PUBLIZIERBARER ENDBERICHT

A) Projektdaten

Kurztitel:	k.i.d.Z.21-Austria
Langtitel:	„k.i.d.Z. – kompetent in die Zukunft" – Preparing Austria´s Youth for Climate Change Challenges of the 21st Century
Programm inkl. Jahr:	Austrian Climate Research Programme 7th Call (2014)
Dauer:	42 Monate (01.04.2015 – 30.09.2018)
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Schlagwörter:	Klimawandelbildung, forschendes Lernen, Transdisziplinarität, LehrerInnenbildung
Projektgesamtkosten:	504.640 €
Fördersumme:	318.500 €
Klimafonds-Nr:	B464783
Erstellt am:	12.12.2018

B) Projektübersicht

1. Kurzfassung

Das Projekt „k.i.d.Z.21-Austria" zielt darauf ab, die Wahrnehmung und das Bewusstsein der Jugendlichen in Österreich bezüglich des Klimawandels zu erhöhen und ihre Handlungs- und Anpassungsfähigkeit zu stärken. Dafür wurde in einer zweijährigen Pilotphase die Forschungs-Bildungskooperation „k.i.d.Z.21-kompetent in die Zukunft" entwickelt und evaluiert. Dem Gedanken des moderaten Konstruktivismus folgend, werden dabei im Rahmen eines inter- und transdisziplinären Ansatzes Raum für forschend-entdeckende Lernprozesse, u.a. bei einem einwöchigen Forschungsaufenthalt im Gebirge, geschaffen. Das Projekt „k.i.d.Z.21-Austria" transportiert in Zusammenarbeit mit LehrerInnen-Arbeitsgemeinschaften auf Bundes- und Länderebene diesen Ansatz im österreichischen Schulsystem in die Breite. Dazu werden fächer- und schulartenübergreifende LehrerInnen-Fortbildung durchgeführt, im Rahmen derer sich die TeilnehmerInnen über ihre wichtige Rolle als MultiplikatorInnen bewusstwerden und aufbauend auf den Grundgedanken des Konzepts „k.i.d.Z.21" Projektideen adaptiert an ihre Region und Schulsituation umsetzen. In Kooperation mit dem Projektteam, ExpertInnen aus der Klimawandelforschung (vermittelt über das sich stetig erweiternde Partnernetzwerk) setzen sie diese um. Dadurch wird die Zielgruppe österreichischer Jugendlicher auf breiter Basis erreicht und ein Beitrag zur Verankerung von Bildung für Nachhaltige Entwicklung im Schulsystem geleistet. Die wissenschaftliche Begleitung des Projekts zielt zum einen darauf ab, die Effektivität des angestrebten Multiplikationseffekts zu ermitteln. Zum anderen werden mit Hilfe, sowohl quantitativer als auch qualitativer Forschungsmethoden Wirkungsfaktoren effektiver Bewusstseinsbildung identifiziert, die in die stetige Weiterentwicklung und Optimierung der zielgruppenspezifischen Formate zur Kommunikation über den Klimawandel einfließen.

2. Executive Summary

Initial motivation of the project: The 21st century is the century of the Grand Challenges. Global climate change may be the most drastic and incisive development society will face. It is today´s duty to prepare the young generation, i.e. the decision makers of tomorrow, for what they will be confronted with throughout their whole lives. This is why k.i.d.Z.21 enables teenagers to fully develop the knowledge, perspectives, values and skills necessary to actively take part in decision making in order to improve the quality of life both locally and globally. Vital pre-requisites for all successful adaptation and transformation strategies and measures are perception, awareness and acceptance. All of these are increased by the education and the communication of scientifically proofed knowledge and competencies to the young generation.

The project k.i.d.Z.21-Austria aims at stimulating competencies of Austria's young generation in order to cope with future climate change challenges. This includes increasing the perception of the ongoing climate change processes and consequences, raising awareness for climate change adaptation and transformation needs, creating acceptance for necessary action, developing concepts of Education for Sustainable Development, and implementing the project results into future concepts for teaching and learning.

The scientific evaluation of the projects aims at investigating the potential of the research-education-co-operation k.i.d.Z.21-Austria for climate change communication. The understanding of multiplier effects in a research-education-co-operation is deepened, climate change education contents and methods are adjusted to the specific needs of the target group, the impact of k.i.d.Z.21-Austria on students and teachers is assessed and concepts and conceptual change on climate change and Education for Sustainable Development among different participants (students and teachers) are evaluated. By promoting collaborations between scientists, teachers and students the k.i.d.Z.21 concept is improved continuously. In the frame of two dissertations within k.i.d.Z.21-Austria, the question of how such a dialogue should be framed and which contents should be included is addressed, including the perspectives of young people, teachers, climate change educators, and scientists.

Project structure and methodology: During a2-year pilot phase, the research-education-co-operation „k.i.d.Z.21-kompetent in die Zukunft" was developed and evaluated. In the scope of an inter- and transdisciplinary approach based on the educational principle of moderate constructivism the students get to explore contents in a research and inquiry based learning process, among others during an Alpine Research Camp in the high mountains. With the follow-up project „k.i.d.Z.21-Austria", this approach is disseminated in the Austrian school system in cooperation with members of National and Federal State Councils of Teachers. Teachers will be sensitized for their role as multipliers in inter- and transdisciplinary training courses. The basic principle of the k.i.d.Z.21 concept is adapted to various regions and school situations, reaching the target group of Austria's young generation on a broad scale. This dissemination process enables the anchoring of the concept in Austrian school curricula, therefore contributing to the further establishment of Education for Sustainable Development.

The scientific activities aim to evaluate the proposed multiplier effect and the project in general in order to improve continuously. In addition, factors for effective and appropriate climate change education are analyzed based on qualitative and quantitative research methods.

k.i.d.Z.21-Austria pilot projects have been successfully implemented and finished in the school years 2015/2016, 2016/2017, 2017/2018 and are currently running for the school year 2018/2019. In the frame of these projects, concepts for the conduction of Alpine Research Camps at sites such as the Pasterze and Dachstein region have been developed. In summer 2016-2018, seven multiplier training courses were conducted with 100 teachers from all over Austria participating in total. Based on these trainings, new subprojects have been started at 21 schools. Networking activities between different k.i.d.Z.21-Austria schools have been supported, such as a kick-off event at the University of Innsbruck with four Tyrolian schools. Existing collaborations with climate change experts have been enhanced by networking with other universities and institutions working in the field of climate change/climate change communication. A CCCA-workgroup on climate change communication has been set up (AG KlimKom). Further, an interdisciplinary course on climate change communication at the University of Innsbruck has been designed with students participating in Alpine Research Camps in 2016 and was offered in 2017 again. Surveys with teenagers have been conducted since 2012 and are scientifically evaluated; focusing on the analysis of the project's learning outcome and potentials for improvement of the learning setting, as well as climate change communication issues in general. Each subproject is evaluated via pre- and post-test and additional qualitative research methods. The multiplier training courses are evaluated as regards relevant factors (e.g. background, motivation of teachers) fostering an implementation of the project at their school. Further, associated projects have started, such as "eKidZ", which investigates multiplier effects of students having participated in k.i.d.Z.21-Austria on their families and peers. The next project steps will include the conduction of three multiplier training courses in summer 2019 to increase the network of k.i.d.Z.21-Austria sub-schools. Ongoing subprojects and Alpine Research Camps will be supported and implemented in the schoolyear 2018/19.

3 Hintergrund und Zielsetzung

The 21st century is the century of the grand challenges. Global climate change may be the most drastic and incisive development society will be faced with during the 21st century.

The 21st century is the century of today´s young generation. It is today´s duty to prepare the young generation, the decision makers of tomorrow, for what they will be confronted with by these Grand Challenges throughout their whole lives. This is done by enabling them to fully develop the knowledge, perspectives, values, and skills necessary to actively take part in making decisions to improve the quality of life both locally and globally on fields which are most relevant to their daily lives.

The 21st century is the century of adaptation and transformation. As a global consensus on climate change mitigation is still missing, there is an ever growing need for adaptation and transformation of societies throughout the whole 21st century. The less mitigation will work, the more adaptation will be necessary.

The 21st century is the century of communication and education. Vital pre-requisite for all successful adaptation and transformation strategies and measures are perception, awareness, and acceptance. All of these are increased by the communication and education of scientifically proofed knowledge and competencies to the young generation.

Against this background, the objectives of the k.i.d.Z.21-Austria project can be differentiated in:

1. Educational goals

   The operational overall goal of the project k.i.d.Z.21-Austria aims at stimulating competencies in order to cope with future climate change challenges. This includes the following subgoals:

   - increase the perception of the ongoing climate change processes and consequences
   - raise awareness for climate change adaptation and transformation needs
   - create acceptance for necessary action
   - develop concepts for competence oriented Education for Sustainable Development
   - implement the project results into future concepts of teaching and learning

2. Scientific goals

   The scientific overall goal is the evaluation of the potential of the research-education-cooperation k.i.d.Z.21-Austria for climate change communication. This includes the following subgoals:

   - deepen the understanding for multiplier effects in research-education-cooperations
   - adjust methods to the specific needs of the targeted group
   - assess the impact of k.i.d.Z.21-Austria on student and teachers level (level of preparedness for climate change challenges: perception, awareness, acceptance, zest for action)
   - evaluate concepts and conceptual change on climate change and Education for Sustainable Development among different participants (students and teachers)
   - improving the k.i.d.Z.21 concept by promoting collaborations between scientists, teachers, and students

These objectives correspond to the ACRP programme aims of i) extensive involvement of actors as vital pre-condition for awareness leading to action, and ii) communicating and enhancing awareness of adaptation needs and actions.

4 Projektinhalt und Ergebnis(se)

Workpackage 1; Conceptualization

The objectives of this working package are to increase the acceptance and applicability for k.i.d.Z.21-Austria multiplier training courses among school stakeholders (Members of National and Federal State Councils of Geography and Economics teachers, teacher representatives, etc.), creating a concept for the k.i.d.Z.21 multiplier training courses and creating common grounds for cooperation at administrational level. Further objectives are the discussion, application and further co-development of k.i.d.Z.21 for Austrian conditions and the support of first k.i.d.Z.21-Austria pilot projects by the core group.

M1.1 Initial concept dialogue

The organization of the first alpine research week in Obergurgl with the core group was initiated in February – possible participants were contacted and a core group consisting of representatives of ARGE members from each federal state was formed. The first dialogues took place during an official "kick-off-workshop" with representatives of the ARGE GWK (22/04/2015 - 24/04/2015 in Linz). Additionally, the Federal Ministry for Education and Research (BMBF) was contacted in order to initiate the dialogue on the implementation of k.i.d.Z.21-Austria on an administrative level. At several meetings with the education authority of Tyrol (08/04/2015 and 21/04/2015) additional first steps for cooperation at administrative level were done.

M1.2 Field experience in Obergurgl with core group

The field experience in Obergurgl with the core group was conducted parallel to the alpine research week of the students of the case study Karl-von-Closen Grammar School Eggenfelden. The members of the core group accompanied the students during their research activities and documented their observation. Additionally, representatives each one of the "Forum Umweltbildung" and of the "Klimabündnis Tirol" accompanied the week in Obergurgl in order to get an impression of our activities and to strengthen the partner network. During daily workshops and discussion groups between the core group and the k.i.d.Z.21-Austria team of the University of Innsbruck, possibilities to apply the concept to Austrian schools were developed. Focus of the discussions were possibilities to apply the project to the own school situation including financial and organisational questions, cooperation possibilities between teachers and the project team and ideas for the development of the multiplier training courses. The results of these workshops were documented and reflected in order to contribute to the conceptualisation of the multiplier training courses.

Figure 1: Left: Students, experts and representatives of ARGE GWK during the alpine research week in Obergurgl (Hemberger 2015). Right: Johann Stötter and members of the ARGE GWK (Lumetzberger 2015)

M1.3 Reflection and conceptualisation of multiplier training course

During the research week in Obergurgl an intensive exchange between the ARGE GWK and the University of Innsbruck took place. Focus of the discussions around the conceptualisation of the multiplier training courses were the contents of the course, the organisation of the course and a possible integration of the experiences of the first pilot projects into the workshops. The discussions were structured in different formats, i.a. the so-called "Worldcafe", where brainstorming takes place in groups and ideas are documented on posters. In the following, ideas and results of the discussions are summarized:

The results of the exchange with the core group during the field experience in Obergurgl were reflected and gathered for the conceptualization of the multiplier training course. The results were documented and sent to the participants. Also, the results of this exchange are an important basis for the concrete conceptualisation and the content of the multiplier training courses. The following contents were considered to be of special interest:

- scientific input on climate change and climate change education
- scientific input on moderate constructivism and Education for Sustainable Development in general
- input on the project and its idea
- chance to experience some parts of the alpine research week
- time for reflection and discussion
- inputs and supporting in aspects like funding the project, locations, networking with the experts etc.

M1.4 Support of k.i.d.Z.21-Austria pilot projects

In September 2015 five of the teacher representatives of ARGE GWK members, who participated in the excursion to Obergurgl as part of the core group, started k.i.d.Z.21-Austria sub projects with one or more classes at their school. The first k.i.d.Z.21-Austria projects started at schools in Tyrol, Lower Austria, Styria and Vorarlberg. Currently, the following schools participate in the k.i.d.Z.21-Austria project (Table 1).

Table 1: Schools participating in the k.i.d.Z.21-Austria pilot projects 2015/2016

School	location	Grade	Number of students
Gymnasium Adolf-Pichler-Platz	Innsbruck, Tyrol	One class grade 3 One class grade 5	ca. 28 students ca. 27 students
BRG Feldkirch	Feldkirch, Vorarlberg	One class grade 4	ca. 25 students
BRG Maria Enzersdorf	Maria Enzersdorf, Lower Austria	One class grade 4	ca. 24 students
Meinhardinum Stams	Stams, Tyrol	One class grade 6	ca. 26 students
BG BRG Hartberg	Hartberg, Styria	One class grade 6 One class grade 4	ca. 22 students ca. 27 students
Aventinus Gymnasium	Burghausen, Bavaria, Germany	Four classes grade 8 (equal to grade 4 in Austria)	Ca. 88 students

In total, five schools are participating in the project in Austria with seven classes. A further k.i.d.Z.21-Austria project was started by the initiative of a teacher in Burghausen, Germany. Inspired by her daughter participating in the precedent project "k.i.d.Z.21-kompetent in die Zukunft" in the school year 2014/2015, she initiated a k.i.d.Z.21-Austria project for the whole grade 8 (equivalent to grade 4 secondary education in Austria) at the Aventinus Grammar School, Burghausen, Germany.

The k.i.d.Z.21-Austria pilot projects are supported by the University of Innsbruck with the organizing of kick-off workshops for the students, the planning of the alpine research weeks at several locations and an adaptation of the concepts to the individual school situations. Additionally to the location of Obergurgl, first projects will be carried out in Galtür (Jamtal), Heiligenblut (Pasterze area) and Schladming (Dachstein mountains) in June and July 2016.

To adapt the existing concepts of the alpine research week, which has taken place in the university centre Obergurgl the last three years, to the new locations, bachelor theses have been supervised at the institute of geography. Part of these theses was to adapt the concepts to the locations in Galtür and the Pasterze and to develop a catalogue of criteria, which are essential for the realization of k.i.d.Z.21-Austria projects in the mountains.

Examples of activities supported by the University of Innsbruck during the school year are a kick-off workshop at the Grammar School Feldkirch, an interactive workshop with the two k.i.d.Z.21-Austria classes of the Adolf Pichler Grammar School, Innsbruck and a kick-off workshop at the Hartberg Grammar School. All of the alpine research weeks are accompanied by team members of the University of Innsbruck in order to ensure a successful completion of the project, to support the teachers and experts and to document the research days at the different locations.

<u>WP 2 "Qualification"</u>

In working package 2, major goals are to raise awareness for the importance of climate change adaptation and transformation needs among multipliers. The multipliers should be enabled for preparing young people for climate change challenges of the 21st century. Further, the concept of multiplier training courses is evaluated and revised.

M.2.1 Preparation of multiplier training courses

The multiplier training courses was announced in various channels for the courses in 2016, 2017 as well as 2018. The preparation of the multiplier training course in 2019 already started and the registration for the training course in August 2019 had started in November 2018.

M.2.2 Implementation of the multiplier training courses

The multiplier training courses took place in Obergurgl in June and August 2016 and in June and August 2017 for 3 or 4 days. In total 100 teachers were registered in total for the courses (see Tab.2). The course has been advertised through several channels and activities (see dissemination 2.3.)

Table 2: Dates and participants of the multiplier training courses in Obergurgl, Summer 2016, 2017 and 2018

Multiplier Training course	Date	Number of Participants
regionale Fortbildung 2016	26.6.-28.6.2016	32
2. Bundesseminar 2016	28.8.-31.8.2016	15
3. Bundesseminar 2016	31.8.-03.9.2016	9
1. Bundesseminar 2017	25.6.-28.6.2017	7
2. Bundesseminar 2017	27.8.-30.8.2017	10
3. Bundesseminar 2017	30.8.-02.9.2017	15
1. Bundesseminar 2018	29.8.-01.9.2018	12

Each of the multiplier training courses started with a scientific input on climate change and its causes and effects in order to get an insight into the scientific basis of climate change. Afterwards, the educational state of the art on the theory of moderate constructivism was presented and discussed with the participants. Insights into the core ideas of the k.i.d.Z.21-Austria was given, as well as the practical implementation of this background at the case-study school and Austrian pilot schools. On the second day, the participants had the chance to actively attend two outdoor workshops of the Alpine Research Camps similar to those visited by the students. One workshop focused on climate change viewed from a social sciences perspective, while the other went into detail with natural scientific aspects of climate change. Just like the students, the teachers was accompanied by scientists working in the respective science fields. Towards the end of the multiplier training courses, the development and planning of the participating teachers' own k.i.d.Z.21-Austria subprojects were discussed. Possibilities for funding, supporting and cooperation etc. were presented and discussed.

The cooperation with the Austrian Association of Geography (AAG) started with a workshop (30/10/2015). This meeting was followed by an approach to integrate the University of Graz, the BOKU Vienna, the University Vienna and the University of Salzburg into the k.i.d.Z.21 network. In December (15/12/2015-18/12/2015), representatives of the k.i.d.Z.21-Austria team visited several Austrian universities in order to build up a network for the support of future k.i.d.Z.21-Austria projects throughout Austria. The events have been announced through several channels, i.a. the CCCA, the Alfred Wegener Centre for Climate Research, an intern network of climate researchers of the University of Natural Resources and Life Sciences Vienna (BOKU) and the project's webpage, etc. In order to promote the project in the research and expert community, additional flyers for the specific target group of potential k.i.d.Z.21-Austria experts was designed and printed.

One result of the discussions is the establishment of a university course offered to students from different disciplines in summer 2016 and 2017. In total 20 students took part in the course. This

course aimed to educate students as "k.i.d.Z.21-Austria experts", which then, after successful participation, are able to accompany school classes during their alpine research days in the mountains. With a growing number of participating schools, the need for educated experts to accompany the individual projects rises each year and gives the incentive to create such a university courses with focus on climate change education and communication.

Milestone 2.3 Reflection of the Multiplier Training Course

The conceptualization of the multiplier training courses is scientifically evaluated regarding factors encouraging an implementation of k.i.d.Z.21-Austria as well as the learning effect. It can be concluded that the concept has proven to be successful and was taken positively by the attending teachers. Especially the possibility to experience the scientific workshops outdoors by themselves was taken as something inspiring. Based on these experiences, the basic structure of the courses was adopted in the following years.

WP 3 "Action": Description of the targets originally defined for the reporting period

The objectives of WP 3 are to prepare Austria's youth for climate change challenges of the 21st century and to raise awareness for climate-change-friendly behaviour among Austrian youth. The successful implementation of k.i.d.Z.21-Austria projects among all Austrian federal states should be ensured. Multiplier training graduates were supported with the implementation of k.i.d.Z.21-Austria projects.

Originally, this working package was meant to start in June 2016. However, we decided to start this package earlier, as the support of the first pilot schools showed that it is very important to create local service points for the different Austrian regions as soon as possible. The support of the individual subprojects demands more effort than expected and the multiplication took place faster than expected, too.

Milestone 3.1. Support regarding adaptation of k.i.d.Z.21 concept

Individual pilot projects were carried out and are continuously adapted to the individual needs of the respective schools. For example, the duration of the Alpine Research Camp and potential locations varies from school to school, according to financial and time resources. The k.i.d.Z.21-Austria team helped to adapt existing concepts for the conduction of Alpine Research Camps to new locations, such as Galtür. In preparatory excursions to the Pasterze region (May and June 2016), Dachstein region (June 2016) and Galtür (May 2017), the practical implementation of Alpine Research Camps at these sites were supported by the k.i.d.Z.21-Austria team.

Milestone 3.2. Support regarding implementation of k.i.d.Z.21-Austria projects

Figure 3 shows the schools that have started a k.i.d.Z.21-Austria project between school year 2015/2016 and 2018/19. The applicant supports the k.i.d.Z.21-Austria projects e.g. by guiding teachers step by step through the implementation of k.i.d.Z.21-Austria at their school, by providing information on potential locations for the Alpine Research Camp or by enhancing the network of climate change experts. In cooperation with CCCA, an online message board was designed in order to give teachers a platform to exchange experiences, to network among each other and to provide them with material relevant for the conduction of the Alpine Research Camp. This message board is updated regularly by the k.i.d.Z.21-Austria team. Further, at least one team member accompanied each of the Alpine Research Weeks.

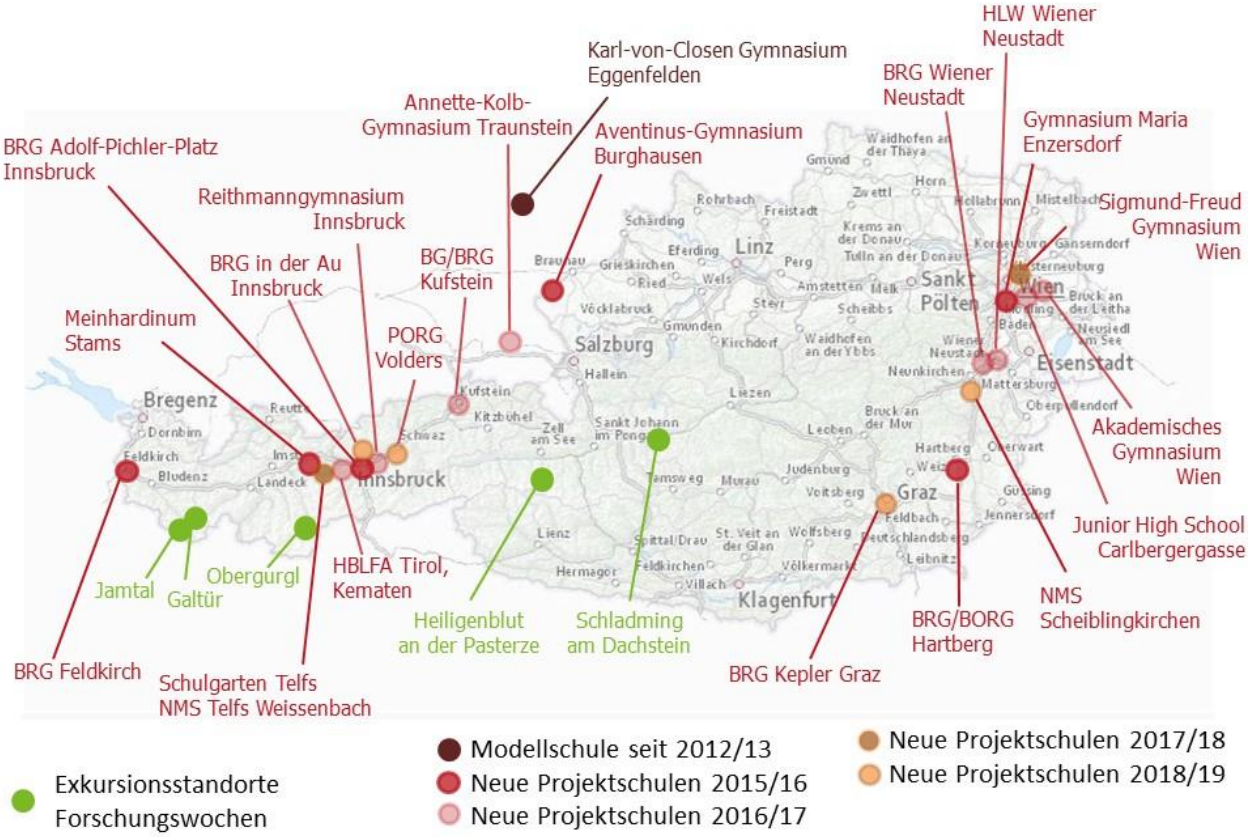


Figure 3: k.i.d.Z.21-Austria schools 2012/13-2018/19 (status 10/2018)

The long-term goal, however, is to qualify multipliers to conduct their projects by themselves without being supported by the k.i.d.Z.21-Austria team - and thus create "sustainable" conditions for the implementation of the project.

Kick-off workshops are supported by the project team in the conceptualization, planning and implementation. For example, a kick-off event involving four Tyrolian schools was organized: On February 6th, about 150 students gathered at the University of Innsbruck in order to discuss climate change from different perspectives. This included a presentation from climate change scientist Prof. Helga Kromp-Kolb (University of Natural Resources and Life Sciences, Vienna), ten different workshops with climate change experts from various backgrounds (such as medicine, policy, ethics, biology) and a fair ("Fair of Possibilities"), where students exchanged views with local climate change initiatives.

In order to document the progress of each subproject, a "k.i.d.Z.21-Austria passport" was designed and distributed among the participating students in February 2017. The passport documents each step the students complete within the project, such as the pre-test, a kick-off event at their school, the completion of an elective interdisciplinary project, participation in the Alpine Research Camp, exchange with climate change experts etc. This passport is one first step to ensure that certain core aspects of k.i.d.Z.21-Austria (e.g. transdisciplinary – exchange with experts) are integrated into each subproject and is a gimmick to help the students keep track with the project steps (Fig.4).

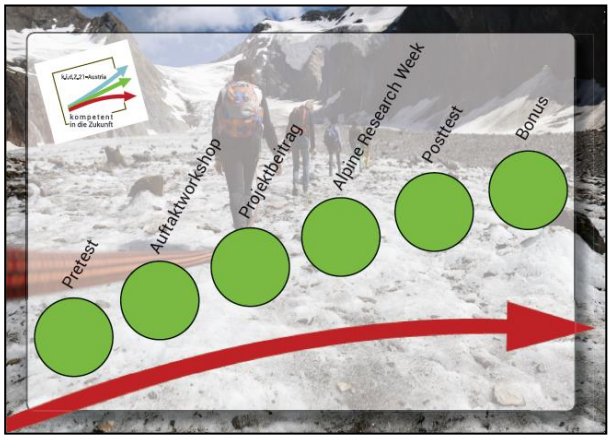


Figure 4: the k.i.d.Z.21-Austria passport helps to document each project's step (University of Innsbruck, 2017)

A competition to nominate the best elective projects between all students participating in the project in 2016/2017 is organized by the k.i.d.Z.21-Austria team. Each class nominated the best project and hand it to a jury (scientists, teachers and students with k.i.d.Z.21-Austria experience), which elected three of the best out of all the submissions.

WP 4 "Scientific Evaluation": Description of the targets originally defined for the reporting period

In working package 4 the scientific overall goal is the evaluation of the potential of the research-education-cooperation k.i.d.Z.21-Austria for climate change education. This includes the following sub goals:

- Deepen the understanding for multiplier effects in research-education-cooperations
- Adjust methods to the specific need of the targeted group
- Assess the impact through k.i.d.Z.21-Austria on students and teachers level (level of preparedness for climate change challenges: perception, awareness, acceptance, zest for action)
- Evaluate concepts and conceptual change on climate change and Education for Sustainable Development among different participants (students and teachers)
- Improve the k.i.d.Z.21 concept by promoting collaborations between scientists, teachers and students

M 4.1. Annual case study k.i.d.Z.21 with Grammar School Eggenfelden

k.i.d.Z.21 projects are evaluated in different quantitative and qualitative approaches. A sample size of ca. 1000 participants for quantitative research is available with data since 2012 included (status 09/2018). Results of the evaluation continuously contribute to the enhancement of the case study in Eggenfelden as well as the k.i.d.Z.21-Austria subprojects.

An analysis of sketches and elective projects of the students gave insights into the questions and topics the teenagers from the case study school Eggenfelden developed whilst becoming involved in climate change in different settings (in-school and out-of-school). This analysis showed that climate change education should include concepts that foster more interconnected ways of thinking. A n engagement with climate change in different learning settings (e.g. in-school and out-of school), as it is the case in the k.i.d.Z.21-Austria programme, is recommendable as such approaches encourage to develop different perspectives on climate change.

In co-operation with the Karl-von-Closen Grammar School and the Institute of Geography at the University of Innsbruck the project "eKidZ" was initiated. The project is financed by the Robert-Bosch-Stiftung for a period of three years (end 2019). Multiplier effects of teenagers participating in k.i.d.Z.21 on their family and peers are analysed by students, thus realizing a transdisciplinary

research approach. The k.i.d.Z.21-Austria team supervises one diploma thesis that aims to analyse these processes and support the students in their research.

M4.2 Evaluation of k.i.d.Z.21-Austria Projects

For the evaluation and development of k.i.d.Z.21-Austria a new questionnaire was designed, which focuses on the three major aspects knowledge, attitude and action of young people with regard to climate change. The questionnaire has been developed based on literature research, the previous questionnaire of the case study and existing studies relating to climate change education, environmental education, Education for Sustainable Development as well as scientific releases on climate change research such as the IPCC and APCC reports. After having attended the Alpine Research Camps in summer, a post-study was conducted with students participating in total. The questionnaire was filled out by over 2000 students between 2015 and 2018. Further, the teenagers' sketches drawn and the dairies written during the research week were collected. Additionally, interviews with students of the Karl-von-Closen Grammar School were carried out.

The data has been analysed and published in several studies while having different foci. In the following the results of these studies are summarized:

Analysis of the sketches and the elective projects

During the school year, the students participating in the project conduct a) elective projects in an in-school setting, and b) sketches with questions in an out-of-school setting during the Alpine Research Week. With the aim of gaining a better understanding of the prerequisites of young people for climate change education, one of the studies conducted in the frame of k.i.d.Z.21-Austria investigates questions and topics young people develop whilst becoming involved in climate change in both settings. Complex challenges, such as climate change, demand ways of thinking that go beyond categories. Therefore, the analysis focuses on the question of in which spheres (natural sphere and anthroposphere) students predominantly make their thematic choices and how far the interconnections between different spheres are built. The results show that the choice of the learning setting influences the topics students connect with climate change. Interconnections between sub-spheres of the anthroposphere and natural sphere are made only occasionally. These findings serve as a basis for reconsidering the content and foundation of climate change communication with young people. We recommend that climate change educational programmes should include phases that allow the following: a) involvement with climate change issues related to single spheres in the first phase, and b) consideration of the interconnections between spheres when becoming involved with climate change issues in the second phase. As the educational setting can considerably influence the focus of the learning process, it should be chosen thoughtfully.

Analysis of the pretests

Under the premise that the young generation of teenagers cannot be considered to be uniform, a study identified groups of teenagers based on their level of climate change awareness, focusing on the following question: Which different groups of young people can be distinguished based on their level of climate change awareness and its different aspects?

Questionnaires answered by 760 teenagers (13-16 years old) from Germany and Austria were analysed using a hierarchical cluster analysis. The teenagers were assigned to four groups that differed as to their cognitive, affective and conative aspects of climate change awareness (see Figure 5). Based on the empirical results, the authors argue that there are different subgroups of young people in terms of climate change awareness that have various conditions, which climate change education should take into consideration.

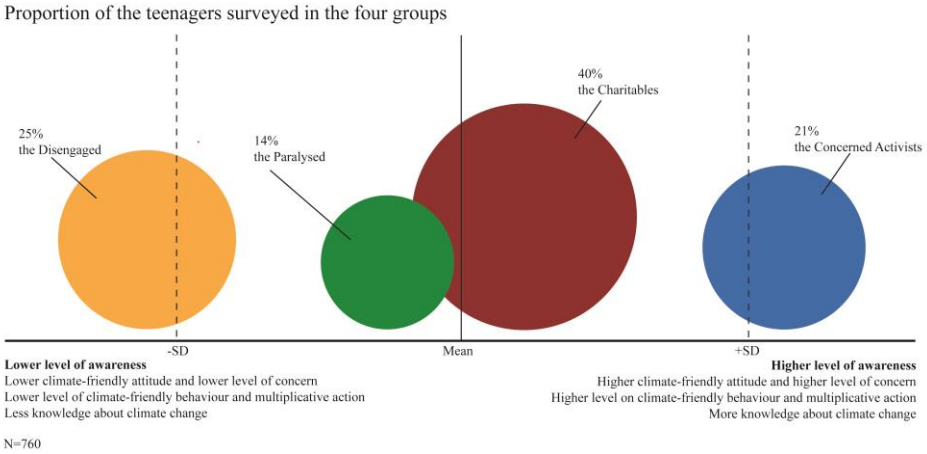


Figure 5: Overview of the four groups and their different preconditions (Kuthe et al., subm.).

Analysis of the pretest and interviews

The climate change awareness of teenagers, as the leading generation for future development affects how future societies will be able to cope with climate change. Especially teenagers' concerns about climate change and their willingness to act in a climate-friendly manner are two important factors that climate change communication has to address. Therefore, a study investigates why teenagers do not feel concerned about climate change or are not willing to act in a climate-friendly manner in order to identify strategies regarding how to strengthen these aspects in target group-oriented climate change communication formats. Using a mixed-method approach, a quantitative analysis of questionnaires answered by 760 13-16-year old teenagers was validated by a qualitative analysis of interviews with selected respondents of the Karl-von-Closen Grammar School. The findings suggest that those teenagers who are not concerned about climate change believe that climate change will happen only in the future. Furthermore, they do not recognize the interconnections or feedbacks regarding climate change between the components of the global system. The group of teenagers who are not willing to act question their own impact and ability to influence the effects of climate change.

Analysis of the pre- and posttests

As the participating teenagers have different weaknesses in climate change awareness before the project, this project evaluation place emphasis on how the project manages to compensate these specific conditions by focusing on the specific weaknesses. Therefore, the preconditions were detected using a pre-survey (N=392). Based on that a t-test for paired samples tested the teenagers' development within the project. The results show that the weaknesses could be mostly addressed (see Figure 6) and focusing on a target-group and weakness specification in evaluating environmental education can be beneficial.

The Disengaged N= 87 (22%)	The Paralyzed N= 48 (12%)	The Charitables N= 186 (47%)	The Concerned Activists N= 71 (18%)
Attitude	Attitude		
Personal Concern		Personal Concern	
Multiplicative Actions	Multiplicative Actions		
Climate-friendly Behavior	Climate-friendly Behavior		
Knowledge			

Figure 6: Overview of the weaknesses of the four groups with regard to the five factors of climate change literacy and how they were addressed in the k.i.d.Z.21-Austria project. Weaknesses regarding which the posttest score of the group is significantly higher than the pretest score are highlighted in dark green (Kuthe et al., subm.)

Analysis of Multiplier Effect

The multiplier effect is analysed by observing the quantitative development of the sub-projects and by surveys with teachers in order to gain a deeper insight into aspects motivating them to conduct or not to conduct a subproject. A questionnaire was developed for the teachers participating in the project and will help to analyse their role as multipliers and multiplier mechanisms in general. So far, multiplier effects can be measured considering that 100 teachers have participated in the multiplier training courses and 21 schools (status 09/2018) have implemented k.i.d.Z.21-Austria. (Please note that there usually is a one year gap between participation of the teachers and implementation of k.i.d.Z.21-Austria at their own school, so further subprojects can be expected as a result of the multiplier training courses.) The multiplier training courses have been evaluated (diploma thesis) and interpreted regarding their motivation to implement a k.i.d.Z.21-Austria subproject.

As the full implementation of a k.i.d.Z.21-Austria project seems hard to realize for some teachers (e.g. due to framework conditions at their schools), successful multiplication should not be measured with regard to an implementation of k.i.d.Z.21-Austria only. Other outcomes, such as an increased implementation of climate change education issues into teaching or teaching methods that foster more critical and multiperspective ways of thinking can be considered as success, too. Therefore, a longitudinal study observed changes in teaching methods and contents within the first school year after teachers have participated in a multiplier training course - independent of a full implementation of k.i.d.Z.21-Austria.

The following milestones have been addressed and completed:

M 4.1 Successful implementation of annual case study with Karl-von-Closen Grammar School Eggenfelden; M 4.2 Scientific evaluation of k.i.d.Z.21-Austria projects; M 4.3 Analysis of multiplier effect.

<u>WP 5 "Dissemination and Sharing of Knowledge": Description of the targets originally defined for the reporting period</u>

The objectives of working package 5 are to disseminate and share the findings of the project, to manage the distribution of relevant information on the project. The results should be translated for the scientific and non-scientific audience. Projects results are published in national and international scientific journals. For the detailed results of working package 5 please see 2.3 (dissemination).

5 Schlussfolgerungen und Empfehlungen

Several conclusions can be drawn from the experiences gained during the three year project phase:

- Students, teachers and involved experts stated that the project takes important steps to increase the knowledge and awareness of young people with regard to climate change. However, further steps should aim at integrating elements of **climate action** into the project, because it was different to really increase the willingness to act. After attending the project, many students mention to feel encouraged to take action, but do not really know where and how to start. Therefore, follow up projects will put more awareness on enabling students to conduct projects that are directly linked to their local environment and every-day life. One possibility could be to enable an exchange between stakeholders from economy and administration and start little projects, where students can develop their own action-oriented projects. First steps have been made into that direction by a Follow-up project in Tyrol, where more focus is put on climate action.
- Further, dealing with climate change over a longer period than one year makes sense, to increase knowledge and awareness step by step and enable action oriented projects as described above. One possibility is to increase the project slot to more than one year, so students engage more deeply with climate change over more than one school year. Further, dealing with climate change beyond the project run-time can be one possibility: there has been a successful approach to enable students to engage with climate change in seminars conducted some years after they have attended the k.i.d.Z.21-Austria project. They reflect on the k.i.d.Z.21-Austria project with some distance to their own participation and help to enhance the project concept. They also take a function as mentors for the younger students currently participating in the project. This peer learning concept is received very positively by the students and also the teachers.
- More intensive **trainings** should be offered for both teachers and scientists attending the project. In order to be able to integrate the topic of climate change into school, teachers will need profound knowledge on climate change issues and get better access to scientifically proven knowledge. Vice versa, scientists could get trainings before conducting, for instance, a workshop at the Alpine Research Week, in order to get the necessary communication and didactic skills. The role of the experts should be defined more clearly, also in order to enable them to integrate their specific scientific background more into the project.
- As several analyses conducted in the frame of the project have shown, there are differences within the group of young people, which have to be considered for the conduction of a climate change education programme such as k.i.d.Z.21-Austria. In order to **respect their different interests** and knowledge, they should get more opportunities to take choices, for example when attending different workshops during the Alpine Research Week.
- Many teachers involved in the project have highlighted the demand for an **exchange between the different schools** that participate in k.i.d.Z.21-Austria. For this purpose, a blog and online forum has been established to enable such an exchange. However, this service was only used very randomly. In order to offer platforms and possibilities for exchange that will be used by the teachers, they should be involved in the development of such, to orient the service at the needs of the users.

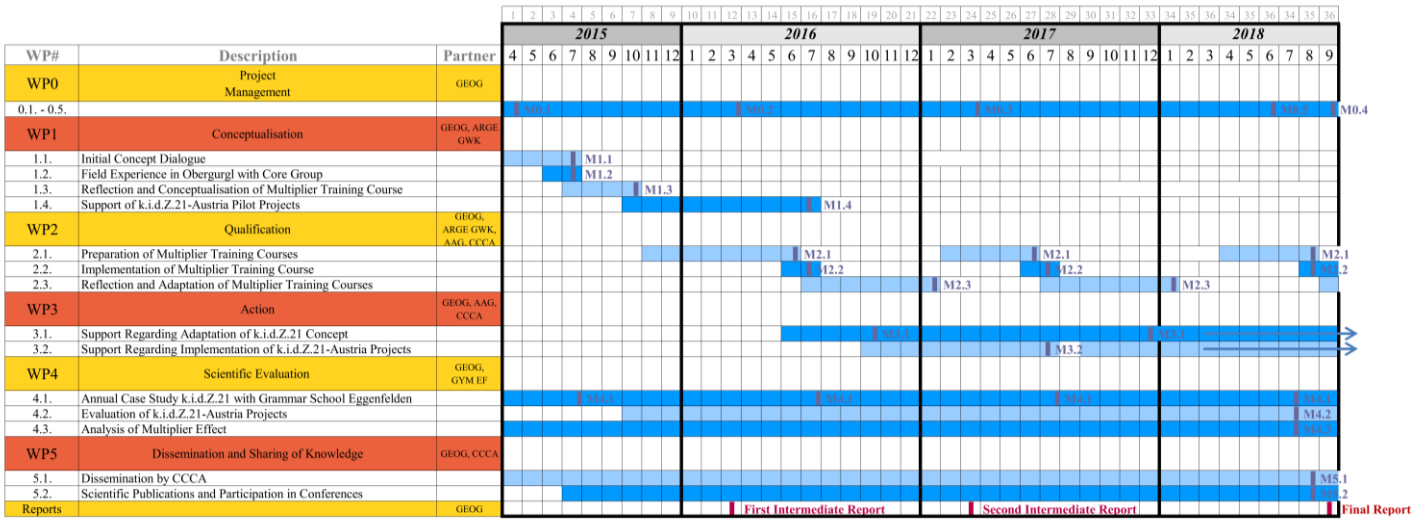
- University **students as future teachers and multipliers** should further be involved into the project. There have been several successful approaches to do so: a) an interdisciplinary course on climate change communication has been offered during several semesters, where students from different subjects participated in order to get trained as future climate change communicators. They accompanied the Alpine Research week and developed own concepts for climate change communication workshops with young people, some of them being implemented after the course. b) Further, future teachers have been involved by other courses and got to know the project. As they will be teaching in some years at schools all over Austria, this multiplication effect should be exploited further. Incentives to engage students even more in the projects could be, for example, certificates that acknowledge their contribution to the project and document their gained skills.
- The experience has shown that it takes a long time until the teachers work independently on the organization and implementation of the project at their school and a lot of support is necessary from the project team. Therefore, one **central coordination** point is essential for the success of the project, in order to support the schools.
- In order to increase the impact of the project on a political-strategic level and foster an integration into school curricula, **headmasters of each school should be involved** from beginning on into the project. This would also have the benefit of giving more support to the teachers, who conduct the project, and of enabling a continuous implementation at the respective schools over several years. The experiences has shown that the schools, who managed to conduct the project each year with a whole grade, instead of just single year projects with only one class, where those schools who have the strong support of their headmaster.

Projektdetails

6 Methodik

See Chapter 4

7 Arbeits- und Zeitplan



8 Publikationen und Disseminierungsaktivitäten

<u>Oral Presentations</u>

Kuthe, A. (2018): Strengthening Personal Concern and the Willingness to Act through Climate Change Communication. International Symposium of Climate Change Communication. 2nd World Symposium Climate Change, 07.-09.02.2018, Graz

Kuthe, A. (2017): k.i.d.Z.21-Austria & Triple A – Wie kann Klimaschutzkommunikation den Bedürfnissen der verschiedenen Zielgruppen gerecht werden? K3 - Kongress zu Klimawandel, Kommunikation und Gesellschaft, 25.-26.9.2017, Salzburg

Kuthe, Alina (2017): Vielfältiges Klimawandelbewustsein von Jugendlichen. Deutscher Kongress für Geographie 2017, 30.9.-3.10.2017, Tübingen

Stötter, J. & Keller, L. (2017): „k.i.d.Z.21 – kompetent in die Zukunft" – Preparing Austria´s Youth for Climate Change Challenges of the 21st century. 18. Österreichischer Klimatag, 22.-24.05.2017, Wien.

Kuthe, A. & Körfgen, A. (2017): *„Ich finde es wichtig, da es meine Zukunft bestimmt!"* - Interesse und Klimawandelbewusstsein von Jugendlichen. 18. Österreichischer Klimatag, 22.-24.05.2017, Wien.

Kuthe, A. & Hofmann, P. (2016): k.i.d.Z.21-Austria – eine Forschungs-Bildungs-Kooperation zur Entwicklung von LehrerInnenfortbildungen, mit dem Ziel „Bildung für nachhaltige Entwicklung" im österreichischen Schulsystem zu verankern. Workshop, Symposium Visible Didactics – Fachdidaktische Forschung trifft Praxis, 15.12.2016, Innsbruck.

Stötter, J., Oberrauch, A. & Dietrich, L. (2016): „k.i.d.Z.21-Austria – kompetent in die Zukunft" – eine Forschungs-Bildungs-Kooperation zur Bewältigung der Herausforderungen des Klimawandels im 21. Jahrhundert. Vortrag bei der Veranstaltung "Young Science-Netzwerktreffen. Schulen im Spannungsfeld Wissenschaft - Wirtschaft - Gesellschaft. Wie können Schulen/Lehrpersonen diese Herausforderung meistern?", 03.05.2016, Innsbruck.

Kuthe, A. (2016): Von k.i.d.Z.21 zu k.i.d.Z.21-Austria: Transfer von „Bildung für Nachhaltige Entwicklung" in die Breite. Vortrag, Konferenz N - Hochschulen weiter denken, 22.01.2016, Berlin.

Oberrauch, A. (2015): Von k.i.d.Z.21 zu k.i.d.Z.21-Austria – ein Beispiel zum Transfer von „Bildung für Nachhaltige Entwicklung" in die Breite. Vortrag, Deutscher Kongress für Geographie, 01.-06.10.2015, Berlin.

Oberrauch, A., Kuthe, A., Keller, L., Körfgen, A. & Stötter, J. (2015): k.i.d.Z.21 – „kompetent in die Zukunft" – Eine Forschungs-Bildungs-Kooperation zur Bewältigung der Herausforderungen des Klimawandels im 21. Jahrhundert. 16. Österreichischer Klimatag, 28.-30.04.2015, Wien.

Articles

Kuthe, A., Körfgen, A., Stötter, J. & Keller, L. (submitted): Strengthening Their Climate Change Awareness – A case study addressing the weaknesses in young people's climate change awareness. Applied Climate Change Education and Communication.

Kuthe, A., Körfgen, A., Keller, L., Oberrauch, A. & Stötter, J. (submitted): How many young generations? – Climate change awareness of teenagers in Germany and Austria.

Keller, L., Stötter, J., Oberrauch, A., Kuthe, A., Körfgen, A. & Huefner, K. (subm.): Change Climate Change Education. GAIA - Ecological Perspectives for Science and Society.

Kuthe, A., Körfgen, A., Stötter, J.; Keller, L., Riede, M. & Oberrauch, A. (2019): Strengthening Personal Concern and the Willingness to Act through Climate Change Communication. In: Leal, Walter (Hrsg.): Addressing the Challenges in Communicating Climate Change Across Various Audiences.

Körfgen, A., Kuthe, A., Chiari, S., Prutsch, A., Keller, L. & Stötter, J. (2019): Moving forward in climate change communication: recommendations for rethinking strategies and frames. In: Leal, Walter (Hrsg.): Addressing the Challenges in Communicating Climate Change Across Various Audiences.

Kuthe, A., Körfgen, A. & Stötter, Johann (2018): CCCA-Factsheet Nr.22: Zielgruppenspezifische Klimawandelkommunikation mit Jugendlichen. https://www.ccca.ac.at/fileadmin /00_DokumenteHauptmenue/02_Klimawissen/FactSheets/22_zielgruppenspezifische_klimakommunikation_v1_17042018.pdf

Keller, L., Oberrauch, A. & Riede, M. (2017): Lebensqualität und/oder Nachhaltigkeit? In: Bundesministerium für Bildung und Frauen et al. (Hrsg.): Politische Bildung und Geschichte, Geografie und Internationale Wirtschaft- und Kulturräume. 13. Schulstufe. HAK-spezifische Bildungsstandards in der Berufsbildung. Ausgewählte Unterrichtsbeispiele. Wien.

Keller, L., Stötter, J., Oberrauch, A., Körfgen, A., Kuthe, A., Riede, M. & Lütke-Spatz, L. (2017): k.i.d.Z.21-Austria – Neue(s aus der) Klimawandelbildung. Jahrbuch Bildung für nachhaltige Entwicklung. Umweltdachverband GmbH/Forum Umweltbildung (Ed.).

Körfgen, A., Keller, L., Kuthe, A., Stötter, J. & Oberrauch, A. (2017): (Climate) Change in young people's minds – From categories towards interconnections between the anthroposphere and natural sphere. In: Science of the Total Environment 580, p. 178-187.

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Riede, M., Kuthe, A., Keller, L. & Greissing, A. (2016): Development, application, and impact assessment of a moderate-constructivist intervention to prepare teenagers for challenges of climate change and energy transition. In: Umweltpsychologie 38, p. 39-61.

Oberrauch, A., Keller, L., Riede, M., Mark, S., Kuthe, A., Körfgen, A. & Stötter, J. (2015): „k.i.d.Z.21 – kompetent in die Zukunft" – Grundlagen und Konzept einer Forschungs-Bildungs-Kooperation zur Bewältigung der Herausforderungen des Klimawandels im 21. Jahrhundert. GW-Unterricht 139 (3/2015), p. 19-31.

Körfgen, A., Kuthe, A., Stötter, J., Keller, L. & Oberrauch, A. (2015): *k.i.d.Z.21-Austria* – Jugendliche in Österreich erforschen den Klimawandel. In: Institut für Geographie & Innsbrucker Geographische Gesellschaft (Ed.): Innsbrucker Jahresbericht 2014-15. Innsbruck, p. 45-61.

Poster Presentations

Körfgen, A., Kuthe, A., Keller, L., Oberrauch, A. & Stötter, J. (2017): (Climate) change in young people's minds. Systemübergreifende Ansätze in der Klimakommunikation mit Jugendlichen. 18. Österreichischer Klimatag 22.-24.05.2017, Wien.

Körfgen, A., Kuthe, A., Chiari, S., Prutsch, A. & Stötter, J. (2017): Klimawandel kommunizieren – wo stehen wir in Österreich? 18. Österreichischer Klimatag, 22.-24.05.2017, Wien.

Hafner, E. (2017): Klimawandelbewusstsein österreichischer Lehrpersonen. Tagung Zukunft Fachdidaktik Geographie und Wirtschaftskunde, 02.-04.05.2017, Schlierbach.

Körfgen, A., Kuthe, A., Oberrauch, A., Keller, L. & Stötter, J. (2017): k.i.d.Z.21-Austria: Contents and methods for the exchange of knowledge and perspectives between young people and scientists. World Symposium on Climate change Communication, 22.-24.02.2017, Manchester.

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Kuthe, A. & Körfgen, A. (2016): k.i.d.Z.21-Austria: Wissens- und Perspektivenaustausch zwischen Jugend und Wissenschaft. Tagung Zukunft Fachdidaktik Geographie und Wirtschaftskunde, 21.-23.04.2016, Schlierbach.

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Workshops and Presentations for Strategic Networking and Advertising the Multiplier Training Courses

„Um.Welt.Gestalten – Gemeinsam für eine Welt von morgen!" Sommerakademie Wels, 24.-26.08.2015

„Klima fair | stehen – Ökolog Tirol Tagung 2016", 11.04.2016, Privates ORG „St. Karl" Volders: Presentation, Workshop with teachers from secondary and primary ÖKOLOG-Schools in Tyrol.

"Engaging Young People with Climate Change", Networking event, 25.04.2016, Climate Outreach Office, Oxford, England.

Networking event at "Energie Tirol", 03.05.2016, Innsbruck.

Presentation for the Educational Authorities of Tyrol / Landesschulrat Tirol, 09.06.2016, Innsbruck.

"Networking meeting for stakeholders in mountain oriented-education of Alpine countries", 27.-28.06.2016, Alparc Office, Chambéry, France.

„Fachdidaktiktag 2016 - IMST-Tagung", Project Workshop in professional groups of school subjects „Education for Sustainable Development", "Geography and Economics", "Chemistry", "Nutritional Education" and „Biology and Environmental Protection", 28.09.2016, Klagenfurt.

„k.i.d.Z.21-Regio – kompetent in die Zukunft", Presentation at „Gemeinderat Telfs", 28.09.2016, Telfs.

„Klimawandel im Anthropozän – Ursachen, Auswirkung, Maßnahmen und Verantwortung", Presentation at Gymnasium Traunstein, 11.10.2016, Traunstein.

„k.i.d.Z.21 – kompetent in die Zukunft", Teacher Training, 11.11.2016, Salzburg.

„k.i.d.Z.21-Regio Telfs" – networking meeting to implement k.i.d.Z.21-Austria in the market town Telfs, 07.02.2017, Sportzentrum Telfs: Presentation and discussion with teachers, school headmasters, communal politicians and local stakeholders.

Second networking meeting on „Education for sustainable development" in teacher education at Universities, 10.03.2017, Vienna.

Verantwortung lehren lernen leben - Ökolog Tirol Tagung 2017/18", 07.11.2017, Landhaus Tirol

3. Tiroler Entwicklungstag zu "Globalem Lernen", 21.11.2017, Landhaus Tirol

Other type of Dissemination

Conception and creation of a k.i.d.Z.21-Austria newsletter for everybody who's interested in the project with an update on news and activities of k.i.d.Z.21-Austria (regularly sent to interested parties)

Conception and creation of the k.i.d.Z.21-Austria homepage (in cooperation with CCCA) with the aim to inform about the project activities and support the teachers with their subprojects

Dissemination activities by the CCCA in order to expand the network of k.i.d.Z.21-Austria experts and scientists and promote the project in various networks

Newsletter „Forum Umweltbildung" and „IMST-Network", November 2016.

Official Letter of Support for advertising the k.i.d.Z.21-Austria-multiplier training courses send out from the Austrian Federal Ministry of Education, Directorate I/6 – Teaching Principles and Multidisciplinary Competences to all Educational Authorities in Austria, November 2016.

News-Blog on „OpenScience4Sustainability" to advertise k.i.d.Z.21-Austria activities:

- „Wecken Sie mit uns die Begeisterung für den Klimaschutz", published on 28.03.2017

- „Klimakommunikation in Österreich", published on 10.04.2017

Press Reviews

„Mehr Lebensqualität und eure Zukunft. Interessanter Vortrag von Hartmut Graßl zum Thema Klimaschutz am AKG." Traunsteiner Tagblatt, 07.03.2017.

„Warum die Erde ein Pflaster braucht". Passauer Neue Presse, 24.02.2017.

„Jugend als Chance für die Klima-Zukunft". Newsroom of the University of Innsbruck, 07.02.2017.

„Tiroler Jugend auf den Klimawandel vorbereiten". Tiroler Tageszeitung Online, 07.02.2017.

„Schüler lernen über Klimawandel." tirol.orf.at, 06.02.2017.

„Schüler lernen über Klimawandel" – News report, „Tirol heute", 06.02.2017.

„Kompetent in die Zukunft." Tiroler Tageszeitung, 24.07.2016, Nr. 204, p. 20.

„Kompetent in die Zukunft." Geschichte des Gelingens. Tirol 2050.

„Gut vorbereitet auf den Wandel." Wissenswert. Journal of the Leopold-Franzens-Universität Innsbruck, June 2016, p. 12-13