

the improvement of the learning

After workshop with telescope kit titled Tukutte' Mirue for age 9
“Build your telescope own and Explore the Universe” and it's educational performance.

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abstract

We have been organizing workshops for 9 years assembling small telescope kits with subsequent observations. While our workshops are enjoying a high level of satisfaction among the participants, we report an increasing efficiency in educational value.

Repeated observations of the Moon, after school have shown a fourfold skill factor as compared with pupils who did not participate our workshop, witnessing a fast learning curve and great motivation by enjoying both, hand-crafting and first-light observations.

The degree of difficulty and choice of observation targets is optimized for elementary school children, as well as for cost performance. We also wish to emphasize the importance of proper telescope handling, in particular focusing.

contact with workshop slide show at <http://orbys.co.jp/kolkit/>

Introduction

Since 1999, we non-profit organizations NPO the little astronomers have been holding workshops under the motto "Build a telescope and observe with it", in which we have children assemble a telescope kit and practice observation of the Moon in the form of a class-on-delivery.

For these workshops, we are ongoingly employing the telescope kit 'KOL-Kit' Spica from Orbys Inc.

In 2008, we analyzed the effectiveness of telescope kit workshops by means of a questionnaire survey covering nine years of experience.



a scene of workshop

Evaluation of Workshops

[Brief Overview]

A workshop is a complete program of about two hours involving introductions of telescope related topics followed by telescope assembly and observation of the Moon (occasionally Jupiter and Saturn as well) with the thus produced telescope. A workshop ends with a question and answer session plus an open discussion.

On an evening with cloudy sky we practice focusing using an illumination in the building and give advice for further use later at home.

Our workshop leader acts as the overall coordinator while one child out of a dozen will attend as staff to assist in providing guidance for tooling and observation.

[Overall Evaluation]

Although we did not engage in any particular PR activities ever since we started in 1999, we continuously received inquiries speaking for high

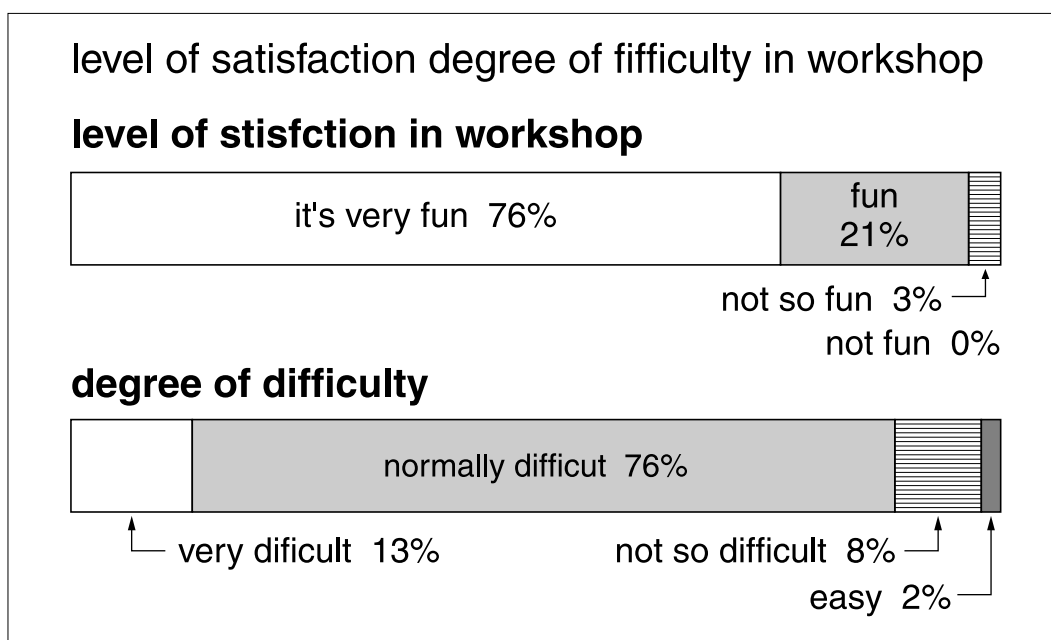
popularity of our workshops. Most frequent attendants are 4th grade elementary kids with their parents, indicating in an event of high acceptance.

On the telescope building session, there are a moment the contents are revealed by opening the bag.

This time, most of participant might be anxious or wonder how it is possible to make telescope with such parts .

But when encouraged to start of operation and after taken appropriate steps it comes to appear step by step looks of telescope. It is joyful time for the participants, above all, when retaining objective lens, it is exciting moment.

Therefore, they understand the image of the Moon focused on, that is of through the lens they touched just before, they might be watching the Moon with mobilized five sence.



[Evaluation of the kit]

From our experience of workshop for past long years, we totally recognize the degree of difficulty to build and also of the telescope performance with high level of satisfaction.

From the survey of the level of difficulty of building and handling telescope, it has been revealed most of pupils felt difficult(90%). diagram-1.

The other hand, for the questionnaire what was the most joyful stage while workshop?, the answer is the crafting the telescope for almost half of pupils.

To say example of an answer of pupil, “ I was excited and joyful when I toughed the objective lens opening the enfold paper and It was joyful for me to build telescope.”

“At first,I saw many parts and wondered what I

should do with those parts.”

“When I was assembling parts, sometimes I lost the way to build, but finally it was successful for me with great pleasure” .

Our over view in acknowledgement is the difficulty and joyful mind live together in the telescope kit.

In another word, the telescope kit is composed with the process enjoyable and that is controlled under the appropriate sense of tension.

Generally to say, this means telescope crafting is totally joyful for the pupils.

We found Spica telescope kit shall be adjusted to age 9 and up.

This account is from our experience of past years.

Nevertheless, the Kit meet to College level, or the old and young alike.

About the telescope performance.

It is possible to explore the craters of the moon, the Galilean moons of Jupiter The ring of Sturn, Sun spot(under supervisor), in the district for no light polluted, the bright nebula and star cluster.

However, for the question what is the most troubled matter in the workshop, The answer is the pointing and the focusing for 45 %.

This means what we consider to take attention in the workshop is not to lead the crafting, but to lead and also assit their handling the telescope they buit.

Our workshops is cooperated with members from NPO the Little Astronmers.

They assist participants in the handling the telescope enable them to be sure of the observaton. We can say, if we do not assist the handling, it will be of 30% who can get independently sure observation with perfect focus. 70% is not perfect..

We can tell about a person saying I can see it, very good !! with the telescope.

But sometimes it could be not perfect focus and if we support.

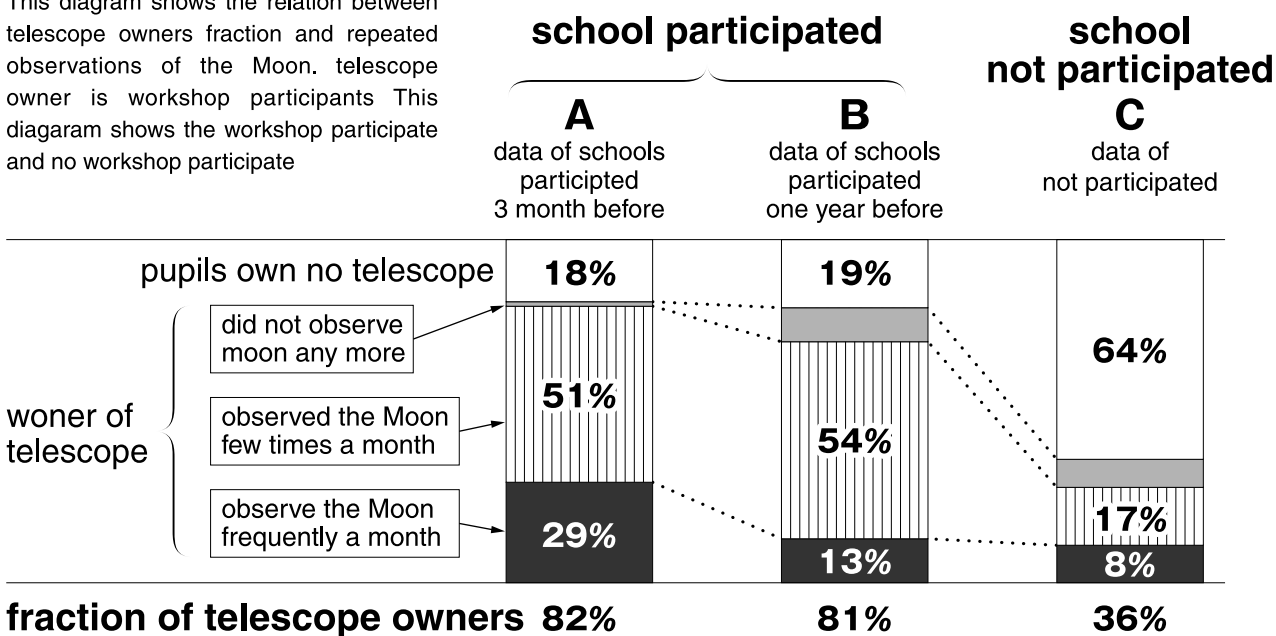
They are surprised what beautiful !!

Finally this might be the fact, to leave the telescope them except support.

The efficiency of workshope will be cut by half.

effect of observation at workshop

This diagram shows the relation between telescope owners fraction and repeated observations of the Moon. telescope owner is workshop participants This diagraph shows the workshop participate and no workshop participate



Continued.....