European Network for Environmental Citizenship
Cost Action CA16229

Evaluating an Educational Intervention Designed to Foster Environmental Citizenship among Undergraduate University Students

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Outline of the presentation

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5. Impact of the Intervention on Students' EC
6. Correlations between Students EC and Background Variables. Focus on Nature Experiences in Childhood and Youth
7. Conclusions and Discussion

<u>Presentation is based on:</u>

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1. Environmental Citizenship (EC) in Higher Education.
Factors Associated with EC

- **EEC theoretically related to** the concepts of environmental education, science education, citizenship education, and especially education for sustainability.

- Putting forwards the ENEC definition of the EC.

- integration in academic curricula, incorporating courses/content on SD/sustainability in the academic programs of different departments/professions in HE has been more highly addressed, while **looking into pedagogical approaches in HE has received less attention**

FURTHER NEED TO FOCUS ON: **the ways** that EEC could be effectively implemented

- **University students** comprise a crucial target audience for EEC.

- Responsibilities of **higher education institutions**?

- **Interventions** designed within higher education settings are acknowledged as significant facilitators of needed EC transformation. Often studied:

  - university campus infrastructure development interventions

  - organizational culture change interventions

  - communication campaigns

  - curriculum integration

  - experimenting with pedagogical approaches

We followed the research stream focusing on the curricula and educational approaches for developing SD competences

- explores the impact of a unique undergraduate sustainable development (SD) course on the **undergraduate students**' EC attributes

- is the first attempt to use the recently validated holistic EC measurement instrument, the **Environmental Citizenship Questionnaire (ECQ)** (Hadjichambis, Paraskeva-Hadjichambi, 2020), in the context of higher education students.

- in view of the novelty of this tool, we also conducted various analyses in the aim of exploring the validity of this instrument in the context of higher education students

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Factors influence individuals' engagement (or lack of) in pro-environmental actions and behaviors:

- demographic factors (e.g., gender)

- internal factors (e.g., cognitive, such as environmental knowledge, affective, such as values and attitudes, etc.)

- external factors (such as the existence of supportive infrastructure, economic factors, and sociocultural factors)

ADDITIONALLY:

- experiences in nature during childhood and youth

2. Case description: EC in the Curriculum at Kaunas University of Technology

- Starting with the 2019–2020 academic year, all first-year university students are entitled to freely choose a 6 ECTS general elective course of either "Sustainable Development" or "Media Philosophy".

- The students enrolled in either of the courses in the Fall semester of 2020 constitute the population of this current research.
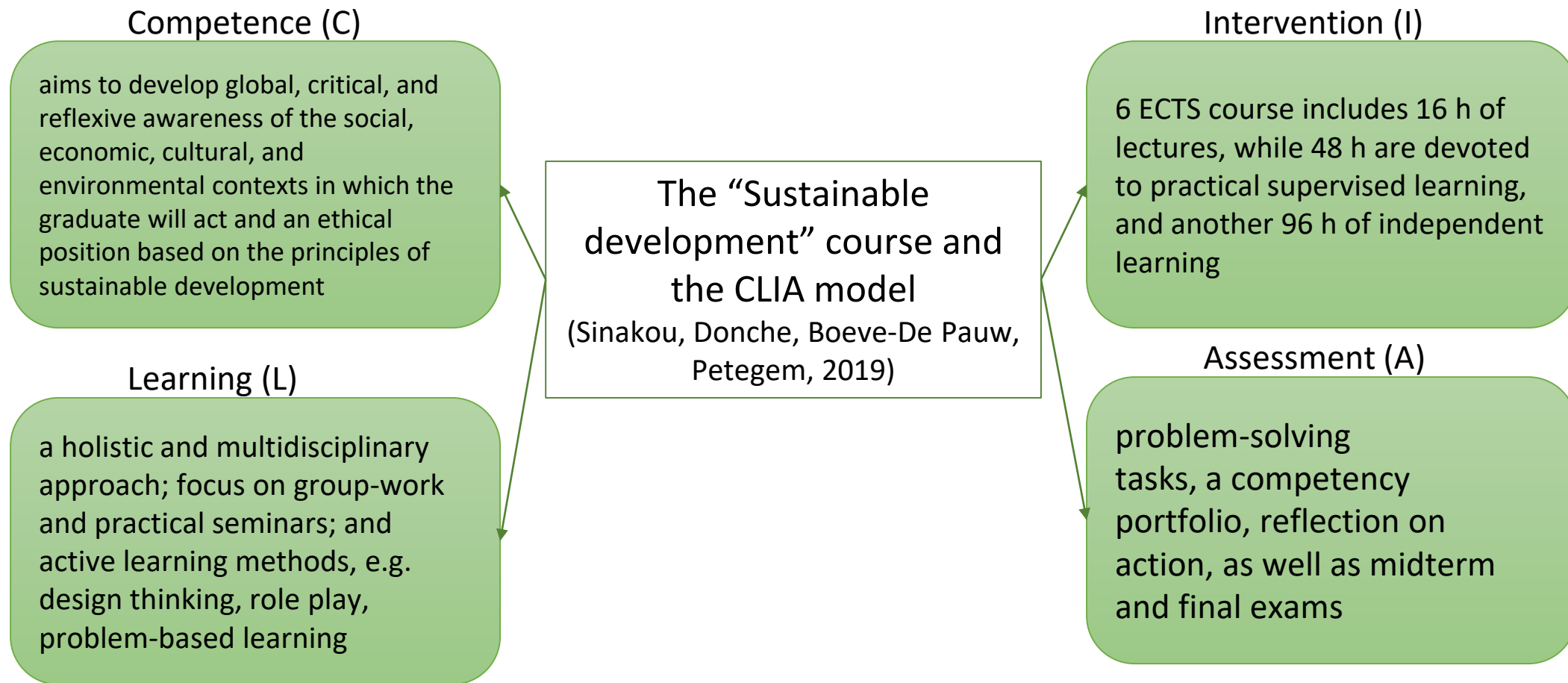
T-shape model of education for SD at KTU

HORIZONTAL: overarching topics and systemic thinking in general electives

VERTICAL: integration of SD topics into courses of the field (e.g. chemistry, physics, mechatronics, sociology, etc.

Case study from KTU

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Competence (C)

aims to develop global, critical, and reflexive awareness of the social, economic, cultural, and environmental contexts in which the graduate will act and an ethical position based on the principles of sustainable development

Learning (L)

a holistic and multidisciplinary approach; focus on group-work and practical seminars; and active learning methods, e.g. design thinking, role play, problem-based learning

The "Sustainable development" course and the CLIA model
(Sinakou, Donche, Boeve-De Pauw, Petegem, 2019)

Intervention (I)

6 ECTS course includes 16 h of lectures, while 48 h are devoted to practical supervised learning, and another 96 h of independent learning

Assessment (A)

problem-solving tasks, a competency portfolio, reflection on action, as well as midterm and final exams

! *quasi-experiment was conducted under COVID-19 pandemic conditions that included internal and cross-border movement restrictions and fully online learning*

3. Research Questions, Hypotheses and Methodology of the Empirical Study

RQ1. Is the ECQ a reliable and valid instrument for measuring HE students' EC?

RQ2. What are the EC characteristics of first year undergraduate students in a large technical Lithuanian university?

RQ3. How do the EC characteristics correlate with background variables such as gender and nature experience?

RQ4. What is the impact of students' participation in a general elective course 'Sustainable development' on their environmental citizenship?

OVERALL HYPOTHESIS: the general elective course focusing explicitly on sustainable development will foster increased EC in participating students.
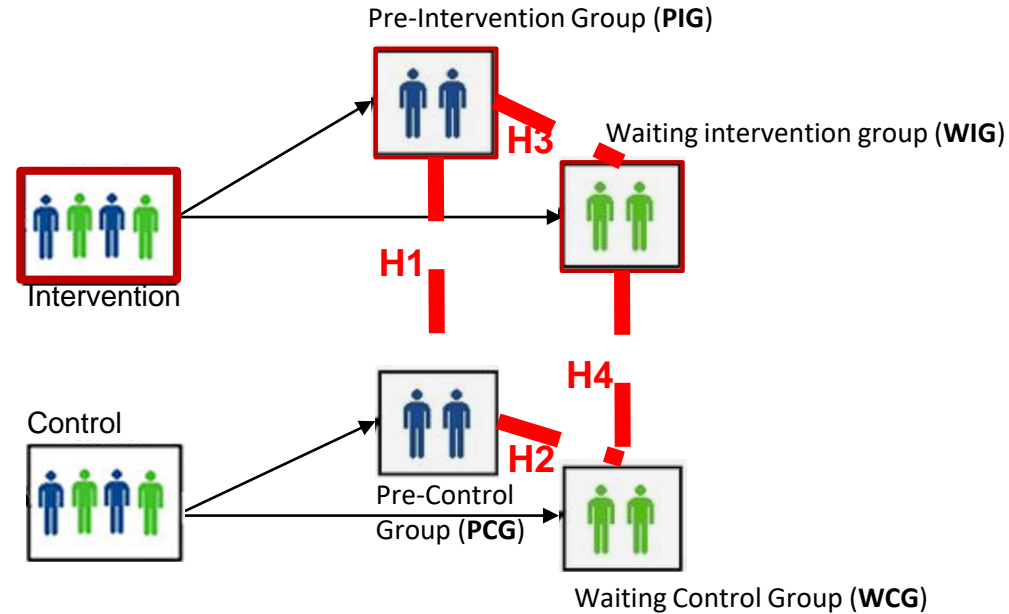
Research design
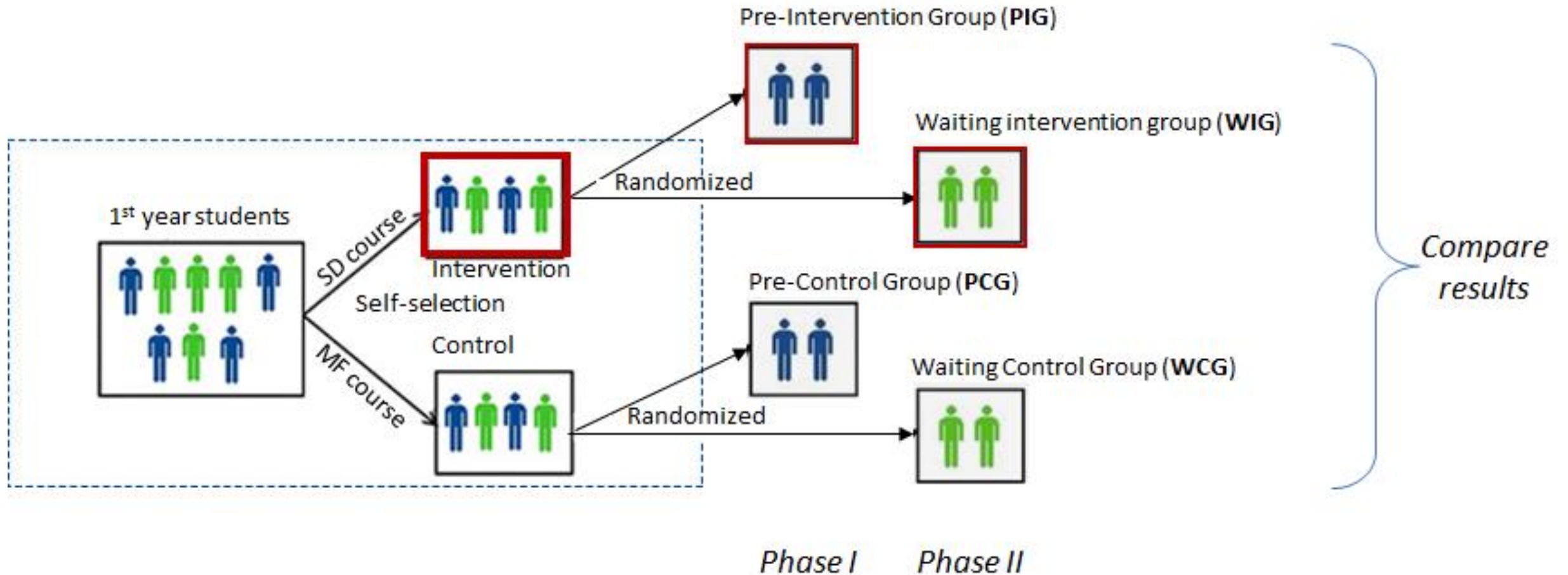
- a randomized quasi-experimental pre-group–post-group design explored the target group students' EC attributes before and after the educational intervention, in comparison to control group students.

Hypotheses

Hypothesis 1 (H1). *Students that were assigned to either one of the two groups that took part in the survey before the courses took place (PIG, PCG) show similar levels of EC.*

Hypothesis 2 (H2). *Students that were assigned to either one the two groups connected to the control group (PCG, WCG) show similar levels of EC.*

Hypothesis 3 (H3). *Students that were assigned to the group that took part in the survey after the intervention course took place (WIG) report higher levels of EC than the students assigned to the pre-intervention group (PIG).*

Hypothesis 4 (H4). *Students that were assigned to the group that took part in the survey after the intervention course took place (WIG) report higher levels of EC than the students assigned to the waiting control group (WCG).*

Research design

- survey data (CAWI); November 2020 AND January 2021

- intervention population N1 = 205; control group N2 = 268; response rate ~50%

- research groups did not differ in terms of disciplinary major

- age and gender distribution:

Categories	Frequency	Percentage (%)
Gender (Valid N = 140)		
Female	71	50.7
Male	65	46.4
I'd rather not say	4	2.9
Age (Valid N = 137)		
17–18 years	20	14.6
19–20 years	104	75.9
21–22 years	7	5.1
23–25 years	4	2.9
26–50 years	2	1.5

Instrumentation (variables)

- Background data: age, gender, study field, socioeconomic class, employment, etc.

- Subjectively reported university-based and external influences

- Attitudes towards instruction and learning methods

- General environmental attitudes (Hansmann and Binder, 2020)

- Experience with nature (Hansmann and Binder, 2020)

! **Environmental Citizenship:**
Hadjichambis & Paraskeva-Hadjichambi (2020) ⟶
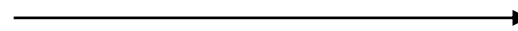
EC-Variable	No. of Items
Past and present EC actions	6
EC knowledge	11
EC conceptions	12
EC skills	6
EC attitudes	8
EC values	15
Future actions inside university	4
Future actions outside university	11
Agents of change	3

the ECQ

EC- variable	No. of items	Exemplar item
Past and present EC actions	6	Have you ever been involved in activities of an environmental organization outside school or university? (INV*)
EC knowledge	11	Before entering university, to what extent have you learned what are the environmental rights and duties of a citizens?
EC conceptions	12	In your opinion, how important is participating in activities to benefit the environment for being a good citizen?
EC skills	6	How well do you think you would do, now as a student, in arguing your point of view about a controversial environmental issue?
EC attitudes	8	To what extent do you agree that companies in rich countries should give employees in poor nations the same conditions as in rich countries
EC values	15	How important for you personally is it that every person has equal opportunities?
Future actions inside university	4	If you were given the chance, how likely is it that you would take part in environmental discussion in a student assembly, if offered at your university?
Future actions outside university	11	As a citizen would you take stage a protest by blocking traffic?
Agents of change	3	How likely is it that you would actively participate in decision-making and also engage in action-taking?

4. Psychometric Quality of the EC Questionnaire and Descriptives of Students' EC

Psychometric Quality of the ECQ

Construct	items	α (us)	α (H&P)	n	M	SD
Environmental citizenship	76	.929	.944	206	2,45	0,57
Past actions (INV)	6	.832	.702	206	1,45	0,67
Knowledge for EC	11	.916	.893	183	2,52	0,60
Conceptions for EC	12	.836	.893	167	3,07	0,42
Skills for EC	6	.852	.755	160	2,45	0,62
Attitudes for EC	8	.856	.733	151	3,39	0,45
Values for EC	15	.834	.734	145	3,1	0,42
Future actions in school	4	.864	.779	144	2,17	0,66
Future actions outside school	11	.863	.839	141	2,18	0,52
Agents of change	3	.866	.747	141	2,82	0,66

Cronbach's alpha values ranged from 0.836 to 0.929 across the different scales, indicating **excellent reliability** of the scales, in line with scale reliability reported by Hadjichambis & Paraskeva-Hadjichambi (2020)

Students responded on a 4-point Likert scale. A value of 2.5 is the tipping point between a negative and positive response.

- overall mean for EC indicates
  a **slightly below moderate level of environmental citizenship**

- a complex picture concerning the different dimensions of EC:
  - ➤ reported **limited involvement in actions** associated with EC in the past
  - ➤ **limited intention to be involved** in the future in environment-supportive actions
  - ➤ **moderate knowledge** of topics relevant for EC
  - ➤ feel that they **would do less than 'fairly well' in various skills** associated with EC

  - ➤ **perceive EC-related behaviors to be important**,
  - ➤ demonstrate **pro-environmental attitudes**/positive attitudes concerning social-environmental aspects related to EC,
  - ➤ **positively identify with social-environmental values** associated with EC

The correlations of EC scale with general environmental attitudes (Hansmann & Binder, 2020) were analyzed to investigate the **convergent validity** of the EC.

The average value of the participants on the General Environmental Attitude scale was M = 3.0 (SD = 0.48) on the four-point scale.

A moderate but significant correlation (r = 0.35, p< 0.001) between General Environmental Attitudes and EC was found, which indicates the relationship between both concepts.

=> Evidence for the validity and reliability of the ECQ to measure environmental citizenship in this novel target group.

5. Impact of the Intervention on Students' EC

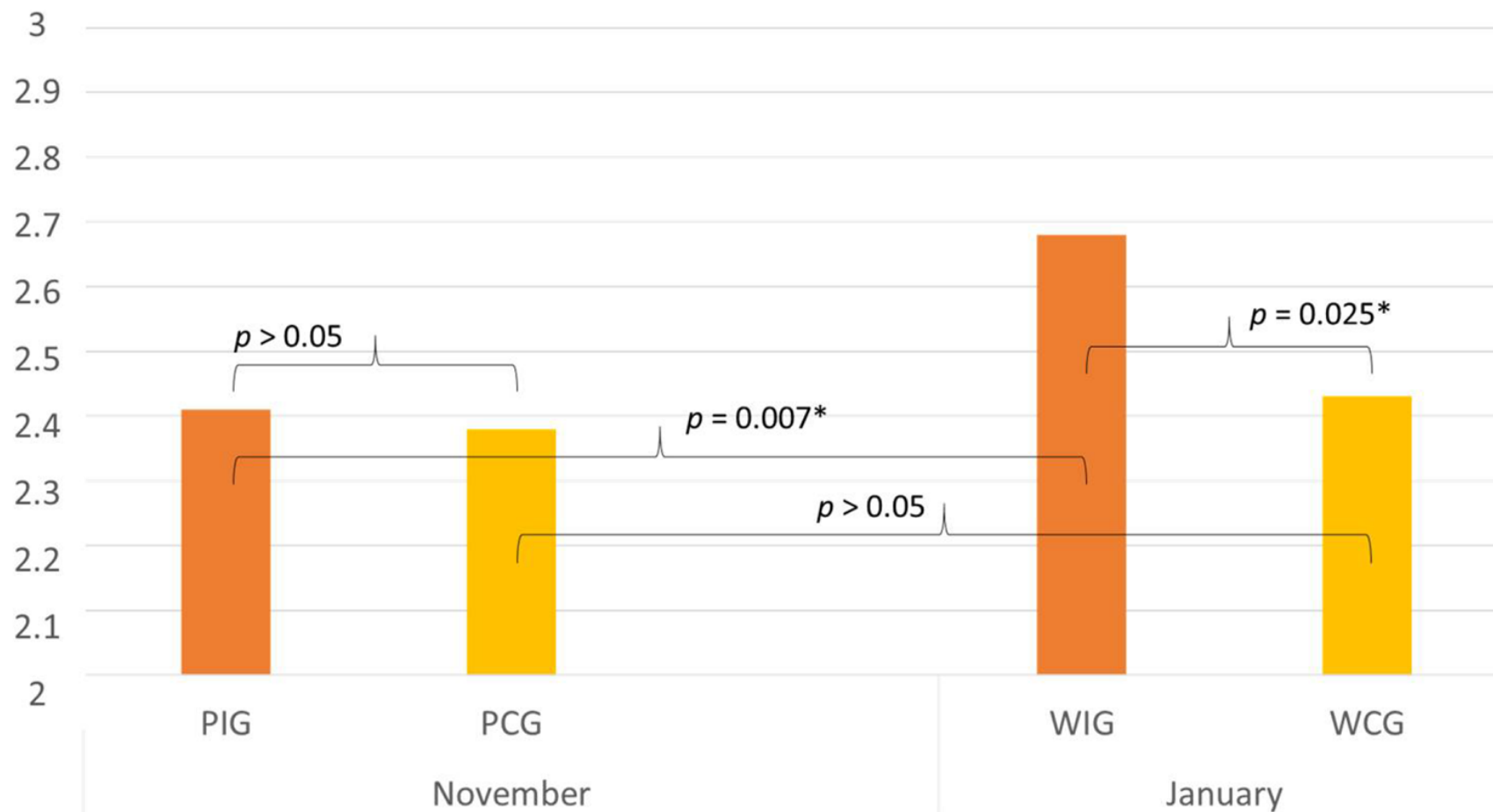# Impact of the Intervention on Students' EC

Figure 1. Mean values of EC for the four groups and significance of mean differences.

ANOVA analyses showed no main effects suggesting that the intervention had no effect on the different scales.

However, when the four groups were compared based on the overall construct of EC, the results indicate **meaningful and significant** differences, with the main effect estimates of $F = 3.508$ (df = 3) and p = 0.016.

Cohen's d=0.52 for both effects

Hypothesis 1 (H1). *Students that were assigned to either one of the two groups that took part in the survey before the courses took place (PIG, PCG) show similar levels of EC.*

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Limitations

- The influence of the intended educational intervention is
  well isolated in terms of the university-based educational influences:
  - 'control course' did not have influence,
  - and there were no other university-related activities due to COVID-19 lockdown

- But only partially isolated from external influences. The context of the global COVID-19 pandemic, and the overlapping discourses of the climate crisis and environmental degradation, might have introduced biases.

- Long distance online learning did not enable us to fully and optimally implement the various instructional methodologies on which the intervention course is based.

- A relatively high average percentage of missingness (we imputed missing values with average values)

6. Correlations between Students EC and Background Variables.
Focus on Gender and Nature Experiences in Childhood and Youth

Gender differences

- The average <u>value of EC</u> among females was higher than among males (difference was statistically significant, p = 0.002).
- Females also showed significantly (p = 0.007) stronger positive <u>environmental attitude</u>.

*stronger pro-environmental orientations and social and behavioral competencies of **females** regarding the ECQ scale*

Differences according to nature experiences in childhood and youth

CHILDHOOD

1. Growing up as a child in a <u>rural versus urban</u> surroundings was not related to environmental citizenship nor was it related to environmental attitudes (EA).
2. The <u>frequency of nature experiences</u> during childhood was likewise not significantly related to EC.
3. The <u>positivity of nature experiences during childhood</u> was significantly positively related to both EC and EA.
4. The <u>connection of nature in childhood</u> was positively correlated with EC and with EA.
5. The <u>interest in nature as a child</u> was slightly more strongly correlated with EC than with EA.

YOUTH

1. Growing up as youth in a <u>rural versus urban</u> surroundings was not related to EC nor was it related to EA.

1. The <u>frequency of nature experiences in</u> youth was significantly positively related to both EC and EA.
2. The <u>positivity of nature experiences during youth</u> was significantly positively related to both EC and EA.
3. The <u>connection of nature in youth</u> was positively correlated with EC and with EA.
4. The <u>interest in nature during youth</u> was also positively related with EC and with EA.

7. Conclusions and discussion

Validity and Reliability of the ECQ

- We adapted the ECQ developed by Hadjichambis and Paraskeva-Hadjichambi (2020), previously tested on Cypriot students in secondary education.
- We introduced three innovations in the application of the ECQ:
  - (1) we used it in another cultural context (Lithuania);
  - (2) we surveyed students in higher education; and
  - (3) we applied it in an intervention design.

! each of the EC scales has excellent reliability
! excellent internal consistency at the overarching conceptual level
! results support the potential validity of the ECQ

ECQ can be used in diverse educational contexts and with diverse ages to tap the EC

Future efforts *should focus on establishing the construct validity of the instrument through exploratory and confirmatory factor analyses.*

- interest in nature, connectedness to nature, and frequent (in particular, positive) experiences in nature during childhood and youth are highly important for the development of young adults' EC

! BUT: lack of correlation between the residential settings—urban or rural—in which the participants grew up and their current EC

⟶ *facilitating individuals to develop a sense of connectedness to nature should be one of the goals of EE programs and interventions as well as one of the assessments of such interventions*

*A recommendation for the SD course implemented at Kaunas University of Technology is to **incorporate instructional components** that cultivate the students' sense of connectedness to nature.*

- results indicate **a significant and positive impact** of the sustainable development course on the students' environmental citizenship

! BUT: the effect size was medium in term of its Cohen's d estimate, and significant effects were found only for the construct of environmental citizenship as a whole, and not for the separate attributes that fall under the construct

*Recommendation to **conduct/repeat the study** (1) in learning conditions that were not restricted by (Covid) lockdowns and enable to more fully implement the instructional methodologies and (2) with a larger cohort of students*

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