Guided reflection to support quality of reflection and inquiry in web-based learning

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Introduction

- Reflection is cognitive process performed to learn from experience (Dewey, 1933; Mezirow, 1991; Schön, 1983).
- Inquiry-based learning is a process of discovering new relations, during which a learner formulates hypotheses and tests them by performing experiments or observations (Mäeots, Pedaste, & Sarapuu, 2011).

Introduction

- Technology enhanced learning environments support students' inquiry skills, regulative skills, and reflection (see De Jong et al., 2012; Pedaste & Sarapuu, 2006; Pedaste & Sarapuu, 2012).
- Young Researcher (see http://bio.edu.ee/teadlane)

Research questions

- How guided reflection improves reflection quality and inquiry skills in the learning environment Young Researcher?
- Which relations appear between the development of the students' inquiry skills and reflection quality?

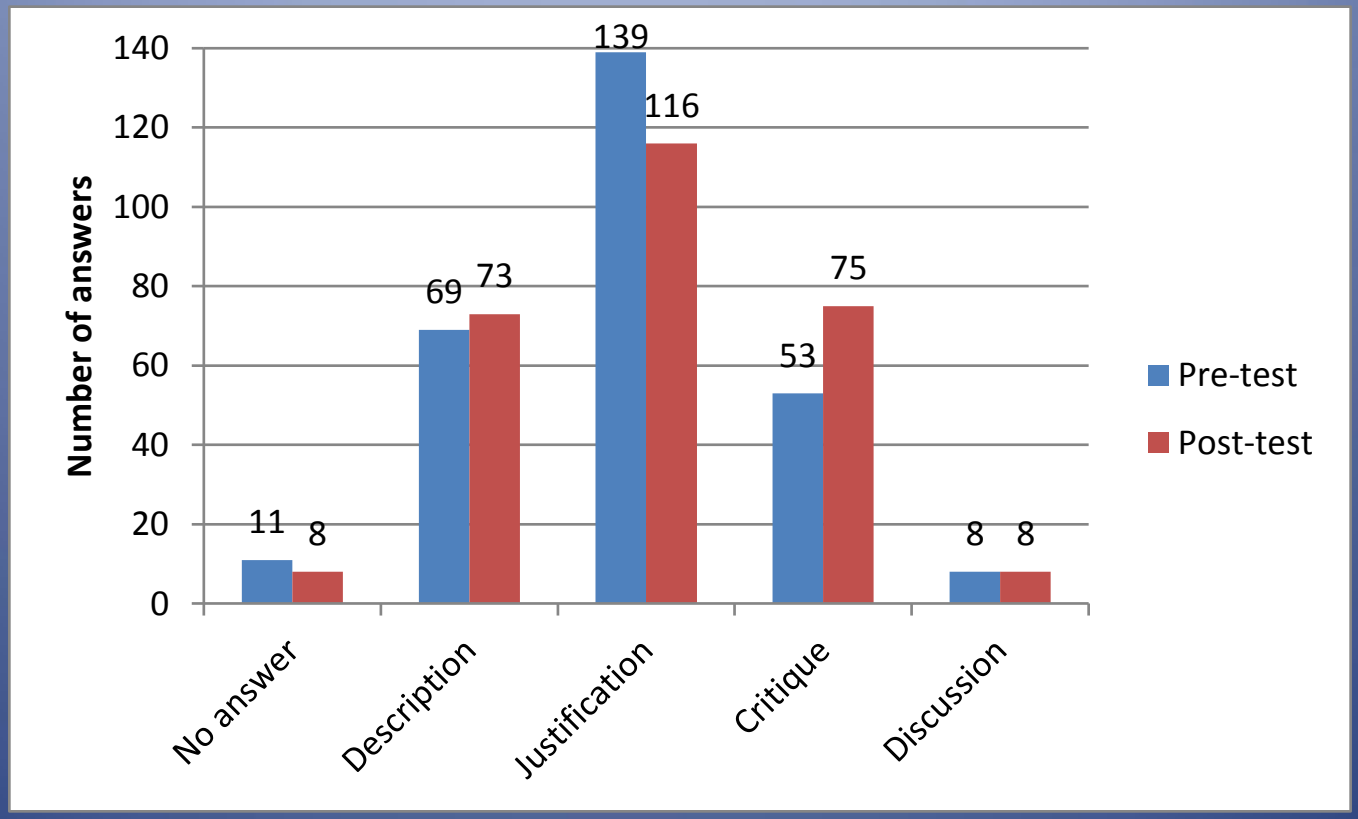
Methodology

- Pre-test: inquiry worksheet and reflection worksheet.
- 1st computer lesson: hypothesis phase.
- 2nd computer lesson: experimentation phase.
- Post-test: inquiry worksheet and reflection worksheet.

Prompts

- Prompt types:
  - Introductory prompt at the beginning of the inquiry task;
  - introductory prompt at the beginning of reflection part;
  - reflection question that guides justification level;
  - reflection question that guides critique level;
  - reflection question that guides discussion level.

Results



- Frequency of reflection levels in students' answers (n=280).

Results

Transformative inquiry skills	Positive Ranks	Negative Ranks	Ties	Z	p
Formulating research question	27	2	6	-4.204	<0.01
Planning experiment	11	2	22	-2.500	<0.05
Formulating inference	14	3	18	-2.584	<0.05

- Change in students' (n=35) inquiry skills in comparison of the pre- and post-tests.

Results

Change in reflection level	Formulating research question			Formulating inference		
	increase	same	decrease	increase	same	decrease
Level increases (75)	60	12	3	27	41	7
Same level (155)	114	34	7	62	79	14
Level decreases (50)	41	4	5	23	20	7

- Associations between development of inquiry skills and reflection (n=280).

Conclusion

- Web-based learning environment Young Researcher is applicable for improving students' inquiry skills.
- Guided reflection through prompts helps students in their reflective activities.
- Associations between the development of reflection levels and development in transformative inquiry skills.

Thank you!

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