The Young People of Today are the Stakeholders of Tomorrow – the Potential of Integrating Youth into Applied River Landscape Research

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INTRODUCTION

A key issue for the implementation of river restoration measures is the information and involvement of the public as required by the Water Framework Directive. An essential prerequisite for a sustainable restoration process is the enhanced knowledge and therefore consciousness for the benefits of ecologically intact river systems. Concerning this, a sustainable way may be to address particularly the young people. The project "FlussAu:WOW!", which is part of an innovative Austrian research programme ("Sparkling Science") aims to improve young peoples' systems understanding by (1) integrating them into applied river landscape research and (2) by using new tools for environmental education.

METHODS

51 high school students (aged between 14 and 18) are actively involved into field mapping and the assessment of different ecological indicators of riverine landscapes in the first stage of the project.

Fig. 1.: mapping morphological structures

Together with the students the research group develops, investigates and maps spatial, abiotic and biotic indicators (Fig. 1) for identifying and assessing crucial functions and processes of riverine landscapes characterized by different human uses.

The first year of the project was characterised by a modular structure (Fig. 2): first of all the students' knowledge was tested. Then the research team developed lesson plans for the further modules taking into account the students' lack of knowledge about riverine ecology, indicators and assessment methods. Together with the students potential biotic and abiotic indicators were identified and field protocols were developed to map these indicators. Within the last module the results of the fieldwork were analysed. To capture the progress of knowledge and system understanding further tests were conducted prior to the fieldwork and after the data analysis module.

Date	Module	Key issues & activities
Dec. 2012	1	Kick-off, **PRE-TEST**
Jan. 2013	2	riverine **ecology**: elements, functions and processes of riverine landscapes
		anthropogenic influences on riverine landscapes
		ecological and spatial indicators and their requirements
Feb. 2013	3	**assessment methods** of riverine landcapes
		selected **biotic and abiotic indicators**
		fieldwork preparation: selection of study area and indicators
		1st **MID-TEST**
Jun. 2013	4	**FIELDWORK**
	5	**ANALYSIS**
		2nd **MID-TEST**

Fig. 2.: Modules and key issues of the projects' first year

FIRST RESULTS

Students had to answer the same questions before and after the workshop activities. The tests were divided into four sections. The section „system understanding of riverine landscapes" covered 5 questions to max. 4 points each. There was a significant increase of correct answers from pre-test to first mid-test. The Boxplots show a significant increase of points (N=47, Wilcoxon, α=0.05, $p<0.001$; Fig. 3). Questions regarding functions, processes and elements of riverine landcapes were answered more extensively. Answers showed an increase of complexity and understanding of cause and effect relationships.

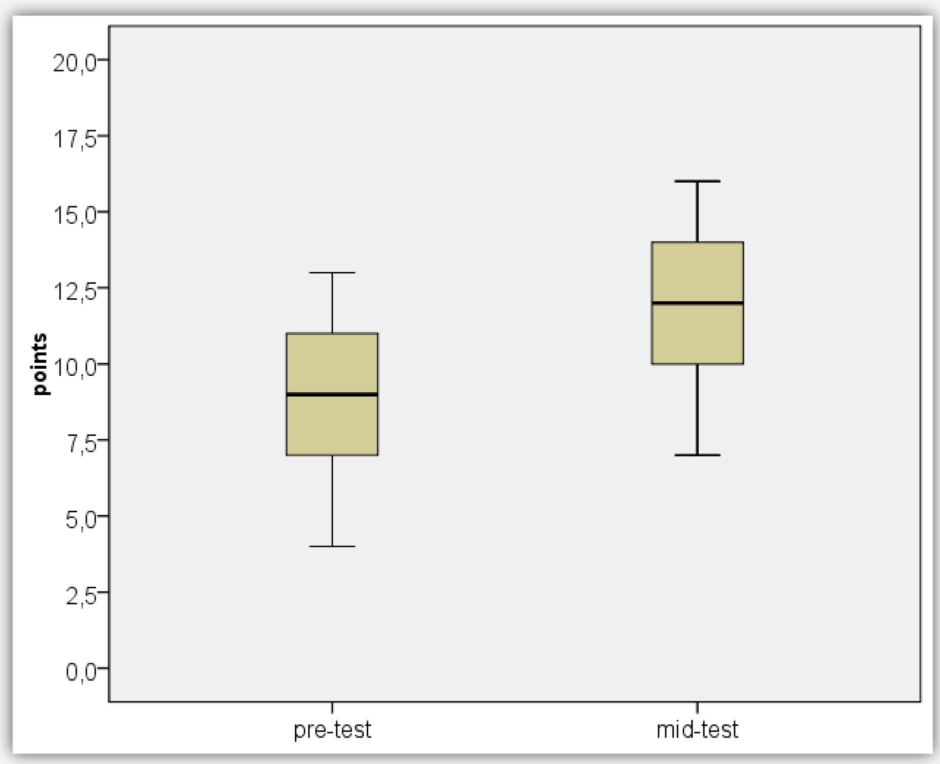

Fig. 3.: Pre- and 1st mid-test results show a significant increase of the students' system understanding.

CONCLUSION

Preliminary results of pre- and first mid-test are confirming our hypothesis that integrating young people into research processes supports the students' system thinking and environmental consciousness by indicating an increase of complexity in their environmental knowledge (e.g. of interrelationships between river functions and human uses) and of their interest in in environmental issues. This – in turn – gives perspective for an enhanced commitment of the young for future restoration projects.

FURTHER STEPS

During the second year of the project a specific learning software (www.dynalearn.eu) will be integrated into the work with the students aiming at a further increase of system thinking and conceptual knowledge. DynaLearn allows for integrating important generic ideas of ecosystem structure and functioning (system dynamics, hierarchy, non-linear dynamics, …) with specific knowledge across different scientific disciplines (Zitek et al., 2011).

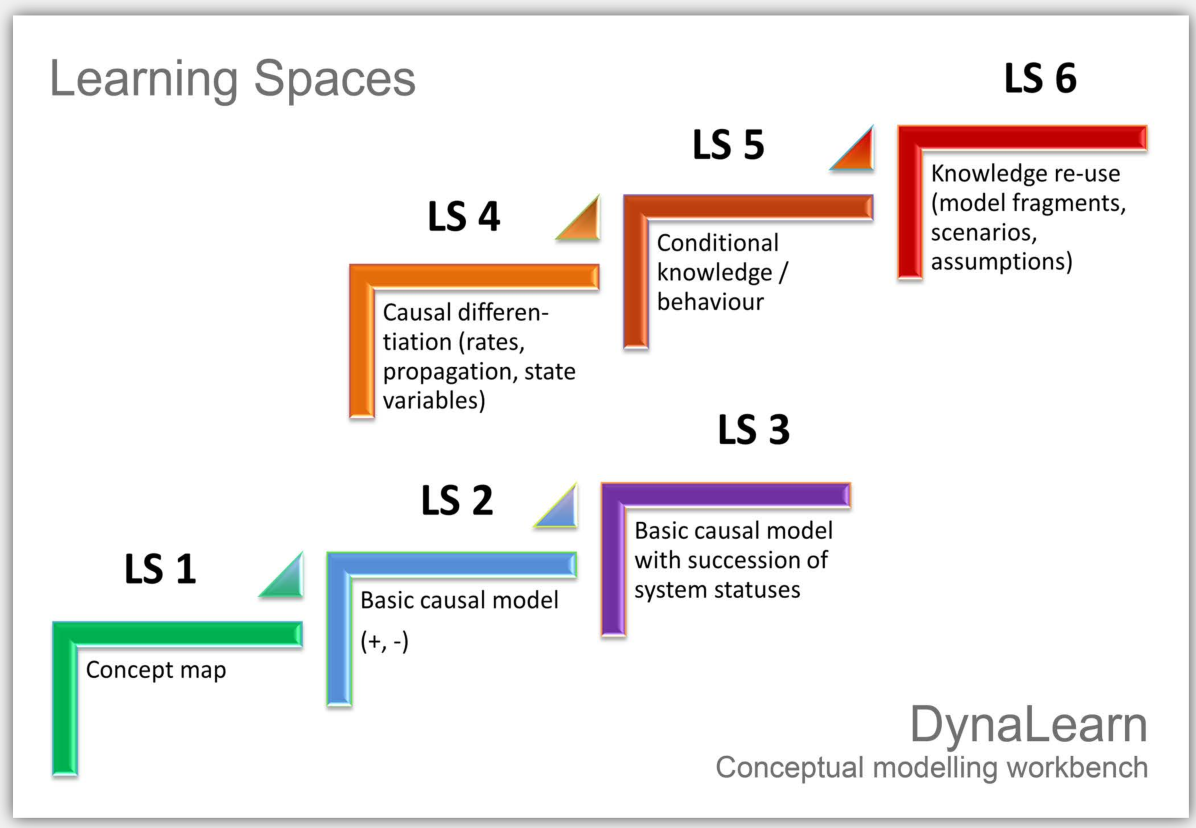

Fig. 4: The six Learning Spaces (LSs) of DynaLearn

The software is organized in six Learning Spaces (LSs, Fig. 2) with increasing complexity. These LSs allow students to explore environmental topics at different levels of complexity taking an interdisciplinary viewpoint, depending on educational goals and settings (Bredeweg et al., 2009).

References:
Bredeweg, B. et al. (2009). *DynaLearn - Engaging and Informed Tools for Learning Conceptual System Knowledge.* Cognitive and Metacognitive Educational Systems (MCES2009).
Zitek, A. et al. (2011). *Educating River Managers of the Future by Teaching Conceptual Systems Understanding*. World's Large Rivers, Vienna 2011