# Knowledge hub
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# Collection of best practices

## Summary of the best practice

1. Title of the best practice (e.g. name of policy, programme, project, etc.) *

GMIN$^2$T Area Project Munich & Region + Hangzhou & Region

2. Country or countries where the practice is implemented *

Germany, Region Munich & China, Region Hangzhou

3. Please select the **most relevant** Action Track(s) the best practice applies to *

- [ ] Action Track 1. Inclusive, equitable, safe, and healthy schools
- [x] Action Track 2. Learning and skills for life, work, and sustainable development
- [x] Action Track 3. Teachers, teaching and the teaching profession
- [ ] Action Track 4. Digital learning and transformation
- [ ] Action Track 5. Financing of education

4. Implementation lead/partner organization(s) *

RCE BenE München, MUC-Labs, PMI-German Chapter & RCE Hangzhou, Hanns-Seidel-Stiftung (Vertretung Zhejiang), Lehrerfortbildungszentrum der Provinz Zhejiang

5. Key words (5-15 words): Please add key descriptive words around aims, modalities, target groups etc. *

Students, Teachers, School-Projects, Practical Projects, STEM subjects, Social Sciences, Sustainability, Partizipation, SDGs, Agenda 2030, Citizen Science, Scientific Issues

6. What makes it a best practice? *

The GMIN$^2$T area project combines the classic MINT subjects (mathematics, computer science, natural science, technology) with the humanities (GMINT). The central theme in the projects is sustainability or sustainable development, which is expressed by the "N2" (GMIN2T).

# Description of the best practice

7. Introduction (350-400 words)
   This section should ideally provide the context of, and justification for, the practice and address the following issues:

   i) Which population was affected?
   ii) What was the problem that needed to be addressed?
   iii) Which approach was taken and what objectives were achieved? *

The GMIN$^2$T area project Munich & Region / Hangzhou & Region is based on the Citizen Science approach. Participating school projects collect measurement data on specific research questions. The projects present themselves to each other - also internationally - and the students exchange their findings, connections and solutions to problem situations. Together, they advocate for public awareness of their project results. In doing so, they examine how society perceives the problem.

8. Implementation (350-450 words)
   Please describe the implementation modalities or processes, where possible in relation to:
   i) What are the main activities carried out?
   ii) When and where the activities were carried out (including the start date and whether it is ongoing)?
   iii) Who were the key implementation actors and collaborators? (civil society organizations, private sector, foundations, coalitions, networks etc.)?
   iv) What were the resources needed (budget and sources) for the implementation? *

Sustainable development and transformation knows no borders, it has to be thought and implemented in larger contexts. The GMIN$^2$T area project Munich & Region and Hangzhou (China) and Region is an urban-rural project between schools. It promotes the exchange between city and country and strengthens the inter-communal and international cooperation through project cooperation in the GMIN2T area.
Pilot project: GMIN$^2$T area project Ignaz-Günther-Gymnasium, Rosenheim
Research topic: "The temperature regime of the Mangfall - an analysis against the background of climate change and existing uses."
Research assignment: collection of robust data - temperature and oxygen - and their subsequent processing for a public presentation. Data and researched facts (fish species, sensitive life stages, legal requirements, etc.) are to be communicated to the public so that they become aware of the problem. Different target groups are to be considered.
Client: Water Management Office Rosenheim
Cooperation partners: RCE BenE Munich, MUC-Labs, PMI-German Chapter & RCE Hangzhou, Hanns-Seidel-Foundation (representation Zhejiang), Teacher Training Center of Zhejiang Province
Project duration: 09/ 2021 - 01.23
International exchange: Counterpart presentation of the projects and digital exchange with Chinese students, who also deal with water-related topics: 07/22 - 12/22
Budget: Due to the voluntary engagement of the cooperation partners, no budget was necessary.
The GMIN$^2$T area project is planned for the long term and will be implemented and further developed with different schools in Munich & Hangzhou in the coming school year, so that a network of school projects is created.

9. Results – outputs and outcomes (250-350 words)
   To the extent possible, please reply to the questions below:
   i) How was the practice identified as transformative? (e.g., impact on policies, impact on management processes, impact on delivery arrangements or education monitoring, impact on teachers, learners and beneficiary communities etc.);
   ii) What were the concrete results achieved with regard to outputs and outcomes?
   iii) Has an assessment of the practice been carried out? If yes, what were the results? *

   The GMIN2T project in the pilot project with the topic: "The temperature regime of the Mangfall - an analysis against the background of climate change and existing uses" can be seen as transformative for all participants.
   In this hot summer in Germany the rivers are drying up and the few remaining waters are heating up extremely, so that on the one hand the biotope river (e.g. the fish stocks) are in danger, but on the other hand also no water can be taken from the rivers for cooling purposes by the industry. The relevance of the research assignment is thus supported by the real weather situation.
   The way of working is new for the students, therefore they are supported by the RCE BenE Munich in the sense of ESD and by professional project managers in addition to the teacher. The teacher and involved/interested teachers* could benefit from the project and want to implement GMIN2T projects themselves with their working groups or school classes in the future. The students were able to present their interim results at the "Rosenheim River Day" in June 2022 and reached many citizens.
   The students evaluate the project themselves on an ongoing basis by means of specifications and status reports from the project management.

10. Lessons learnt (300 words)

To the extent possible, please reply to the following questions:

i) What were the key triggers for transformation?

ii) What worked really well – what facilitated this?

iii) What did not work – why did it not work? *

Since the project is still running, it is not yet possible to talk about the change. In addition, the long-term use and handling of the measurement data lies with the client, the Rosenheim Water Management Office. Until the results lead to political reactions, it can usually take a long time in Germany...

Concretely, however, a change can be seen in the students. They have learned to work in a participative and cooperative way and to fulfill the serious assignment of the Water Management Office Rosenheim in a professional way. In terms of content, they were trained by the staff there and learned relevant content on ESD and project management.

The cooperation of the project partners worked especially well, so that the school projects in Germany and China received wonderful support.

At the beginning, it was difficult for the students in Rosenheim to work in a self-organized way, as they were not used to working freely and creatively in the school context.

11. Conclusions (250 words)
    Please describe why may this intervention be considered a “best practice”. What recommendations can be made for those intending to adopt the documented “best practice” or how can it help people working on the same issue(s)? *

We are at the very beginning of a new age. The stable modern dogma of the separation between natural sciences & humanities is increasingly reaching its limits in times of globalization, digitalization & the increasing challenges of environmental problems. At the same time, however, this offers the opportunity to illustrate that it is precisely here that dynamics emerge. These boundaries should therefore not be understood as separating, but rather as connecting points of contact. It is therefore a question of interfaces that form precisely at those points where future challenges can no longer be mastered on the basis of individual disciplines. We are convinced that it is above all at these boundaries or interfaces that progress in science takes place.

Area projects enable comparisons: Our area project aims to move GMIN2T research and GMIN2T development from a local setting to a larger one to enable comparisons, such as here between urban and rural areas or China and Germany.
Research questions as assignment: In principle, students can bring in the research questions themselves. However, research questions from external partners (e.g. governmental institutions) are particularly interesting, since a social relevance has already been recognized in the assignment.
Research promotes creativity: Due to the diverse topics, curiosity and creativity are awakened in the students during our area project and the associated exchange with students from different schools.
Research in international dialogue: The school projects can participate in an international exchange between German and Chinese schools. The students present their projects to each other in a digital dialog. They compare prerequisites, approaches and methods, present their results and discuss their projects with each other.

12. Further reading
    Please provide a list and URLs of key reference documents for additional information on the “best practice” for those who may be interested in knowing how the results benefited the beneficiary group/s. *

https://www.bene-muenchen.de/gmin2t-flaechenprojekt-muenchen-und-region/
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