

Table of Contents

1	Introduction	7
2	Requirements for a Reflective Citizen.....	10
3	Inquiry-based Learning	14
3.1	The Abilities to do Inquiry.....	16
3.2	Effectiveness of Inquiry-based Learning	20
3.3	Levels of Inquiry.....	21
3.4	Nature of Science and Nature of Scientific Inquiry	29
4	Diversity.....	33
4.1	Diversity and Migration.....	34
4.2	Diversity and Language	36
4.2.1	Language and Migration.....	36
4.2.2	Language and Science – Scientific Terminology	38
4.3	Diversity and Culture.....	39
5	Inquiry-based Learning and Diversity.....	41
6	Scaffolding.....	45
6.1	Scaffolding of Inquiry-based Learning	45
6.2	Scaffolding of Language	48
6.3	Cultural Considerations concerning Scaffolding	49
7	Conclusion.....	51
8	Research Design	52
8.1	Research Area.....	52
8.2	Research Questions	53
8.3	Methods	53
8.3.1	Methods of Data Collection.....	55
8.3.2	Methods of Analyzing Data.....	60
9	Background Information about the Class	73
9.1	Diversity of the Class	73
9.1.1	Language	73
9.1.2	Educational Background.....	75
9.1.3	Age.....	76
9.2	Characterization of the Class	77
9.3	The Class through the Lens of Questionnaires and Numbers	79
9.3.1	Attitudes towards Science and Subject-related Self-concept	79
9.3.2	Analysis of the CFT-20R Test.....	81

10 Insights into the Laboratory Lessons	83
10.1 Overview of the Tasks	83
10.2 Four Phases.....	85
10.2.1 Phase 1: Introduction.....	86
10.2.2 Phase 2: Further Opening.....	86
10.2.3 Phase 3: Application	87
10.2.4 Phase 4: Asking Questions.....	87
10.2.5 The Stepwise Introduction	88
11 The Scaffolding by the Teacher.....	88
11.1 Scaffolding of Language.....	89
11.1.1 Language Aids in the Task Sheets	90
11.1.2 Language Aids during the Inquiry Process.....	92
11.1.3 Language Aids for Writing a Lab Report	93
11.2 Scaffolding of “Doing Inquiry”	97
11.2.1 Level 0.....	97
11.2.2 Level 1	98
11.2.3 Level 2.....	100
11.3 Scaffolding of “Learning about Inquiry”	102
11.4 Role of Content	103
11.5 Conclusion	108
12 The Questionnaire “Views of Scientific Inquiry”	109
13 Focus on Individual Persons.....	116
13.1 Dana	116
13.2 Lija	119
13.3 Melina	121
13.4 Dimitrij	123
14 Discussion	126
14.1 Successive Implementation of Inquiry-based Learning.....	126
14.2 The Scaffolding	127
14.2.1 Taking the Diversity into Account.....	127
14.2.2 Scaffolding while “Doing Inquiry-based Learning”	129
14.2.3 Difficulties of Scaffolding when “Learning About Inquiry” .	129
14.2.4 Conclusions about the Scaffolding by the Teacher	130
14.3 Students’ Views of Scientific Inquiry	131
14.4 Discussion of the Methods	133
14.4.1 Data Collection	133
14.4.2 Intelligence Test	133
14.4.3 Questionnaire “Views of Scientific Inquiry”	134
14.4.4 PISA Questionnaire	134

14.4.5 Suitable Methods for Diverse Classrooms	135
14.5 Conclusion and Outlook	135
References.....	138
Abstract.....	154
Zusammenfassung.....	155
List of Figures and Tables	156
Appendix.....	159
Appendix 1: Coding Manual – Scaffolding	159
Appendix 2: Coding Manual – “Views of Scientific Inquiry”	167