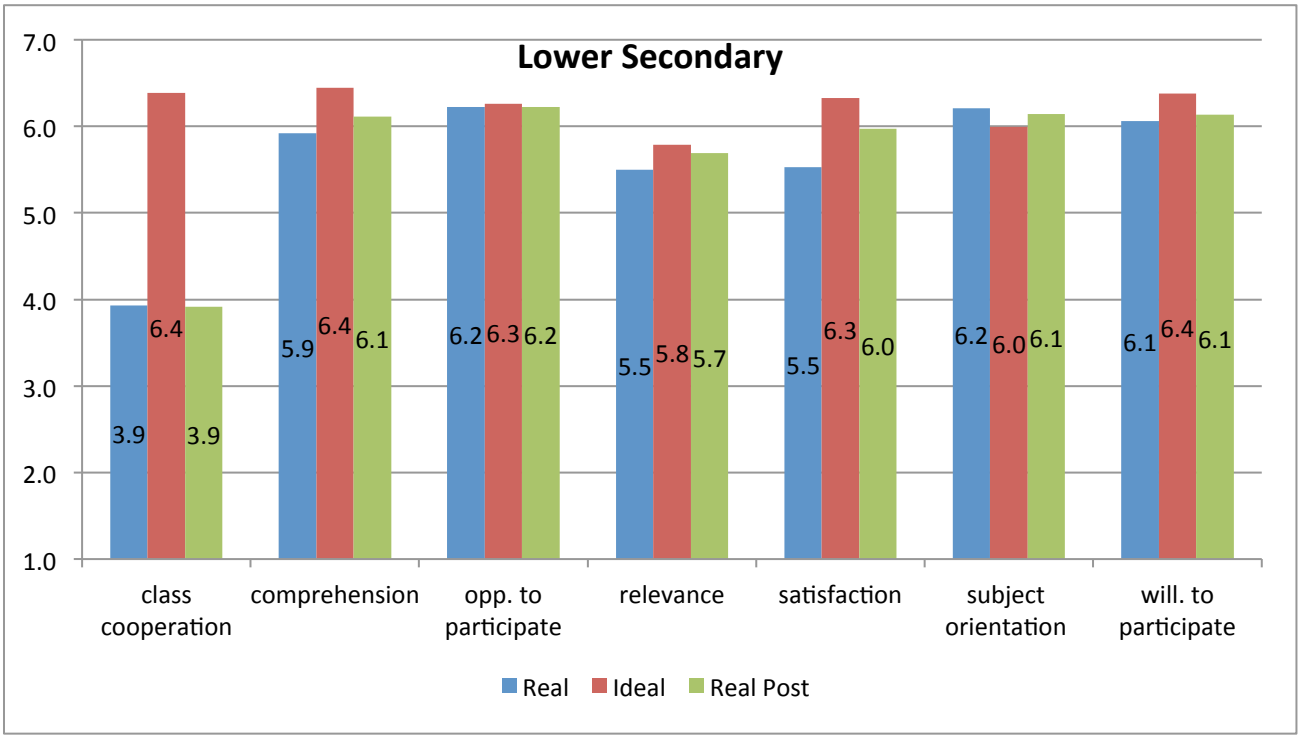


Fig. 1. Mean scores of the seven MoLE scales differentiated by pre- and post-test / treatment group analyses for the lower secondary classes students.

Focusing on the lower secondary classes **students' priorities and wishes regarding science lessons – Analyses of the students' feedback on the MoLE IDEAL-version:**

The students' wishes regarding science expressed in their feedback on the scales of the MoLE questionnaire's IDEAL-version is that the priorities of the students are given to class cooperation, comprehension and willingness to participate (M= 6.4, Range #1). Also they gave high score to opportunity to participate and satisfaction (M=6.3, Range #2). The next priority is given to subject orientation (M= 6.0, Range

#3). The Relevance is less important in the feedbacks of the students (M= 5.8, Range #4).

Focusing on the lower secondary classes students' assessments regarding their regular science lessons (before the PROFILES intervention started /of the control group)-Analyses of the students' feedbackon the MoLE REAL-version in the pre-test/control group:

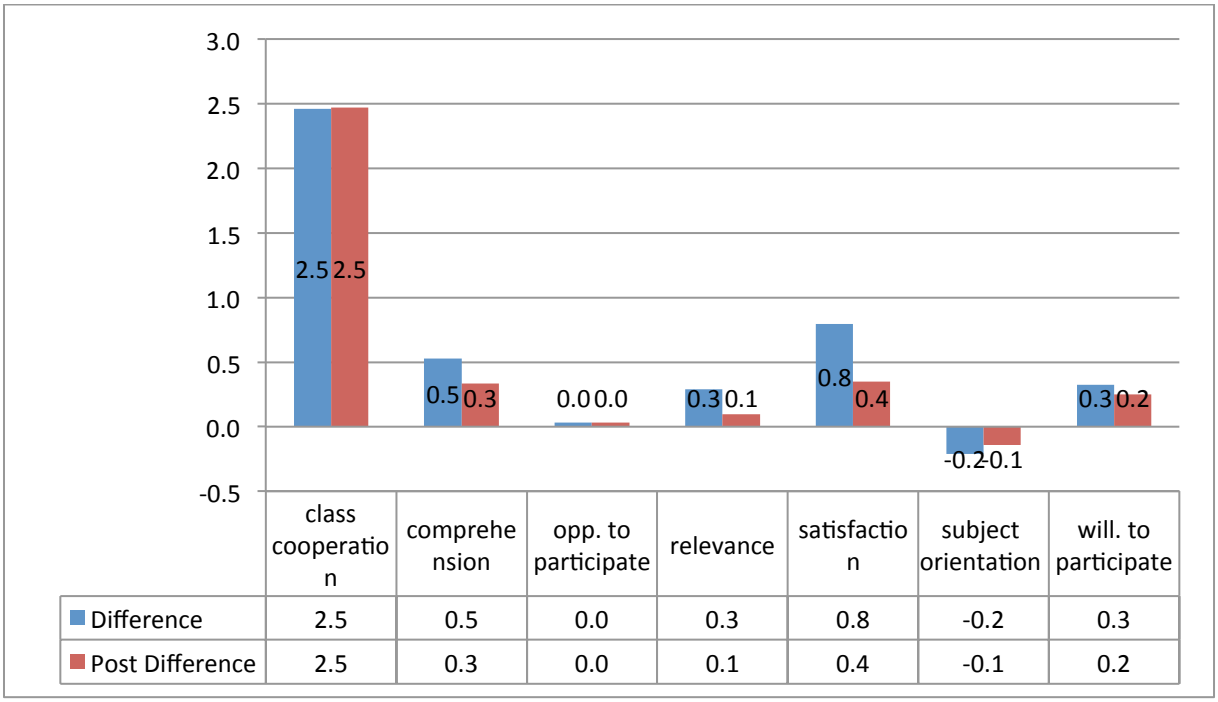
In the pre-test the highest mean score is found regarding the students' assessment of their perception of the opportunities to participate and subject orientation (both M=6.2, range #1). The lowest mean score is found for the class cooperation (M=3.9, Range # 5).

Focusing on the lower secondary classes students' assessments regarding their PROFILES science lessons of the PROFILES intervention - Analyses of the students' feedback on the MoLE REAL-version in the post-test of the treatment group:

In the post-test the students gave the highest range to opportunity to participate (M=6.2, Range #1). The next in the range are thecomprehention, subject orientation and willigness to participate (M=6.1, Range#2). The lowest score is given to class cooperation (M=3.9, Range#5).

Comparing the lower secondary classes students' assessments regarding the PROFILES science lessons before and after the PROFILES intervention – Analyses of the pre- and post-test-data sources:

For the analysing the pre- and post-test findings we compare wish-to-reality differences (Fig. 2). For most of variables we found positive changes, but for some of them there were not observable progress. The significant differences to ideal scores are for class cooperation for both real and real post assessments. There are also differences with ideal scores for comprehension and satisfaction. There are no differences in assessing of the opportunity to participate.



	class cooperation	comprehension	opp. to participate	relevance	satisfaction	subject orientation	will. to participate
Difference	2.5	0.5	0.0	0.3	0.8	-0.2	0.3
Post Difference	2.5	0.3	0.0	0.1	0.4	-0.1	0.2

Fig. 2. Calculated wish-to-reality-differences regarding the seven MoLE scales differentiated by pre- and post-test analyses of the lower secondary classes students' assessments (IDEAL-minus-pre-REAL-assessments and IDEAL-minus-post-treatment-group-REAL-assessments).

a) Upper Secondary Classes Students Gains

Figure 3 provides the mean scores of the MoLE scales – differentiated by the pre- and the post-test treatment group analyses of the students' REAL-assessments and IDEAL-assessments of the ISU sample for upper secondary classes students.

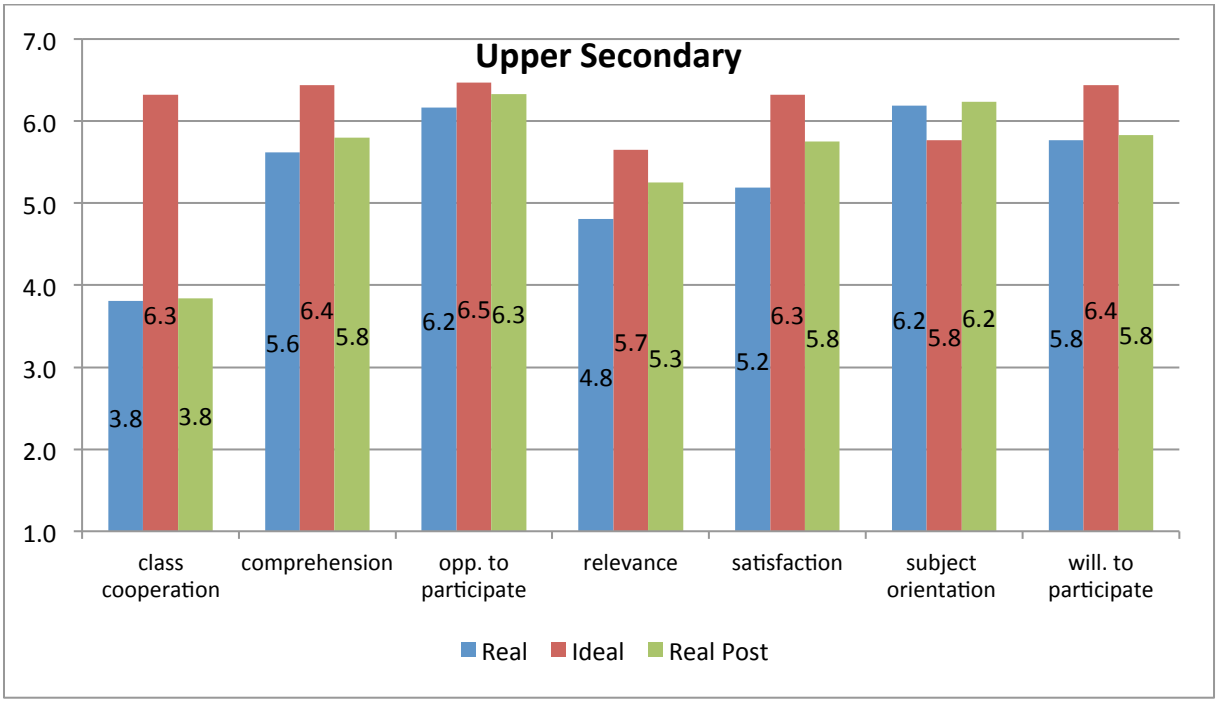


Fig. 3. Mean scores of the seven MoLE scales differentiated by pre- and post-test / treatment group analyses for the upper secondary classes students.

Focusing on the upper secondary classes students' priorities and wishes regarding science lessons – Analyses of the students' feedback on the MoLE IDEAL-version:

The students' wishes regarding science expressed in their feedback on the scales of the MoLE questionnaire's IDEAL-version is that the priorities of the students are given to opportunity to participate (M= 6.5, Range #1), also high range is given to comprehension and willingness to participate (M=6.4, Range #2). Next priority is given to class cooperation and satisfaction (M= 6.3, Range #3). The relevance is less important in the feedbacks of the students (M= 5.7, Range #5).

Focusing on the upper secondary classes students' assessments regarding their regular science lessons (before the PROFILES intervention started/of the control group)-Analyses of the students' feedback on the MoLE REAL-version in the pre-test/control group:

In the pre-test the highest mean score is found regarding the students' assessment of their perception for the subject orientation and opportunities to participate

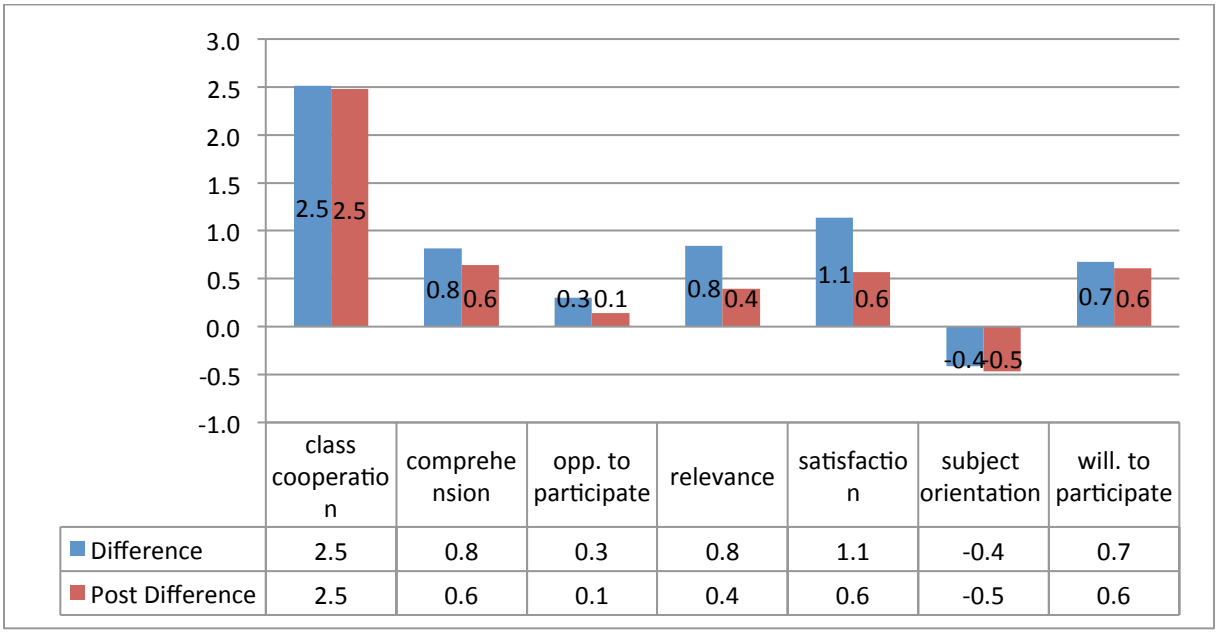
(M=6.2,Range#1). The lowest mean score is found for the class cooperation (M=3.8, Range#6).

Focusing on the upper secondary classes students' assessments regarding their PROFILES science lessons of the PROFILES intervention - Analyses of the students' feedback on the MoLE REAL-version in the post-test of the treatment group:

In the post-test the students gave the highest range to opportunity to participate (M=6.3, Range #1). The next in the range is the subject orientation (M=6.2, Range#2). The lowest score is given to class cooperation (M=3.8, Range#5).

Comparing the upper secondary classes students' assessments regarding the PROFILES science lessons before and after the PROFILES intervention – Analyses of the pre- and post-test-data sources:

For the analysing the pre- and post-test findings we compere wish-to-reality differences (Fig. 4). For most of variables we found positive changes, but for some of them there were not observable progress. The significant differences to ideal scores are for class cooperation for both real and real post assessments. There are also differences with ideal scores for comprehension, relevance, satisfaction and willingness to participate. There is minor difference in assessing of the opportunity to participate.



	class cooperation	comprehension	opp. to participate	relevance	satisfaction	subject orientation	will. to participate
Difference	2.5	0.8	0.3	0.8	1.1	-0.4	0.7
Post Difference	2.5	0.6	0.1	0.4	0.6	-0.5	0.6

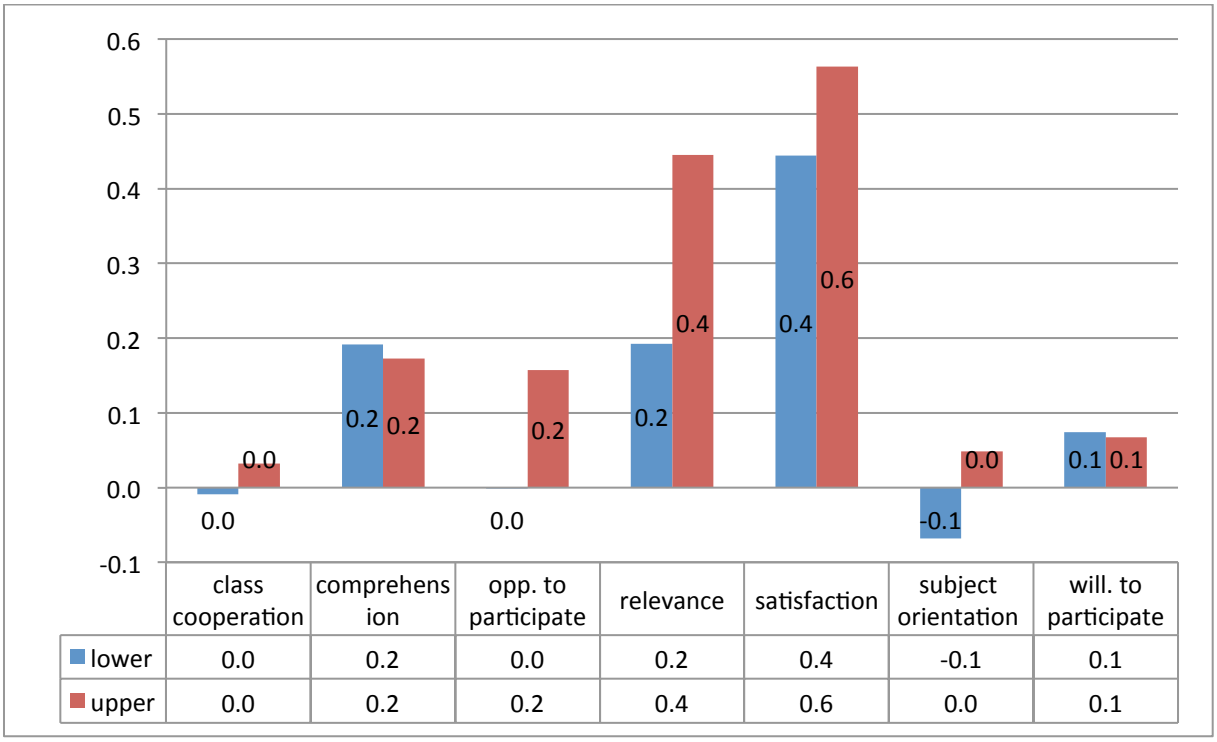
Fig. 4. Calculated wish-to-reality-differences regarding the seven MoLE scales differentiated by pre- and post-test analyses of the students' assessments (IDEAL-minus-pre-REAL-assessments and IDEAL-minus-post-treatment-group-REAL-assessments) for the urban schools.

Comparing the Lower Secondary and Upper Secondary Classes Students wish-to-reality-differences

For the analysing of post-test findings we compare wish-to-reality differences (Fig. 5) for the lower secondary and upper secondary classes. For some of variables we found positive changes, but for some there were not observable progress.

The significant progress is for satisfaction for the lower secondary (D=0.4) and upper secondary (D=0.6) schools' students. But the progress is more significant for the upper secondary schools students than for lower secondary.

For class opportunity to participate relevance and satisfaction are assessed more positive and there is more progress for upper secondary students.



	class cooperation	comprehension	opp. to participate	relevance	satisfaction	subject orientation	will. to participate
lower	0.0	0.2	0.0	0.2	0.4	-0.1	0.1
upper	0.0	0.2	0.2	0.4	0.6	0.0	0.1

Fig. 5.Calculated difference between wish-to-reality-differences regarding the seven MoLE scales (Difference - minus-Difference Post) for the rural and urban schools.

Conclusions regarding the MoLE analyses

We can conclude that there are different leading motivational factors for lower and upper secondary school students during their PROFILES based lessons in Georgia. By means of these students' gains evaluation the PROFILES working group of ISU is able to conclude that PROFILES intervention was not the same for lower and upper secondary school students. It means that PROFILES modules needs to be modified for lower secondary school students for more increasing the students motivation to learn science.