



# EVALUATING CO-CREATION OF KNOWLEDGE

## Quality Criteria and Indicators

Susanne Schuck-Zöller, Jörg Cortekar,  
Irene Fischer-Bruns, Stefan Füsers, Elke Keup-Thiel, Diana Rechid  
**Climate Service Center Germany/Helmholtz-Zentrum Geesthacht**

## ■ Definition

### **Co-creation of knowledge**

Consisting of co-design, co-production, co-development, co-dissemination (Mauser et al. 2013)

**Involving practitioners in research processes to ensure the usability of research and development results.**

**Co-creation and its subtopics are the processes to realize the transdisciplinary research mode.**



# Literature survey



## ■ Key questions, method of the survey

Which systems can be established in order to ....

... evaluate the **processes** of co-creation of knowledge?

... evaluate the **results** of co-creation of knowledge?

... evaluate the **impact** of transdisciplinary research projects?

Survey is overarching **all different research fields**

Mixed **methods** of keywords, being completed by snowball sampling

# Literature survey, Method (I)

## Bilingual systematic search

### English key words

Basic for all platforms:  
*Evaluation, transdisciplinary  
research*

### German key words

Basic for all platforms:  
*Evaluation, transdisziplinäre  
Forschung*

### Platforms

J-Stor, Science Direct, Hamburg University Library,  
open web search (grey literature)

If reasonable, combined with further key  
words: *e.g. team science, co-production, co-  
design, metrics, assesment, measurement,  
quality criteria, etc.*

If reasonable, combined with further key  
words: *e.g. Stakeholder Beteiligung, Mode  
2, Qualitätskriterien, Evaluierung,  
Partizpation, transdisziplinäre Dialoge, etc.*

## 50 search results

## Search results from different fields

50 publications can be found by entering the different key words, originating from different scientific fields:

1. Epistemology (17 articles)
2. Health (9 articles)
3. Sustainability and ecology (18 articles)
4. Technology (3 articles)
5. Urban studies (3 articles)

**50 search results by key words**

All results were scanned regarding relevance

Completed by snowball sampling

**29 publications exploited that make statements referring to evaluation indicators**

## ■ Evaluation cascade

Quality dimensions have to be made operational. A cascade from very general dimensions to very detailed measurement methods is agreed upon in nearly all literature contributions.



Our literature survey covers „Dimension, criteria and indicator“.  
Methods and ideas for measurement are added by ourselves as a proposal, perhaps useful to better illustrate the idea of the evaluation cascade.

## Phase of problem identification and structuring

| Dimension              | Criteria (examples)  | Indicator  | Methods                        |
|------------------------|--|--|--------------------------------|
| Systemic quality       | <ul style="list-style-type: none"> <li>Understanding of systemic context and factual interdependencies</li> <li>Clear problem definition and focus,</li> <li>Societal relevance</li> </ul> |  |                                |
| Scale spanning quality | <ul style="list-style-type: none"> <li>Constructive selection of participants</li> <li>Consideration of different scales of the problem (temporal, spatial, social)</li> </ul>             | <ul style="list-style-type: none"> <li>Stakeholder Analysis</li> </ul> | Check of project documentation |
| Prospective quality    | <ul style="list-style-type: none"> <li>Variability of goals</li> <li>Space for reflection, iteration, flexibility in changing directions</li> </ul>  |  |                                |



## Research and development process

| Dimension                | Criteria (examples)  | Indicator  | Methods  |
|--------------------------|--|--|--|
| Context specific quality | <ul style="list-style-type: none"><li>• Relation to concrete problems</li><li>• Space for reflection and self-assessment</li><li>• Handling of cognitive boundaries</li></ul>  |  |  |
| Integrative quality      | <ul style="list-style-type: none"><li>• Setting the scene for co-production of knowledge</li></ul>   | <ul style="list-style-type: none"><li>• Enough possibilities for involvement</li></ul> | <ul style="list-style-type: none"><li>• Interviews of project participants</li></ul> |
|                          | <ul style="list-style-type: none"><li>• Recognition of all kinds of knowledge and different normative systems</li><li>• Transparency of mutual expectations</li><li>• Transparency of different roles</li></ul>                                    |  |  |
| Method-based quality     | <ul style="list-style-type: none"><li>• Accountable, transparent generation and evaluation of knowledge</li><li>• Professional planning and management</li><li>• Achievement of joint problem ownership</li><li>• Organizational support</li></ul> |  |  |

## Research and development process

| Dimension           | Criteria (examples)  | Indicator   | Methods  |
|---------------------|--|---|--|
| Integrative quality | <ul style="list-style-type: none"> <li>Setting the scene for co-production of knowledge</li> </ul> | <ul style="list-style-type: none"> <li>Enough room for involvement</li> </ul> | <ul style="list-style-type: none"> <li>Interviews of project participants</li> </ul> |

### Questions related to the integrative quality:

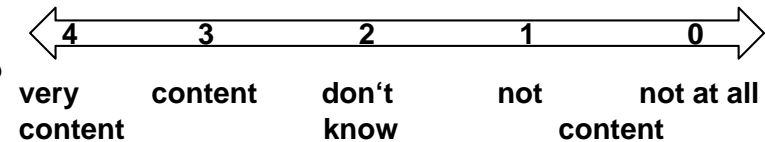
How content are the participants with the time range provided for involvement?

How content are the practitioners in terms of the moderation of the involvement process?

How content are the scientists with the moderation of the involvement process?

Do the practitioners feel the scientific partners open to their points of view?

Do the scientists feel understood in terms of scientific rules and limitations?



## Results I: Output and outcome

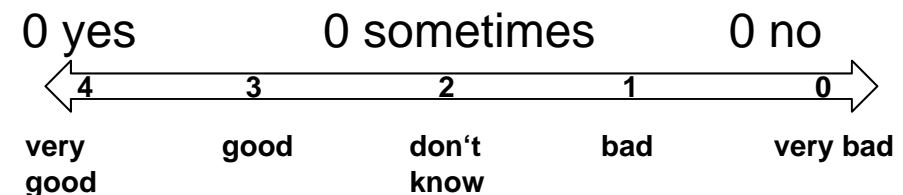
| Dimension          | Criteria (examples)  | Indicator (ex.)  | Methods   |
|--------------------|--|--|---|
| Quality of output  | <ul style="list-style-type: none"> <li>Productivity</li> <li>Elaboration</li> <li>Innovation</li> <li>Critical reflection</li> <li>Safeguarding knowledge and transparent documentation</li> </ul>       | <ul style="list-style-type: none"> <li>Number of reviewed papers</li> <li>Number of conference contributions</li> <li>Grey literature</li> <li>Comprehensibility</li> <li>Advances in knowledge</li> <li>Detailed final report</li> <li>Document server</li> </ul> | <ul style="list-style-type: none"> <li>Check documentation</li> <li>Check documentation</li> <li>Check documentation</li> </ul> |
| Quality of outcome | <ul style="list-style-type: none"> <li>Development of new products and services</li> <li>Reception of results, scientific acknowledgement</li> <li>Capability to improve societal development</li> </ul> | <ul style="list-style-type: none"> <li>Usability</li> <li>Citations</li> </ul>   | <ul style="list-style-type: none"> <li>Survey</li> <li>Bibliometrics</li> </ul>   |

## Results I: Output and outcome

| Dimension          | Criteria (Examples)  | Indicator (Ex.)   | Methods   |
|--------------------|--|---|---|
| Quality of outcome | <ul style="list-style-type: none"> <li>Development of new products and services</li> </ul> | <ul style="list-style-type: none"> <li>Usability</li> </ul> | <ul style="list-style-type: none"> <li>Survey with users</li> </ul> |

### Questions related to the outcome of new products and services:

Do you use the new product XY?



How do you judge the quality of the product on the whole?

Does it facilitate your work?

0 yes                      0 sometimes                      0 no

Is it easy to handle?

0 yes                      0 in some aspects                      0 no

Are there new findings to generate using the product?

0 yes                      0 partly                      0 no

Does the product allow for new features?

0 yes                      0 partly                      0 no

Which ones?

What is the overall benefit, using the product?

## Results II: Impact

| Dimension<br>(Examples)          | Criteria (Examples)  | Indicator<br>(Examples)  | Methods  |
|----------------------------------|--|--|--|
| Quality of scientific impact     | <ul style="list-style-type: none"> <li>• Increase of intersectorality</li> <li>• Training of researchers</li> <li>• Growing knowledge for the specific research field</li> </ul> | <ul style="list-style-type: none"> <li>• Number of sectors covered</li> <li>• Number and enrolments</li> <li>• Increase of students, young researchers</li> <li>• Increase in funding means</li> </ul> |  |
| Quality of economic impact       | <ul style="list-style-type: none"> <li>• Market development</li> <li>• Innovation</li> </ul>   | <ul style="list-style-type: none"> <li>• Market uptake of services</li> <li>• Revenues</li> <li>• Patent or copyrights</li> </ul>  |  |
| Quality of societal impact       | <ul style="list-style-type: none"> <li>• Political decision making</li> <li>• Quality of life</li> <li>• Sustainability</li> </ul>   | <ul style="list-style-type: none"> <li>• Perception by politicians</li> </ul>  | <ul style="list-style-type: none"> <li>• Survey</li> </ul> |
| Quality of organizational impact | <ul style="list-style-type: none"> <li>• Change in management</li> <li>• Trainings for employees</li> <li>• Uptake by private consultancies</li> </ul>                           | <ul style="list-style-type: none"> <li>• Enrolments</li> </ul>   |  |



# Conclusions and outlook



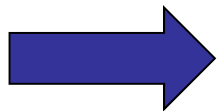
## Preliminary analysis

- Climate services can benefit a lot from other research fields in terms of transdisciplinary methodologies and evaluation
- Literature provides a broad set of criteria but only few indicators of which only very few are quantitative
- Evaluation of impact is being discussed very rarely
- Following literature an evaluation cascade and some pattern of a matrix can be generated, but in terms of evaluation methods and measurements own ideas are necessary to get a step further
- Transdisciplinary projects need another and much broader set of evaluation methodologies than the traditional research modes because of different guiding principles and goals
- No overall scheme, but selection of individual set of indicators to be chosen specifically for each evaluation process
- The evaluation scheme of the prospective project should follow the the guiding principles of TDR as well as the prospective goals of the specific project

## Outlook

### Open tasks

- Evaluation of outcome and impact only makes sense a few months or even years later – funding agencies should provide enough time for evaluation or allow for a subsequent evaluation phase
- Design of an evaluation framework is needed, that is operational (could also be a transdisciplinary process)
- The matrix needs entries for all dimensions and criteria (long lasting task)
- Search for and definition of appropriate (and measurable) indicators



A challenge for the whole community that applies co-creation methods,



Work-in-progress, being completed together as a community effort



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# Thank you!