

# **Evaluation report**

**Universe Awareness Teacher Trainings The Netherlands 2013**

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## Summary for educators

This report evaluates a series of 6 teacher trainings about astronomy for primary school teachers in The Netherlands. After each training a questionnaire was handed out to every participant. The trainings were divided into two workshops of two hours and addressed the subjects of the Universe Awareness toolkit *Universe in a Box*; the Moon, the Earth, the Sun, the planets and the stars. The trainer explained theory around those topics with a slideshow, and in between the teachers got acquainted with hands-on activities so they could immediately implement astronomy in their classroom the day after.

Below we give an overview of the costs per training. Note that in most cases, the purchased materials can be re-used in other trainings. Prices are shown for a training for 20 teachers, in euros.

• Print outs	20
• Scissors	10
• Glue sticks	5
• Flash lights	10
• Earth balls	60
• Universe in a Box	64
• Styrofoam spheres	5
<i>Total</i>	<i>174</i>

On top of these costs come travel and personnel costs. The 6 trainings in this series were all held in collaboration with a PABO (school for primary school teachers), who were able to provide a lecture room for free.

Below we summarise our findings that can be helpful for educators that are planning to give a teacher training on astronomy for primary school teachers.

- Teachers like:
  - Knowledge to be immediately applicable
  - An enthusiastic trainer
  - Many movies / photos
  - Print outs of concrete activities and weblinks
  - Concrete tips on observing / websites / apps
- Teachers dislike:
  - Too much craftwork
- With a training, you can:
  - Incite a feeling of insignificance
  - Put the real distances in the Universe into perspective
  - Transfer a lot of new knowledge
- Teachers can still improve their skill of concrete transferring of complex theory

- If you train teachers in astronomy, they are likely to share their new knowledge, resulting in a cascade effect
- A teacher training is very likely to have a direct effect on the participant's curriculums

## **Introduction**

In this report we evaluate 6 teacher trainings we organised in The Netherlands in the autumn of 2013. Each training consisted of two workshops of two hours, usually with a break of two weeks in between. The 3 teacher trainings we organised in the spring of 2014 in Suriname, we evaluate separately, since the data show that teachers experience those trainings in a different way, which could have a cultural cause. Also the training was set up in a slightly different way. Because the purpose of this report is to improve the next series of teacher trainings in The Netherlands, in the autumn of 2014, we evaluate the experience of only the Dutch teachers.

After the second workshop of each training, we handed out a questionnaire for the teachers to fill out. This questionnaire is characterised by its open questions. By keeping the amount of closed questions to a minimum, we avoid pushing teachers into giving an answer that is close to their experience, but not exactly grasps the essence. Answers to open questions describe what teachers genuinely experienced. At the same time, an open questionnaire is harder to analyse. However, by using qualitative analysis based on keywords and key issues, this problem can be solved. The keywords and key issues that were used, are all derived from often used terms in answers, and were not set up beforehand. It is not possible to express keywords and key issues in percentages, but we can highlight the most used keywords and key issues and compare them to less used keywords and key issues in absolute numbers to find a ratio and judge their significance by weighing in the total number of filled out questionnaires.

All 6 Dutch trainings were set up in almost the same way. However, we let the teachers do slightly less activities themselves in the last 4, compared to the first 2 trainings. This change was made based on a first analysis of the evaluation data.

## Results

### Total of respondents

107

### Returning teachers

The questionnaires are slightly biased in the sense that it was only filled out by teachers that returned after the first workshop. In order to estimate how the teachers experienced the trainings, we also analyse the numbers of returning teachers. For this we measure the ratio of the number of teachers that attend the first workshop and the number of teachers that attend both workshops. In some cases a few teachers only showed up for the second workshop. From those numbers we cannot derive any experience, so we don't take those into account. Note that this causes a difference in the amount of teachers to attend both workshops and the amount that filled out the questionnaire. The number of filled out questionnaires is not necessarily higher, since some teachers didn't fill out the questionnaire.

In the majority of the cases where teachers didn't return, they provided an excuse and unregistered beforehand.

Attend first sessions: 141

Attend both sessions: 106

Percentage of returning teachers: 75(±14)%

### Questions

#### *1. What did you like about the training?*

-Knowledge is immediately applicable	55
-Interesting information	42
-Clear explanation /enthusiasm of lecturer	37
-Movies/photos	22
-Amazement	13
-Activities	10
-Interactive	7
-Variety	4
-Weblinks	1
-1st workshop for younger, 2 <sup>nd</sup> for older children	1

2. *Did you learn something about the Universe? If so, what exactly?*

-Immensely large Universe / we are insignificant	40
-Real distances put into clear perspective	37
-Astronomy knowledge in general	25
-Solar System / Planets	23
-Stars	19
-Practical: how to translate astronomy to kids	15
-Moon	7
-Light years	6
-Earth	3
-Sun	2
-Generation of new theories	2
-Seasons	2
-Leap years	1

3. *Did you learn new skills or practised existing skills? Which ones?*

Concrete transferring of complex theory	44
Philosophise	2
Enquiry-based learning	1
Working with models / metaphors	1
Spatial skills	1

4. *Did you / will you share aspects of the training with colleagues?*

Yes	86
I don't know yet / No answer	18
No	3

5. *Do you have suggestions for improvements / additions?*

-Lower level (especially 2nd workshop)	7
-Practice less activities	6
-Hand out printed slideshow	6
-Hand out pages with weblinks	6
-Provide tips on books, crafting and observing	4
-Show movies of activities in classrooms	3
-Hand out printed handbook	3
-Extension with toddler lessons	3
-Practise more activities in 2nd workshop	2
-Adress more modern tools (smartphone, tablet etc.)	2
-Increase awareness amongst education institutions	1
-More feedback towards implementation in classroom	1
-Start earlier	1
-More focus on specific age groups	1
-Ask participants to bring USB sticks	1

6. *Did you / will you add new lessons to your curriculum because of this training?*

Yes	96
I don't know yet / No answer	8
No	3

7. *How likely is it that you will recommend this training to other people, on a scale from 0 to 10?*

8.6

## Conclusions

With an average of 86 percent probability that participants will recommend the training to other people, it seems like it was received very well. However, the 25 percent of the participants that didn't return after the first workshop might have experienced it differently. The majority of them did provide an excuse, but that could be false. The percentage of returning teachers and the probability of recommendation will act as a checkpoint to test if the future series actually has been an improved version of the previous series.

For this next series of teacher trainings in The Netherlands, we will make the following changes based on this evaluation, in an attempt to improve them.

- We lower the level of the 2nd training, by getting rid of the explanation of a red lunar eclips.
- We let the teachers practise less activities themselves, by getting rid of some craft exercises about day/night and gravity.
- We prepare pages with the weblinks printed that we only provided on screen before.
- We give more tips on astronomy apps and online tools, like Star Walk, Google Sky and Stellarium.

The number of teachers that share aspects of the training and add astronomy lessons is satisfying.



## Discussion

The weakness of an evaluation in the form of open questions is that the analysis isn't waterproof. The labeling of answers with certain keywords or key issues is never completely unarbitrary. Also, there can be a keyword or key issue that is broader than others. It could be labeled on less answers than two narrower keywords or key issues combined, but still end up higher in the ranking, since the two narrower keywords or key issues are not summed. For this reasons, one should look at the whole list of keywords and key issues, and not just at the top three. However, drawing conclusions from larger lists is more difficult.

When considering the absolute numbers, one should look at the ratio between the amount of times a label was allocated and the number of participants that filled out the questionnaire. However, one should keep in mind that most questions are open, eg. if a label is assigned 36 times out of 107 respondents, it does not mean that one third experienced something, and two thirds did definitely not experience that. In an open questionnaire participants write down what immediately comes to mind, and could forget to mention experiences or just note down the one most significant experience.

When looking at the numbers of teachers that returned after the first workshop, one should not be following. One training (Utrecht, October) has a very different ratio than the other trainings (48% compared to the overall ratio of 75( $\pm$ 14)%), which means a deviation of 27 percent points compared to a standard deviation of 14 percent points). The second workshop of this training took place on a night with heavy rain in a building that teachers were unfamiliar with, i.e. not the PABO building. This might have caused this unusual turnout.

In the answers to the 2nd question, the label '*Practical: how to translate astronomy to kids*' was allocated a disappointing 15 times, while this is one of the main things we want teachers to take home from the training. However, it seems that this is just not a concrete form of knowledge that participants think of when answering this open question. It seems that way because the '*immediately applicable knowledge*' is the top label in the 1st question, with 55 allocations. Therefore this is no cause for change.