MMvIB social learning manual

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This manual provides the steps for monitoring social learning processes and identifying moments of translation between participants that aid in first- and second-order learning. The manual accompanies the paper "Social learning in participatory multi-modelling: Crossing boundaries for multi-party collaboration" (ten Caat & de Looze, 2022). In this paper, the researchers used the steps outlined in this manual to measure social learning within the first iteration of the MMvIB¹ project. Because the first iteration only had a timespan of six months, it is recommended to continue with this monitoring process for the remainder of the project. This manual helps in doing so by providing clear and succinct steps to take to continue with this research. A more elaborate explanation of the key concepts used in this manual can be found in the research paper.

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The surveys and meeting observations show how social learning can be measured throughout the project. The tips for multi-party collaboration consists of a list of lessons learned from the first iteration for structuring meetings in a more effective way to foster collaboration and facilitate social learning.

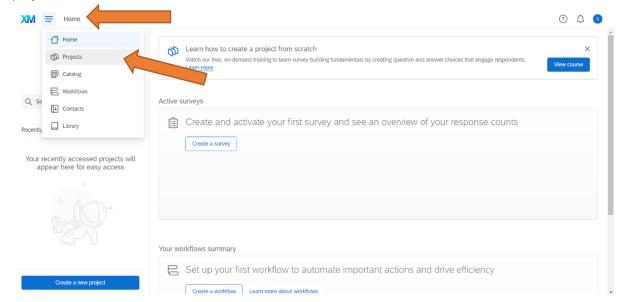
¹ MMvIB: Naar een nationale Multi-Model infrastructuur voor Integrale Besluitvorming in de energietransitie. www.multi-model.nl

Surveys

1. Granting and gaining access to the surveys

The surveys can be most easily accessed through the version of the Qualtrics website specific to the organisation you are employed or studying at². The project leader has been given access to these surveys and can provide access to new researchers. To claim access:

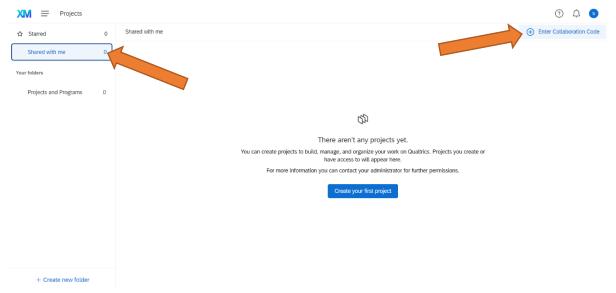
- 1. Go to your university/company email inbox. You will have received an email from "updates@notifications.qualtrics.com" called "[Name] has shared a Qualtrics survey with you".
- 2. Copy the Collaboration Code in this email.
- 3. Go to your organisation's Qualtrics website and login or sign up (this process is unique to your organisation).
- 4. On your Homepage, click on the menu icon in between the XM-logo and "Home" and click projects.



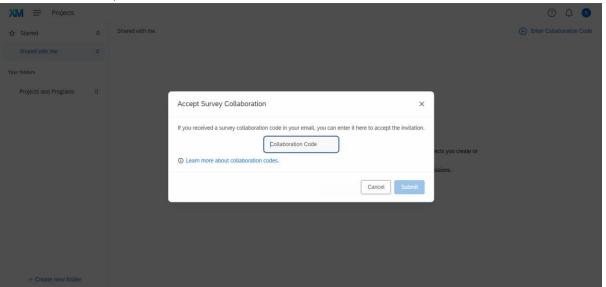
For TU Delft: https://tudelft.eu.qualtrics.com/

² The company or university should have a license for Qualtrics. For Leiden University: https://leidenuniv.eu.qualtrics.com/

5. Go to "Shared with me" and click "Enter collaboration code".

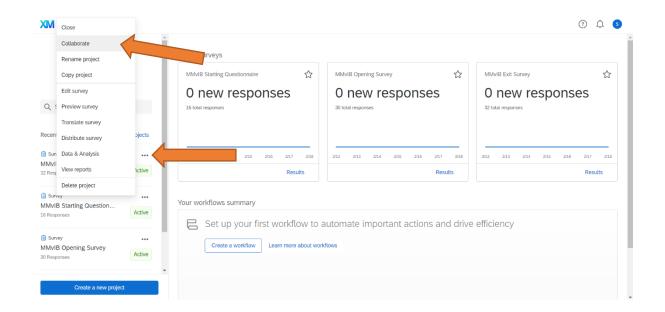


6. Enter the Collaboration Code you copied from the email and click "Submit". You now have access to the surveys!

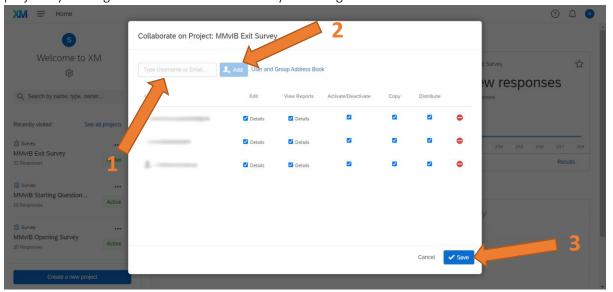


Providing access to the surveys can be done in the following way:

1. On the Qualtrics Homepage, click on the three dots next to a survey name in the left hand panel and click "Collaborate".



2. Enter the email of the person you want to grant access and click "Add". You can authorise a person to do several things with the surveys, such as editing and distributing. By default, a newly added person is authorised to do everything. You can remove a person from the project by clicking the . Click "Save" to save your changes.



2. Conducting the surveys

There are two types of surveys: opening surveys and exit surveys. The questions to the surveys are provided in two languages: English and Dutch (Appendix 1). Surveys should be conducted during every consortium meeting: five minutes should be reserved at the beginning and ending of every meeting. This means that time management is of crucial importance during these meetings: if no time is reserved, participants will most likely not fill out the surveys in their own time.

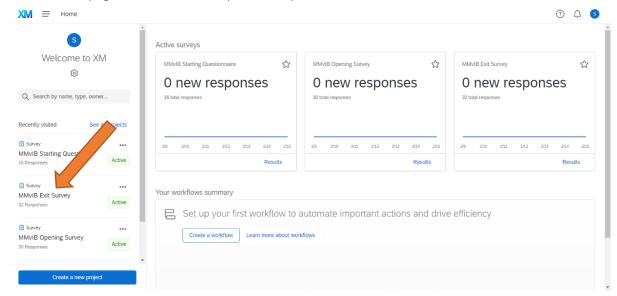
The links to the surveys to share with the participants are always the same:

- Opening survey: https://leidenuniv.eu.qualtrics.com/jfe/form/SV e50d0XieRmmg2I6
- Exit survey: https://leidenuniv.eu.qualtrics.com/jfe/form/SV 7P6Z5ukS3ivVoJE

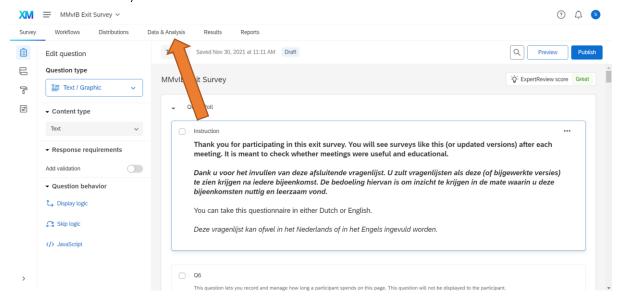
3. Downloading the results

When you want to analyse the survey input, survey results can be downloaded from Qualtrics:

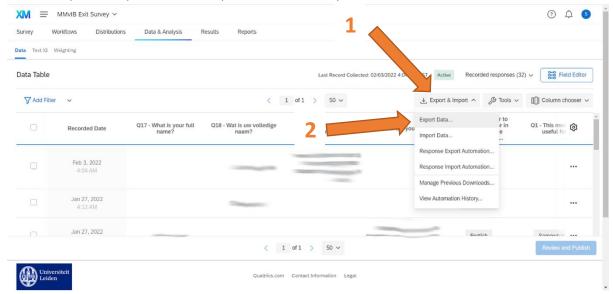
1. On the Homepage, click on the survey of which you want to download the results.



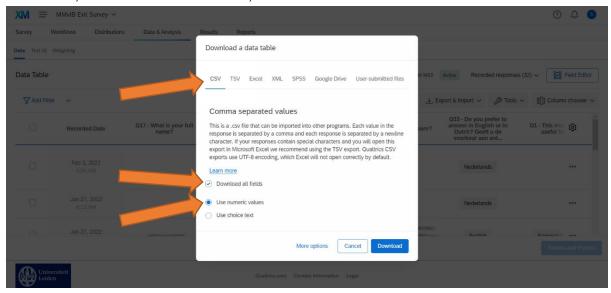
2. Click on Data & Analysis



3. Click on Export & Import, then on Export data in the dropdown menu



4. Choose CSV, enable "Download all fields", and "Use numeric values"



5. Download the data

This will download data from all of the surveys conducted since the beginning of the project.

4. Analysing the results

To analyse the results, we made an R script (Appendix 2, separate .txt file). The R script indicates the steps you need to take to load the results. It generates a variety of violin plots and boxplots within an interactive environment in which you can select different parameters for comparison. Note that the script will not produce plots for any new questions you add to the surveys.

Installing R

To run this script, you need to have installed both the R language for statistical computing and RStudio. Alternatively, you could run the script in RStudio Cloud if you own an account for this. If you have neither, then the steps below provide a short guide for installing R and RStudio to your computer.

- 1. First download R: navigate to https://cloud.r-project.org/.
- 2. Under "Download and Install R" click the link for your operating system (Linux, macOS or Windows).
 - a. For Linux, click "Download R for Linux" and follow the steps unique to your version of Linux.
 - b. For macOS, after clicking "Download R for macOS", scroll down and click the topmost .pkg file to download R.
 - c. For Windows, click "Download R for Windows", click "base" and click the large "Download R for Windows" link at the top of the page.
- 3. Run the file your computer just downloaded and follow the installation instructions.
- 4. Download RStudio: navigate to https://www.rstudio.com/products/rstudio/download/#download
- 5. Click the download link for your operating system (you might need to scroll down a bit if you are not using Windows).
- 6. Run the downloaded file and follow the installation instructions.

Running the script

- 1. Open RStudio.
- 2. Click "File", then "New File" in the dropdown menu and choose "R Markdown...".
- 3. Insert a title for you R Markdown file and click "OK".
- 4. Select all of the default code in this new file and delete it.
- 5. Open the Appendix2_R_Script.txt file from your system's file browser (so NOT in RStudio), copy its contents and paste those into your new R Markdown file in RStudio.
- 6. Follow the steps in the script.

With regards to the open-ended questions, these should be reviewed individually and manually.

Meeting observations

1. Taking notes

To monitor social learning during the meetings, extensive notes should be taken. Notes should be taken during the meetings and/or afterwards, based on the recordings. These notes should include:

- What is being discussed
- Who discusses it
- What is eventually concluded
- Observations on the process as a whole
- Moments of (dis)agreement about definitions, choices, and expectations among the participants
- Body language/non-verbal communication
- Output of the meeting, such as jointly-made lists/overviews
- (if online:) Comments in the meeting chat

2. Analysing the notes

To analyse the meetings, search the notes for:

- Moments of disagreement and discussion
- Moments in which disagreement is overcome
- Moments in which there is no/little discussion and/or little input from participants

Key verbs that help in finding these moments:

- Define
- Expect
- Explain
- Think
- Understand
- Believe
- Agree
- Disagree

Based on these meeting observations and moments of attention, search the notes for signs of boundary objects: artifacts that function as a way to translate meaning from one person to another despite their differences in expertise and understanding of the problem at hand. These can be anything, ranging from material objects such as maps to immaterial objects such as theories or concepts. Examine whether the boundary objects helped facilitate understanding between participants and led to first- or second-order social learning.

Tips for better multi-party collaboration

1. Clear meeting agenda

Meetings should be designed properly to foster multi-party collaboration and stimulate both first- and second-order social learning. A first key design choice for proper meetings is a clear meeting agenda. This agenda should include:

- Topics being discussed in the meeting
- Clear structure that outlines the amount of time that will be spend on each topic
- Expected inputs from participants
- Time reserved for participants to fill out the opening and exit surveys
- Time reserved for breaks (at least once every hour in a digital environment)

The agenda should be sent out well in advance of the meeting to enable participants to properly prepare.

2. Active participation

Meetings should foster active participation of all the participants. A first step is setting clear rules for participation in both an online and offline environment:

- Ask participants to raise hands before talking
- One person speaks at a time
- Avoid using the chat box function

For the chair, it is important to pay attention to who raised their hands, who was first in doing so (and should thus get the floor first), and who wrote questions in the chat. Address these questions and raised hands quickly and fairly, as participants might otherwise either speak before raising their hands or be demotivated to participate.

Second, the chair should create room for discussion and open debate. The rules specified above help, especially when combined with:

- Requiring input before the meeting
 - Preparing short presentations
 - o Reading handed-out materials
 - o Brainstorming/concretising expectations/needs within participants' own organisation
- Requiring input during the meeting
 - o Online whiteboard (e.g. Miro board)
 - o Polls
 - o Brainstorming exercises
- Avoiding unexpected and time-intensive workloads during the meeting
- Asking direct (follow-up) questions
- Paying attention to moments of misunderstanding
- Allowing participants to express differing expectations
- Reserving time to discuss (changing) expectations and understandings throughout the project
- Providing positive feedback to participants' input and the progress of the meeting

The last point also serves to create a positive and friendly environment. Be strict, but avoid an overly formal setting so as to keep participants happy and engaged.

3. Improved process design

To improve social learning in the project, commitment, trust, transparency and fairness should be fostered. Additionally, the MMvIB project should pay attention to differences among the participants and their opinion and expectations, as the rather homogeneous nature of the group makes some participants wrongly conclude that their fellow participants almost all think similarly about the problems at hand.

Several steps can improve the process design for social learning:

- Provide regular opportunities for Work Packages and project leaders to share updates regarding their progress, allowing every participant to stay up to date on the progress of the project.
- Organise feedback meetings one or two weeks after workshops. These should be used to discuss:
 - o Differences in expectations among stakeholders;
 - o Causes of misunderstandings in workshops (and other meetings);
 - o Groupings of participants around certain expectations or points of view;
 - o Reflections on the causes of unequal contributions to meetings and workshops;
 - o Results from meeting observations and surveys.
- Regular in-person meetings to increase interaction and familiarity among group members to build trust and commitment to the project.

Appendix 1. Survey questions

Privacy statement

Your answers will not be shared with third parties and will only be accessible to the Leiden University & TU Delft researchers (right now Annemiek de Looze, Sander ten Caat, Eefje Cuppen and Igor Nikolic). Your data will be anonymised for use in publications. We still ask you to provide your name, but this is only for internal use.

Baseline survey

English

- 1. I consent to the use of my anonymised data for research purposes. (Yes/No)
- 2. What is your full name?
- 3. I think the MMvIB project will provide my organisation with results which will be:
 - a. Extremely beneficial
 - b. Very beneficial
 - c. Moderately beneficial
 - d. Slightly beneficial
 - e. Not at all beneficial
- 4. What kind of results do you think these will be? Which of these is the most important for you? *(Text answer)*
- 5. What is the most important problem/challenge that this project will address? (Text answer)
- 6. How would you define the ultimate goal of this project? (Text answer)
- 7. How much knowledge do you have on the topic of multi-modelling?
 - a. A great deal
 - b. A lot
 - c. A moderate amount
 - d. A little
 - e. None at all
- 8. How much knowledge on the topic of multi-modelling exists in your organisation?
 - a. A great deal
 - b. A lot
 - c. A moderate amount
 - d. A little
 - e. None at all
- 9. How much do you expect to learn from your participation in this project?
 - a. A great deal
 - b. A lot
 - c. A moderate amount
 - d. A little
 - e. Not at all
- 10. What do you expect to learn? (Text answer)
- 11. How much will your organisation learn from your participation in this project?
 - a. A great deal
 - b. A lot
 - c. A moderate amount

- d. A little
- e. Nothing
- 12. How much do you expect that the other participants will learn from you?
 - a. A great deal
 - b. A lot
 - c. A moderate amount
 - d. A little
 - e. Nothing
- 13. The MMvIB project will be a great success! (Yes!)

Dutch

- 1. Ik stem in met het gebruik van mijn geanonimiseerde data voor onderzoeksdoeleinden. (Ja/Nee)
- 2. Wat is uw volledige naam? (Open antwoord)
- 3. Ik verwacht dat het MMvIB project zaken zal opleveren waar mijn organisatie:
 - a. Zeer veel aan heeft
 - b. Veel aan heeft
 - c. Enigszins wat aan heeft
 - d. Weinig aan heeft
 - e. Helemaal niets aan heeft
- 4. Wat voor zaken verwacht u dat dat zijn? Welke daarvan vindt u de belangrijkste? (Open antwoord)
- 5. Wat is het belangrijkste probleem/uitdaging dat dit project zal aanpakken? (Open antwoord)
- 6. Hoe zou u het ultieme doel van dit project definiëren? (Open antwoord)
- 7. Hoeveel kennis heeft u over multimodelleren?
 - a. Zeer veel
 - b. Veel
 - c. Niet veel, niet weinig
 - d. Weinig
 - e. Helemaal niets
- 8. Hoeveel kennis heeft uw organisatie over multimodelleren?
 - a. Zeer veel
 - b. Veel
 - c. Niet veel, niet weinig
 - d. Weinig
 - e. Helemaal niets
- 9. Hoeveel verwacht u te leren van uw deelname aan dit project?
 - a. Zeer veel
 - b. Veel
 - c. Niet veel, niet weinig
 - d. Weinig
 - e. Helemaal niets
- 10. Wat verwacht u te leren? (Open antwoord)
- 11. Hoeveel zal uw organisatie leren van uw deelname aan dit project?
 - a. Zeer veel
 - b. Veel

- c. Niet veel, niet weinig
- d. Weinig
- e. Helemaal niets
- 12. Hoeveel denkt u dat andere deelnemers van uw deelname zullen leren?
 - a. Zeer veel
 - b. Veel
 - c. Niet veel, niet weinig
 - d. Weinig
 - e. Helemaal niets
- 14. Het MMvIB project wordt een groot succes! (Ja!)

Opening survey

English

I consent to the use of my anonymised data for research purposes. (Yes/No)

What is your full name? (Text answer)

- 1. I expect that today's meeting will be useful for the progress of this project
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 2. I expect I will be able to meaningfully contribute to today's discussions
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 3. I expect to learn a lot from today's meeting
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 4. I feel prepared for this meeting
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 5. I know what is expected of me today
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree

- e. Strongly disagree
- 6. To what extent do you think that participants will agree when discussing today's topics?
 - a. Strongly agree with each other
 - b. Somewhat agree with each other
 - c. Neither agree nor disagree with each other
 - d. Somewhat disagree with each other
 - e. Strongly disagree with each other
- 7. To what extent do you think that the participants' goals within the MMvIB project are similar?
 - a. Very similar
 - b. Somewhat similar
 - c. Neither similar nor different
 - d. Somewhat different
 - e. Very different

Only displayed if question 1 was answered with "Somewhat disagree" or "Strongly disagree": You indicated that you expect today's meeting to not be too useful. What topics should rather be discussed today, in your opinion? (Text answer)

Only displayed if question 4 or question 5 were answered with "Somewhat disagree" or "Strongly disagree": You indicated that you do not feel prepared for this meeting and/or that you do not know what is expected of you for today's meeting. How could we help to improve this situation for future meetings? (Text answer)

Dutch

Ik stem in met het gebruik van mijn geanonimiseerde data voor onderzoeksdoeleinden. (Ja/Nee)

Wat is uw volledige naam? (Open antwoord)

- 1. Ik verwacht dat de bijeenkomst van vandaag nuttig zal zijn voor het verloop van het project
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 2. Ik verwacht dat ik een waardevolle bijdrage kan leveren aan de discussies van vandaag
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 3. Ik verwacht veel te leren van de bijeenkomst van vandaag
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 4. Ik voel me goed voorbereid voor deze bijeenkomst
 - a. Helemaal mee eens

- b. Mee eens
- c. Niet mee eens en niet mee oneens
- d. Mee oneens
- e. Helemaal mee oneens
- 5. Ik weet wat er van me verwacht wordt vandaag
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 6. In hoeverre denkt u dat de deelnemers het met elkaar eens zullen zijn vandaag over de onderwerpen die tijdens de bijeenkomst besproken worden?
 - a. Helemaal met elkaar eens
 - b. Met elkaar eens
 - c. Niet met elkaar eens en niet met elkaar oneens
 - d. Met elkaar oneens
 - e. Helemaal met elkaar oneens
- 7. In hoeverre denkt u dat de doelen die de deelnemers met het MMvIB project hebben overeenkomen?
 - a. Zeer overeenkomstig
 - b. Overeenkomstig
 - c. Niet overeenkomstig, niet verschillend
 - d. Verschillend
 - e. Zeer verschillend

Only displayed if question 1 was answered with "Mee oneens" or "Helemaal mee oneens": U gaf aan dat u verwacht dat de bijeenkomst van vandaag niet al te nuttig zal zijn. Welke onderwerpen zouden volgens u vandaag beter besproken kunnen worden?

Only displayed if question 4 or question 5 were answered with "Mee oneens" or "Helemaal mee oneens": U heeft aangegeven dat u zich niet voorbereid voelt op de bijeenkomst en/of dat u niet weet wat er van u wordt verwacht voor de bijeenkomst van vandaag. Hoe kunnen we deze situatie helpen verbeteren voor toekomstige bijeenkomsten?

Exit survey

English

What is your full name? (Text answer)

- 1. This meeting was useful for me
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 2. My participation was useful for others
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree

- d. Somewhat disagree
- e. Strongly disagree
- 3. I learned a lot from this meeting
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree

Only displayed if question 3 was answered with "Strongly agree" or "Somewhat agree": What did you learn? (Text answer)

Only displayed if question 3 was answered with "Strongly disagree" or "Somewhat disagree":

Could you explain what caused your lack of learning in this meeting? (Text answer)

- 4. What did you think of the set up of this meeting?
 - a. Very good
 - b. Good
 - c. Sufficient
 - d. Some improvements recommended
 - e. Significant improvements recommended

Only displayed if question 4 was answered with "Some improvements recommended" or

"Significant improvements recommended": What would you like to see improved in the process of these meetings? Please suggest one improvement. (Text answer)

Only displayed if question 4 was answered with "Very good" or "Good": What made this meeting work so well? (Text answer)

- 5. This meeting focused on the right subjects
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 6. To what extent do you think that all of the participants would describe the project in a similar way?
 - a. Very similar
 - b. Somewhat similar
 - c. Neither similar nor different
 - d. Somewhat different
 - e. Very different
- 7. To what extent do you think that the participants' goals within this project are similar?
 - a. Very similar
 - b. Somewhat similar
 - c. Neither similar nor different
 - d. Somewhat different
 - e. Very different
- 8. To what extent are the conclusions of this meeting clear to you?
 - a. Very clear
 - b. Clear

- c. Neither clear nor unclear
- d. *Unclear*
- e. Very unclear
- 9. I know what is expected of me for the next meeting
 - a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
- 10. What was surprising in this meeting? (Text answer)

Dutch

Wat is uw volledige naam? (Open antwoord)

- 1. Deze bijeenkomst was nuttig voor mij
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 2. Mijn deelname was nuttig voor de andere deelnemers
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 3. Ik heb veel geleerd van deze bijeenkomst
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens

Only displayed if question 3 was answered with "Helemaal mee eens" or "Mee eens": Wat heeft u geleerd? (Open antwoord)

Only displayed if question 3 was answered with "Mee oneens" or "Helemaal mee oneens": Kunt u aangeven waardoor u denkt dat het komt dat u weinig geleerd heeft? (Open antwoord)

- 4. Hoe vindt u de manier waarop de bijeenkomst was opgezet?
 - a. Zeer goed
 - b. Goed
 - c. Voldoende
 - d. Voor enige verbetering vatbaar
 - e. Zeer voor verbetering vatbaar

Only displayed if question 4 was answered with "Zeer voor verbetering vatbaar" or "Voor verbetering vatbaar": Wat zou u willen verbeteren aan de opzet van deze bijeenkomst? Voer alstublieft één verbetering in. (Open antwoord)

Only displayed if question 4 was answered with "Zeer goed" or "Goed": Wat zorgt ervoor dat deze bijeenkomst zo goed werkt? (Open antwoord)

- 5. Deze bijeenkomst behandelde de juiste onderwerpen
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 6. In hoeverre denkt u dat alle deelnemers het project op dezelfde manier zouden omschrijven?
 - a. Zeer vergelijkbaar
 - b. Vergelijkbaar
 - c. Niet vergelijkbaar, niet verschillend
 - d. Verschillend
 - e. Zeer verschillend
- 7. In hoeverre denkt u dat de doelen die de deelnemers met het project hebben overeenkomen?
 - a. Zeer overeenkomstig
 - b. Overeenkomstig
 - c. Niet overeenkomstig, niet verschillend
 - d. Verschillend
 - e. Zeer verschillend
- 8. In hoeverre heeft u een duidelijk beeld van wat de conclusies van deze bijeenkomst zijn?
 - a. Zeer duidelijk
 - b. Duidelijk
 - c. Niet duidelijk en niet onduidelijk
 - d. Onduidelijk
 - e. Zeer onduidelijk
- 9. Ik weet wat er voor de volgende bijeenkomst van mij verwacht wordt
 - a. Helemaal mee eens
 - b. Mee eens
 - c. Niet mee eens en niet mee oneens
 - d. Mee oneens
 - e. Helemaal mee oneens
- 10. Wat was verrassend tijdens deze bijeenkomst? (Open antwoord)