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Maths For Minis – MfM

www.MathsForMinis.eu

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Four Countries - Six Partners

2018 - 2021

This booklet summarizes the results of the Erasmus + project and is aimed at everyone who is professionally involved in looking after young children.

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Introduction

Different Countries and Different Educational Institutions - Same Problem

Europe's prosperity is based on the motivation and innovative ability of its citizens. Demographic change in numerous European countries (e.g. aging population in Germany, Italy) and industrial development in other parts of the world will significantly change the framework conditions for growth and prosperity in the future. There is obviously a risk that Europe will experience a long-term shortage of skilled workers, particularly for mathematical and scientific qualifications.

One of the main problems seems to be that younger children in daycare and primary school, despite the facilities being adequately equipped, are given little playful and action-oriented confrontation with mathematical phenomena that prove to be significant in their educational biography and influence their future career choices. The dominance of the feminine working world in daycare and primary level reinforces these deficits.

The project partners have set themselves the goal of further developing promising new means in early childhood care, education and upbringing, using the example of the 'MiniMathematikum' traveling exhibition at the 'Mathematikum' in Giessen,

- to standardize them and make them available to interested professionals, educational professionals, school authorities and adult education institutions across Europe,

- to give all specialists in daycare centers and elementary schools a higher level of motivation and a sense of achievement in their daily work in their institutions,
- to further develop a game-based and action-oriented approach to mathematical phenomena, which is also suitable for people with certain disabilities who have previously had little access to mathematics,
- to counteract the educational disadvantage of children with a migration background and to offer children of Sinti and Roma an educational offer that is independent of language,
- to interest young people in mathematical phenomena while taking gender aspects into account,
- to involve parents more closely in the educational efforts of the daycare and primary level of their children in order to strengthen the learning success in their educational biography.

It turned out to be a relief that in all partner countries the organization of early childhood care facilities and the training of the people who work there have a high degree of similarities. (See Appendix 1)

COORDINATOR of the project is:

- **Institut für Bildung und Erziehung gGmbH (Goettingen - Germany)**

www.IBE-Goettingen.de

PARTNERS of the projects are:

- **CRAMARS SOCIETA COOPERATIVA SOCIALE (Tolmezzo – Italy)**

www.coopcramars.it

- **Fundacion Docete Omnes (La Zubia, Granada - Spain)**

www.doceteomnes.com

- **Lifelong Learning Center (Skopje – North Macedonia)**

www.lifelonglearning.mk

- **Association for Roma Community Development SUMNAL (Skopje, Bitola – North Macedonia)**

<https://sumnal.mk/en/>

- **Berufsbildende Schulen BBS- Rinteln (Rinteln -Germany)**

<https://www.bbs-rinteln.de/>

1 Project Description According to the Approved Application

Initial situation:

The educational biographies of children are shaped by early childhood education or its lack. Educators and primary school teachers have little experience with mathematical exhibits in order to be able to support the children appropriately.

The touring exhibition '**MiniMathematikum**' comes from the 'Mathematikum' in Giessen (Germany) and is aimed at children between the ages of four and eight - it consists of a total of 15 play stations.

(See Chapter 3).

At the beginning of the project, the applicant partner IBE had experience in the implementation of the traveling exhibition supported by a state program in Germany (Lower Saxony) - it was presented and supervised in 25 cities across the state. The traveling exhibition was visited by several hundred children at each exhibition location. Children independently explore mathematical phenomena and come up with solutions. Research-based learning on objects is the central, innovative pedagogical / didactic approach that inspires younger children (cf. the program 'Haus der kleinen Forscher' ('House of Little Researchers') funded by the German BMBF.

The challenge:

In a consortium of six European partners, we examined the instrument of the touring exhibition MiniMathematikum with regard to its use and effect on specific target groups at the partners' locations - after reviewing



Our Team

comparable pedagogical / didactic learning approaches and the different national organizational forms of childcare in the partner countries (See Appendix 1). For this purpose, the traveling exhibition was professionally set up by

the Mathematikum in Gießen for all partners for two weeks (in Italy three weeks) and operated by the partners so that specific observations could be made. For this purpose, daycare groups and elementary school classes from the region were invited to visit. It was necessary to check whether the acceptance and effect of the MiniMathematics with regard to a special target group of children is the same as for children in general.

Postscript

The project originally ran for 24 months. Due to the travel and contact restrictions because of the Covid-19 pandemic, we have decided to apply for a project extension until March 31, 2021. We had the hope that by this time unrestricted meeting and travel activities would be possible again, as our project is based on the direct interaction of the children and the adults involved. Unfortunately that was not the case. Therefore, the last project exhibition in Bückeberg could only be evaluated by a small group of participating educators and only with 3 project partners. It should be noted, however, that all planned project exhibitions could be carried out.

It is particularly regrettable, however, that a planned closing event with many hundreds of educators from all over Europe could not take place for the reasons mentioned above. The occasion would have been the official handover of our exhibition to the University of Göttingen, which will be presented there as a permanent exhibition in the future.

In this way it will be achieved that the project can prove its sustainability and that the exhibits will inspire the public for decades.

The handover has now taken place - unfortunately closed to the public. (see press article on the right).

We have therefore decided to create a somewhat detailed project documentation, although our dissemination activities originally aimed at direct contact with educational professionals and children.



2 Implementation of the Transnational Project Meetings

Transnational project meetings were held regularly with all partners throughout the project period. These had the function of accompanying the project progress together and discussing the evaluations of the results of the traveling exhibition with the partners. The host partner prepared the transnational project meeting organizationally on site - the dates for this were jointly set on a long-term basis so that as many partners as possible could participate. A total of six transnational project meetings took place:

2.1 28/29 November 2018 in Goettingen and Giessen (Germany)

At the 1st Transnational Project Meeting, the tasks in the project were discussed and distributed, a time schedule for the traveling exhibition was drawn up at the partners' premises, and the IBE's experiences with carrying out the traveling exhibitions in Lower Saxony were reported.



The long-term preparation of the partners, the selection of a suitable exhibition location and the timely information and invitation of the daycare centers and elementary schools in the region were important for the project implementation on site. For this it was necessary that a flyer

developed according to common criteria had to be produced. (See Appendix 3).



Прекму овој проект и ромските деца ќе имаат можност да ги посетат изложбите кои ќе се организираат во Скопје и Битола и на забавен начин да го развијат математичкото знаење како и логиката.

The thematic focal points of the observations by target groups in the project were distributed:

Skopje (North Macedonia): Girls' access to the traveling exhibition

Bitola (North Macedonia): Access for

Sinti and Roma children to the traveling exhibition

Tolmezzo (Italy): Access for children with a migrant background to the traveling exhibition

Granada (Spain): Access for children with disabilities to the traveling exhibition

Bückeburg (Germany): children of daycare institutions have access to the traveling exhibition

The first meeting already enjoyed an unexpectedly large amount of media interest, although organizational considerations were in the foreground. (See some examples above and Appendix 10)

On the 2nd day of the Transnational Project Meeting, the entire group made a trip to the Mathematikum in Giessen to experiment with the exhibits in the MiniMathematikum and to gain their own experiences. Explanations were given by the long-term cooperation partner of the IBE, Melanie Schmidt, from the 'Mathematikum'.

2.2 10/11 April 2019 in Skopje and Bitola (North Macedonia)

At the 2nd Transnational Project Meeting the discussion of the results of the exhibition in North Macedonia was in the foreground. This had been

set up for two weeks in a museum in downtown Skopie and two weeks in the Bitola city library. The Italian partner in Tolmezzo presented the concept of the evaluation, which was discussed and approved by the partners. The 1st day of the TPM took place in Skopie, the 2nd day in Bitola - both partners had prepared the TPM very well. The observation of LLL (Skopie) and SUMNAL (Bitola) of the children in the traveling exhibition showed that there are no significant differences in the use of the instrument between boys and girls and that there are also no significant differences in use between the Sinti children and Roma ethnic group and other children there. This means: The MiniMathematikum is classified in the evaluation of the observations on special target groups in North Macedonia as a universalistic instrument that does not favor or disadvantage any subgroup. Further topics of the TPM were: evaluation, quality management and project administration.

2.3 3rd / 4th June 2019 in Tolmezzo (Italy)

At the 3rd Transnational Project Meeting in Tolmezzo, the discussion of the results of the exhibition in Tolmezzo was in the foreground. Due to the particularly high level of interest, the MiniMathematikum there had been extended by a week so that more children could visit the exhibition. The interim evaluation of the project was carried out by the Italian partner CRAMARS - all six partners were very satisfied with the progress of the project - the MiniMathematikum was experienced as an enrichment for the partners on site. The observation of the children in the traveling exhibition showed that there are no significant differences in the access of children with a migration background and children without a migration background. On the 2nd day of the TPM, the group made a trip to Trieste to a natural science museum, which also has its profile according to the principles of research-based learning by grasping. It was discussed with this museum (see Appendix 4) whether objects from the 'MiniMathematikum' could expand the offer. Further topics of the TPM were: quality management and project administration.

2.4 12./13. November 2019 in Granada / La Zubia (Spain)

At the 4th Transnational Project Meeting in Granada, the discussion of the results of the exhibition in Granada was in the foreground. There, too, the interest was particularly high - but the exhibition could not be extended because it was needed in Germany. The observation of the children in the exhibition showed that there are no significant differences in the access of children with disabilities and without disabilities. The project group continued the evaluation. Further topics of the TPM were: quality management and project administration.

2.5 11./12. February 2020 in Goettingen (Germany)

At the 5th Transnational Project Meeting in Goettingen, previous experiences with the MiniMathematikum were brought together again and further project progress was discussed on the basis of the interim report. The evaluation showed that all partners showed a high level of interest among the children in the visit. Dissemination and impact of the project was a key point of discussion.

2.6 10/11 March 2020 in Bueckeburg (Germany)

At the 6th Transnational Project Meeting, the discussion of the results of the exhibition in Bueckeburg was in the foreground. Due to the corona, the group at this TPM was very small, participants who did not appear in person were added to the video conference. BBS Rinteln (Vocational school for educators) had prepared the TPM well. In addition to the continuous evaluation, the evaluation of the children's observations by trainees from BBS Rinteln was presented and discussed: No differences in access to the traveling exhibition of younger children from daycare and elementary school children were found.

3 Implementation and Observation results of the Exhibitions in the Partner Countries

3.1 Description of the Exhibits in the Exhibition

The objects described below were used for all exhibitions:

(All exhibits are made by 'Mathematikum" in Giessen, Germany)

The Bridge

A bridge is to be built from the parts. This is similar to the Leonardo Bridge, only four bars are firmly connected to each other.



What are you feeling?

With your hands you feel ten different objects. Can you feel something round or something angular? The pictures must be assigned to the felt objects.



The Ghost Puzzle

With the ghosts you can cover the area without any gaps - a different kind of parquet.



Paint in the Mirror

Draw a figure or write your own name:
actually quite simple -
but not if you can only look in the mirror..



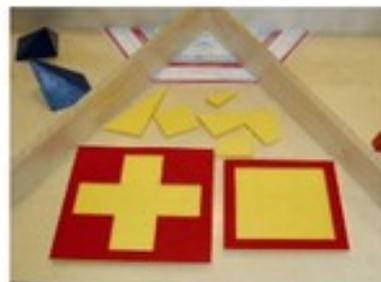
The Puzzle Table

This table is a combination of six different
puzzle games: cross or square, cube from two
parts, cube from three parts, ball pyramid,
square puzzle and triangle.



**The Puzzle Table -
Cross or Square?**

With the five parts you can either lay out the
cross or the square.



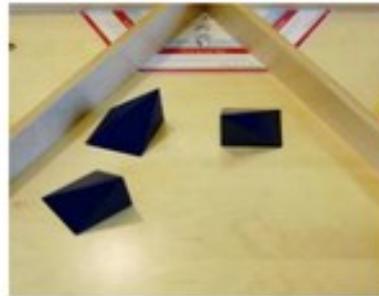
**The Puzzle Table -
Cube made of two parts**

You can assemble a cube from the two parts.



**The Puzzle Table -
Cube made of three parts**

You can build a cube from the three pyramids.



The Puzzle Table - Spherical Pyramid

You can build a spherical pyramid from the three parts.

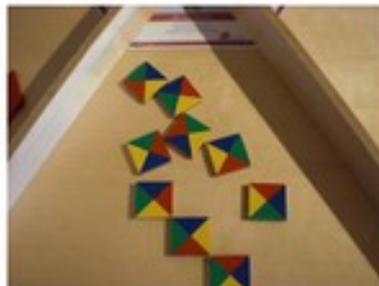


The Puzzle Table - Triangle
The three equal parts put together form a triangle.

The yellow bar serves as a guide for the size of the triangle.



The Puzzle Table - The Square Puzzle



The Ball Tracks

Two ball tracks - one blue and one red. The red path contains an arch, so the route is longer. Two balls are racing. The ball on the red track wins. Why?.



The Hedgehog Wheels

Three tracks that have differently arranged holes and three wheels that are also different. Only the right wheels roll along the tracks on their own.



The Labyrinth

A round labyrinth with an entrance and an exit - and there is only one way through.



The Soap Skins

Different metal frames can be immersed in soapy water. The result is beautiful soap skins - minimal areas that one would not have expected.



The Giant Soap Skin

If you pull on a rope, you will be enveloped in a beautiful soap tunnel. First, the tunnel has the shape of a tube, but soon he gets an ever smaller waist, until it finally touches the visitors and burst.



The Mirror House

If you crawl into the mirror house, you will see yourself mirrored infinitely from different directions.



Lots of Ducks

All ducklings have to find a place in the waves. Each color may only be used once per wave..



We're Building a City

You can recreate the shadow wall with different building blocks. Little by little, a city with houses, towers and churches emerges.



The Number Circle

Twelve round holes are arranged in a circle. Behind every pane of glass under a number there is something - what does what you see have to do with the respective number?



The Gears

A starting wheel with a crank and a wheel at the end with an optical illusion are firmly screwed to the magnet wall. The other gears should now be attached so that the last wheel turns. Does it make a difference in which direction you turn the first wheel?



3.2 Preparation of the Educators and Supervisors involved (LTTA)

Due to the expected high level of interest in the exhibitions, it was necessary to familiarize everyone involved on site with the educational background and organizational requirements beforehand. The supervisors should also act as multipliers for the project and be able to provide answers for experts among the visitors.

IBE employees explained the educational background of the individual objects in several days of training held at all exhibition locations. This was particularly necessary in order to be able to use the observation sheets developed by all partners correctly and to work out an appropriate time window with the exhibition visitors, which had to be agreed on site.

On the other hand, the existing pedagogical experience of the people involved on site could be recorded and appreciated in this way.

The following topics were dealt with in detail:

- **Introduction to the exhibits of the 'MiniMathematikum'**
- **Learning by experimenting**
- **Criteria for the design of learning environments in early childhood education**
- **Evaluation of innovations in the classroom**

The offer to issue a certificate for participation in the training proved to be an additional motivation for the colleagues on site. (See Appendix 2)

3.3 Results of the implementation in Skopje (North Macedonia)

- Preparation and selection of the venue

The partner LLC went to great lengths to find a suitable exhibition location close to the city center that could be visited by many children in Skopje. The selected art museum turned out to be particularly suitable because it is very centrally located.

- Number of visiting children and caregivers

During the two weeks of the exhibition, **558 (298 girls and 260 boys)**; children and their caregivers visited the MiniMathematikum - far more than expected! The daycare centers and primary schools from downtown Skopje were very satisfied with the visit - they had never been offered such an exhibition before.

- Supervision of the exhibition

The exhibition was continuously supervised by the employees of LLC - our partner. Thus, the questions related to the observation of the children could be implemented and processed immediately.

(A detailed evaluation of the exhibition in Skopje can be found in Appendix 4)

- Public impact

Our partner LLC had advertised the exhibition intensively in advance so that it was known to all those involved in early childhood education in Skopje. The feedback on the visit was very positive.

For the purposes of dissemination of information about the project and its activities in Skopje, Lifelong Learning Center prepared promotional materials, conducted meetings with managerial and teaching staff of kindergartens, elementary schools, cultural houses, day care centers for children etc.

Information was spread through the website, as well as on the FaceBook profile of the Lifelong Learning Center, through which **3132** people were reached through the reporting during the exhibition period.

In addition, Lifelong Learning Center created a separate page **Minimathematikum Macedonia**, where info and pictures from the exhibitions were posted on daily basis. A total of **1143** people were reached through this page in the period of the exhibition in Skopje.



Little visitors during the exhibition in Skopje

- Particularities

From the discussions led with the managerial staff and the teachers of the elementary schools and their feedback about Minimathematikum, it is clear that this kind of approach in bringing mathematical concepts closer to children, is not present in the formal school education in Macedonia.

Due to various factors, the current circumstances in the constant changing of curricula for children from 1st to 4th grade, there is a gap related to practical educational work, which creates a need for such concepts as 'Minimathematikum'.

- The interest and willingness of elementary schools for visiting 'Minimathematikum' was much bigger than the capacities to accept them in the given period of 15 days. From that aspect, there is a need for addressing the lack of practical methods and suitable equipment in schools for teaching and learning mathematics through presence of Minimathematikum not only in Skopje, but in the whole country, for a longer period of time, in the form of a project cooperation in which more schools and kindergartens can be involved in a more systematic manner.

After the exhibition, we discussed with our partner LLC whether it would be possible to have a similar touring exhibition to present in all regions of North Macedonia. The responsible Ministry seemed to be interested so this might be a realistic option for the future.

3.4 Results of the implementation in Bitola (North Macedonia)

- Preparation and selection of the venue

In Bitola, the central city library - easily accessible for younger children and centrally located - was chosen as the exhibition location. An member from partner SUMNAL is employed there. The city library was interested in expanding its day-to-day business with an ambitious educational program and thereby sharpening its profile in the field of education.

- Number of visiting children and caregivers

During the two weeks of the exhibition, 42 groups of children in Bitola form primary schools and kindergartens visited the exhibition. In total there were 891 children and 47 teachers. It was visited by children from 1st to 3rd grade from the following primary schools in Bitola: “Dame Gruev”, “Gjorgji Sugarev”, “Kliment Ohridski”, “Stiv Naumov”, “Kiril i Metodij”, “Goce Delcev”, “Elpida Karamndi”, “Trifun Panovski”, and children from the kindergarten “Snowflake”. The number of visitors who visited the MiniMathematikum - far more than expected! The city library in Bitola was enlivened by the visit of the many children.

- Supervision of the exhibition

The exhibition was supervised by the employees of SUMNAL. They made personal experiences with the exhibition during a visit to the Mathematikum in Giessen - that was very helpful. The observations of the children were carried out by the employees of SUMNAL, who have special expertise in projects with Roma and Sinti children.

(A detailed evaluation of the exhibition in Bitola can be found in Appendix 5)

- **Public effect**

The exhibition in the City of Bitola, the second largest city in North Macedonia in, had been prepared for the long term by the partner and was supported a lot by the municipality.

The mayor and senior staff of the city administration received a delegation of the project partners during a visit on site. The local print and online media reported extensively on both the exhibition and the visit.



“Сумнал” ги презентираше резултатите од проектот “Математика за мали” (фотогалерија)

2019-04-11

- **Particularities**

The country’s teacher training facility is located in Bitola. 4 Teachers and 44 students at the local University of Education have explored the MiniMathematikum and discussed about how learning through research on mathematical objects can be integrated into teacher training.

3.5 Results of the implementation in Tolmezzo (Italy)

- Preparation and selection of the venue

In Tolmezzo, the exhibition was held on the premises of the Secondary Public School of Tolmezzo. These were centrally located in the village and therefore easily accessible for younger children. The project was well prepared by CRAMARS - the partner was able to expand its own profile with the target group of younger children and their caregivers.

- Number of children and carers visiting

More groups from daycare centers and elementary schools had registered than expected, so we extended the period of the exhibition to three weeks at short notice so that everyone interested could visit the exhibition. **Eleven elementary schools (classes 1 to 3) and ten kindergarten**



The little visitors have a lot of fun

participated. A total of 90 Teaching staff/ caregivers and 494 (228 girls and 266 boys) children, out of them, 35 children from immigrant families, 1 Roma, 12 with disability from the region visited the exhibition.

- Supervision of the exhibition

The exhibition was supervised by employees from CRAMARS, who were prepared by the IBE as part of LLTA with regard to the concept of the exhibition and the tasks involved in supervision. The observations of the children were also carried out and evaluated by these people.

(A detailed evaluation of the exhibition in Tolmezzo can be found in Appendix 6)

- Public impact

The exhibition was very well received by the media, in the preparation stage an article was written in the **Messaggero Veneto** (newspaper) the event was promoted also via a radio interview by the **national RAI 1**. Due to the high number of visiting children, **this was the central event in the three weeks in Tolmezzo and the surrounding area**. CRAMARS has worked intensively on the perception of the project in social media.

- Particularities

In the run-up to the exhibition, CRAMARS contacted the **Science Center Immaginario Scientifico in Trieste**, which offers research-based learning based on similar principles, but has no play stations for younger children in its program. The project was about exploring the extent to which exhibits from the MiniMathematikum duplicated could expand the permanent offer in Trieste.

During the exhibition in collaboration with the **Institute Linussio of Tolmezzo**, a high school that deals with training young people on the subject of pedagogy and preparing them for their future university studies in the field of education, we involved 7 students in the afternoon shifts for their project, managed by the school, of alternation school / work. This with the aim to give them the opportunity, for didactical reasons, to directly observe the behaviour of the little ones in the training / play activities of the exhibits.

3.6 Results of the implementation in Granada (Spain)

- Preparation and selection of the venue

In Granada, the exhibition was held in an assembly hall of a school by partner F.D.O. carried out close to the city center. The partner is a large educational institution with contacts in many educational areas, with branches in social integration, people with disabilities and elderly care. The exhibition was well prepared and publicly known, so that many daycare groups and elementary school classes could register in good time.

- Number of children and carers visiting

We could see that during the exhibition period, due to the positive reports from the visiting groups, more and more groups wanted to register at short notice. Unfortunately, the period of the exhibition could not be



extended because the MiniMathematikum was needed in Germany. A total of **576 children** and more than **70 caregivers and teaching staff** visited the exhibition.

- Supervision of the exhibition

The exhibition was organized and supervised by employees of F.D.O. These were trained within the framework of LTTA with regard to the concept of the exhibition and the tasks involved in the supervision. The observations of the children were also carried out and evaluated by these people.

(A detailed evaluation of the exhibition in Granada can be found in Appendix 7)

- **Public impact**

The educational institution F.D.O. has a large network of activities on site - especially in the area of promoting the disabled.



The project was presented to all departments internally and thus advertised. **The project and the exhibition were promoted in all the local schools and kindergartens in Granada**, via e-mail, letters and telephone calls. A press release was sent to province level media, and some of them published articles about the exhibition. **The high number of visiting children had a public impact - because children enthusiastically told their families about the MiniMathematikum.**

- **Particularities**

A group of people with mental disabilities coming from F.D.O. occupational centre, supervised by F.D.O. staff, helped set up and dismantle the exhibits. That brought everyone together and a lot of joy!



3.7 Results of the implementation in Bueckeberg (Germany)

- Preparation and selection of the venue

In addition to BBS Rinteln (Vocational school for educators), the 'Fachberatung KITA im Landkreis Schaumburg' (advisory service for day care centers) was also involved in the preparation of the exhibition. This enabled all daycare centers in the Schaumburg district to be reached - the IBE presented the project at the daycare center management meeting three months before the start of the exhibition. The community center of the Evangelical Church in Bueckeberg was chosen as the location, as it was spatially very suitable for the exhibition and could be easily reached by younger children.

- Number of children and carers visiting

During the two weeks of the exhibition, **more than 1,000 children and caregivers visited the exhibition** in groups. In addition, we organized two open **family afternoons that were well attended**. The 'MiniMathematikum' was the central event in Bückeberg during this time.

- Supervision of the exhibition

Two groups of the educator training facility of the BBS Rinteln took over the supervision of the exhibition - always three to four aspiring educators in the exhibition. The groups were prepared for their tasks by the IBE on a long-term basis - we hope for a new positive approach to mathematics for those children who otherwise tend to reject mathematics. The observation sheets that were used were developed together with the cooperation partners. There was a close connection between teaching

and project activities. (A detailed evaluation of the exhibition in Bückeberg can be found in Appendix 8)

- **Public impact**

Just for this part four press articles were published. Thanks to the huge amount of visitors, the exhibition was even more present in the region - during the exhibition there were repeated inquiries whether further groups could come (“word of mouth”).

- **Particularities**

The MiniMathematikum was extended to three weeks so that it could be used in addition intensively by ‘Projekt Forscherfreunde des Landkreises Schaumburg’ - a local educational initiative involving several schools and daycare centers.

4. Overall results, sustainability and evaluation

The touring exhibition MiniMathematikum was rated by all European project partners as a suitable instrument for younger children to independently research mathematical phenomena.

Interest in visiting the exhibition was far exceeded with over 3.500 children, parents, pedagogues and carers although the contact restrictions caused by Covid19 pandemic in 2020/21 did not make all planned events possible.

Fortunately, all partners were able to complete the specific implementation of the traveling exhibitions in advance of the contact restrictions caused by the Covid19 pandemic in 2020/21.

The content-related focal points of the partners could be processed well. This was not least due to the fact that the topic also had a very motivating effect on the people involved in the organization and evaluation. The same was true for the young and adult visitors to the exhibition. The observation of the visitors and the evaluation of the observation sheets showed that the work with the objects caused euphoric enthusiasm among the little visitors.

With the help of the observation sheets it was also possible to document that the objects are suitable for children

- regardless of cultural or ethnic backgrounds (e.g Roma children, social origin, gender or linguistic and physical abilities.

They communicated with each other and found most of the solutions themselves.

It should be emphasized that the average length of stay of visitors to the exhibitions was over 90 minutes.

The partners themselves were able to expand their own skill profiles. In Bitola (North Macedonia), Tolmezzo (Italy) and Bückeberg (Germany) in particular, training facilities for supervisors from these professional fields were systematically included, so that sustainable use of a concept of research-based learning based on mathematical phenomena can be assumed. In Skopje (North Macedonia) discussions were even possible with the responsible Ministry of Education. In addition, the traveling exhibition was accompanied by intensive public relations work by all partners. (See Appendix 10)

The actual effect and sustainability of the project is based on the individual or joint engagement with the exhibits. This applies equally to the children and the educators or accompanying persons.

As regrettable as it may be that due to the adverse circumstances mentioned, the public could not be involved to the planned extent until the end, it was nevertheless possible to secure the public effectiveness of the project for decades:

The touring exhibition ,MiniMathematikum‘ with it’s 15 exhibits had been handed over to the newly established ,FORUM WISSEN‘ of the University of Goettingen opening in autumn 2021 and will be accessible to the public in the long term (see page 8).

Immediately after the opening, the IBE will carry out in cooperation with specialists in museum education of the University a ,MiniMathematikum+‘ project for approx. 3.000 children from daycare centers and elementary schools in the Goettingen region

Overall, it must be stated that the MiniMathematikum has proven to be a universalistic learning tool for all children between the ages of four and eight, regardless of gender, cultural affiliation, origin or impairment.

The goals defined in the application were achieved - despite adverse circumstances.

5. Recommendations

5.1 Pedagogical Aspects

The Mathematics is a very important and necessary subject to learn that benefits us all throughout our entire life. But not all children like it and we (parents and teachers especially) have to find a way to increase their motivation for learning Mathematics. The exhibits we offered during our project did exactly that: the children, and even the teachers and adults who accompanied them were highly motivated to engage with the stations and were having a lot of fun during the process asking for additional time to stay.

Learning Math through this kind of exercises increases children's motivation.

Another positive thing is that the method of learning that the exhibits offer is **highly inclusive**. During our observation we came to the conclusion that all children regardless of ethnicity, gender, specific age or disability act the same way: extremely motivated and happy to learn cooperating with each other and having a lot of fun together. Teachers can use such learning objects not only to promote the integration of certain students, but in this way the inclusion of disabled students can also be promoted.

Furthermore, this way of learning **promotes the individuality** at the same time. Each child is a story by itself and has different level of understanding, ways of dealing with issues and needs different time to come to a conclusion. Thus, it is important to treat children as equals and

give them enough time in the process of learning. The exhibits provide this as well and give the opportunity to the children to individual approach through research developing their cognitive, affective and psychomotor skills including logical thinking.

Learning in pairs or in group is also available as we observed that children simultaneously engage in conversations and activities sharing their thoughts on mathematical notions and solutions.

It has been shown that it is possible and necessary that **even children at the age of 4** can make progress in learning by dealing with the objects. This way **Mathematics as a subject is introduced since very early age**, which is necessary for developing proper attitude and love towards it.

Dealing with the objects **enables ortho-sensory learning and spatial experiences**, which is particularly important for the children and which no longer plays a role in most subjects. These skills are extremely important for proper development of children and this way of learning enables it.

From everything learned through the observations, the conclusions and the recommendations, schools should be given the support for developing interactive curriculum for learning Mathematics based on the exhibits through research and play, so that children can develop their mathematical skills and interest for the subject from their early age. We could see that children were given the opportunity to develop their own style and approach towards learning Mathematics, they could choose the

activities according personal interest, understanding and acceptance, practice persistence in doing an activity till its finalization, and could develop their own opinion regarding learning.

All of this is extremely important for their proper development and this type of learning has extremely positive impact on teaching Mathematics in general, especially in the early ages.

As a final conclusion, we highly recommend that teachers use this method of teaching which will contribute not only for the proper learning and development of their students, but also to their professional development.

5.2 Practical Advice

The specific objects that we were able to use during the project are of course hardly available in all facilities, kindergartens or primary schools. But there are also simple, similar objects of mathematical phenomena that are suitable for educational practice - the child's independence is important. In addition, many objects can easily be created by yourself - even in class. Finally, there are inexpensive objects from various providers that we would recommend for educational practice. In addition, many games are easy to make yourself - maybe even in class?

We would therefore like to make the following suggestions to everyone who is professionally or voluntarily involved in the education and upbringing of children:

1. Use objects or experiments more often with which the children can search for solutions on their own - by trying out, grasping and reflecting on them.
2. Try to structure the exercises in such a way that the children have reason to communicate with one another, but do not have to permanently.
3. Explain the task (e.g. build a pyramid), but not the solution.
4. Give the children enough time so that the sense of achievement can come by itself and the child feels self-efficacy..
5. Make it clear to yourself again and again that the children are learning with their hands, all their senses and their own imagination - this is important, even if there is no mathematical calculation at the end. The child's enthusiasm should be the focus.
6. Try to eavesdrop on the children at work from a distance - you will find them talking about math problems! The 'MiniMathematikum' is also an instrument for language training. To a certain extent, you can measure your teaching success by this.
7. If no one finds the solution for a particular experiment, repeat it another day before you reveal the solution.
8. Observe whether children talk to each other during the experiments who otherwise would not and whether everyone participates.
You will likely find that the individual children are moving closer together.
9. Think about how you can implement research-based learning on mathematical exhibits in your facilities. What resources do you need for this?

You can download a full report with all appendices included from our website:

www.MathsforMinis.eu

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Educational System in Partners' Countries

	County: Germany Name of the partner's institution: BBS Rinteln	County: Italy Name of the partner's institution: Cramars	County: Macedonia Name of the partner's institution: SUMNAL/ LLC Macedonia	County: Spain Name of the partner's institution: Docete Omnes
At what age does compulsory education begin in your country?	At the age of six.	Compulsory schooling begins at the age of 6 when children enter primary school.	In our country the compulsory education begins with the enrollment in first grade at the age of six.	At the age of six.
Are there voluntary pre-school education and care facilities? If yes, which and for which age groups?	Yes, we have the following forms of support: Day nursery for children at the age of 0-3. This form is used by 33 % of the children. Kindergartens for children at the age of 3-6.	Yes, there are. <u>Kindergartens</u> welcome children from 2 years and 8 months up to 5 years of age. <u>Nurseries</u> welcome children from 6 month up to 3 years of age.	Yes, there are. We have kindergartens which accept children aged from 2 years and 8 months till 5 years. We also have nurseries which accept children aged from 6 months till 3 years.	Yes, there are. We have Kindergartens (Escuelas Infantiles) for children from birth to 6 years old. They are educational centers where the first stage of primary education is taught. The inscription in these centers is voluntary, though.
Do many parents use these facilities for their children?	This form is visited by nearly 95% of the children.	Almost all parents avail themselves of the help of kindergartens, while a smaller number of them use nurseries preferring to entrust children to the care of grandparents or nannies.	Almost all of the parents use the kindergartens, while the nurseries are used by smaller number of parents because they prefer to leave their children at the care of their grandparents. Some of them hire nannies.	There are other centers where kids are cared (nurseries and playhouses) till the age of three maximum. They don't offer education services and they are not considered as education centers. 37,9% of kids under 3 years they are schooled in Spain. 53% of children under 3 use any of the facilities available.
Is the participation free of charge?	The calculation of the charges depends on the federal state the daily care takes place.	Depends on the type of school. State kindergartens are free while private kindergartens are charge. Private nurseries are paid for, while municipal nurseries provide for the payment of a fee established, on the basis of the income of the families.	The participation in the state kindergartens is free, while the state nurseries provide care for a free established, based on the income of the parents. The private kindergartens are paid for. There are also Early childhood development centers. Some of them are paid for, and some are free of charge, like our Center which works primarily with children of the Roma population, the most marginalized, poor and socially endangered population.	As an average, only 6% of school places available are completely free of charge, but the figures varies from one "Comunidad autónoma" to another. Anyway, the fee is calculated accordingly to the economical situation of the families.

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Are these facilities operated privately or by the state?	The state has the duty to take care for an adequate offer of facilities. The facilities themselves are operated privately, churchy, by social welfare and subsidiary by the state.	There are both private and state kindergartens. The nurseries school are largely private but there are also some municipal ones, that ask for an economic contribution based on the income of the families.	The state facilities are operated by the state, and the private ones privately. The nurseries are mostly private, but there are some operated by the municipality where parents give some economic contribution based on their income.	There are state and private kindergartens. Nurseries and Playhouses are mainly private, but many of them are managed by the government of the Comunidad Autónoma and/or of the municipalities.
Do these facilities have full-time staff with fixed contracts?	This is the common practice.	Partly. Most of the staff have permanent and full-time contracts. But there is a part of staff that works with monthly or annual contracts. A small part benefits from the part-time.	Most of them have full time staff with fixed contracts, but there also some which work with monthly or annual contracts. There are also part-time employees.	In centers managed by public bodies, that type of contracts are the most usual, but even in those centers, 28% of iterrim teachers are laid off in holidays (and after them they are hired again).
Does the staff need to have certain qualifications? If yes, which?	Yes, most of the staff has the following qualifications: Sozialpädagogischer Assistent (minimum) Erzieher Heilerziehungspfleger Heilpädagoge Sozialpädagoge	Since 2002 teachers must have a degree in training science (Scienze della Formazione) in order to be qualified to teach. Before 2002 it was necessary to have a high school diploma (Magistral School or Psycho-pedagogical High School)	Yes. The employees in the kindergartens have to have a degree in teaching preschool and kindergarten children obtained in some of our pedagogical faculties, or a license to work with children of the specific age.	Yes, in kindergartens a Teaching Degree (Magisterio) or High School diploma in Infant Education (Técnico Superior en Educación Infantil) are needed.
Do these facilities have to meet certain equipment standards? If yes, which?	This depends on the federal state. For lower saxony we have the following standards: KiTaG 1. and 2. DVO.	Yes, as far as kindergartens are concerned. Children leaving kindergartens must have the necessary skills and pre- requisition to enter primary school.	Yes, they have to meet the equipment standards according to the Law for protection of the children under the supervision of the Ministry for labor and social issues.	Yes. There is a special regulation for each kind of centre, that can vary from one Comunidad Autónoma to another.
Is there a curriculum that describes playful learning in mathematics (Age of four to eight years)? If yes,how is this implemented in children's facilities?	This depends on the federal state. To lower saxony applies: Orientierungsplan für Bildung und Erziehung in niedersächsischen Kindertageseinrichtungen.	Yes, there is. Italian teachers refer to European curricula and national indications to plan structured activities in all disciplinary fields. Among the activities there are also recreational activities (playful learning) and laboratory.	Yes, there is. The teachers refer to European curricula and national indications to plan and implement the activities.	In Spain educational system is decentralized, so each Comunidad Autónoma has its own curriculum.

Educational System in Partners' Countries

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Are there any approaches for this age group that focus on researching learning and thus on children's own activity?	Yes, for example: Co-construction Metacognition	Yes, there are. Most of the proposed activities have as their main aim the promotion of the learning of the children through a direct involvement of the children in the different activities.	Yes. Most of the activities require direct involvement of the children.	Yes, there are, but again there's no unified model for the whole country.
Is there a collection of educational models or games that support learning in the field of mathematics? If so, how is this used?	There are several materials and games that refer to the fields of mathematics.	Not officially. Generally, games and activities are designed and prepared by the individual teacher or by the team of teachers of the class/ the school/ college teachers. They are used during the lessons.	There is no official collection. Mostly the activities are planed individually by the teachers and implemented during the lesson.	Not officially. Teachers are, in general, free to implement their own activities and even assessment methods. Every educational centre has a job position called "Jefe de Estudios" who is responsible for organising the teaching methods.
Is there a debate about strengthening STEM (science, technology, engineering, mathematics)competencies and are initiatives taken? If yes, which?	Yes, we call it MINT (mathematics, informatics, natural science, technology). The debate led to several projects, foundations, etc. that finance the early childhood education in these ranges.	Not that I know of.	There have been some attempts to promote and strengthen the STEM competences in the educational facilities. There is a STEM academy in our country and at the Educational conferences I have visited, this question has been discussed and promoted. I am not aware if it is implemented in the regular educational system.	Yes, and there are many educational center (mainly private ones) that offer study planes addressed to improving STEM competences.



Project Partners

Germany

BERUFSBILDENDE SCHULEN RINTELN

<https://www.bbs-rintel.n.de/>

Italy



<https://www.coopcramars.it/en/home/>

Spain



<http://www.doceteomnes.com/>

Germany



<https://www.ibe-goettingen.de/>

Macedonia



<http://www.lifelonglearning.mk>

Macedonia



<https://sumnal.mk/en/>

Maths For Minis – MfM

www.MathsForMinis.eu

Project-No. 2108-1-DE02-KA202-005080
01-10-2018 to 30-09-2020

Four Countries - Six Partners

Mr./Ms. **XXXXXXXXXX XXXXXX**
from

Name of organisation

CERTIFY

that

Mr./Ms. **XXXXXX XXXXXXXXXXXX**

participated successfully in a training seminar following the topics:

- Introduction to the exhibits of the 'MiniMathematikum'
- Learning by experimenting
- Criteria for the design of learning environments in early childhood education
- Evaluation of innovations in the classroom

Date:

Signature



TRAVELING EXHIBITION FOUR COUNTRIES - SIX PARTNERS

www.MathsforMinis.eu

Where?

The traveling exhibition can be visited in different project countries

When?

The traveling exhibition is open

Skopje (MK) - February 2019
Bitola (MK) - February/March 2019
Tolmezzo (IT) - May 2019
Granada (E) - October 2019
Rinteln (D) - January 2020



WHAT IS THE GOAL OF THE PROJECT?

The potential of younger children to access mathematical phenomena is not adequately promoted in most European countries and has no priority in early childhood education. This has consequences: in an important phase of their educational socialization, children get only few experiences to engage in mathematical phenomena with enthusiasm and everyday orientation. Four countries, six partners. We want to face this problem. The traveling exhibition „Maths for Minis“ from the Mathematikum in Giessen - Germany, is a collection of exhibits for children aged four to eight years. 15 “play stations“ allow a new positive approach to mathematics because children can independently make their own mathematical experiences. Genuine understanding arises from the fact that children actively build up knowledge, that is, “construct”.

In this project, funded by the ERASMUS + program, the traveling exhibition will be tested in various European countries with focus on special target groups. After evaluating the results, in 2020 a final conference will take place in Germany.

THE CONCEPT

The exhibition is based on the so-called “Mini Mathematikum” from Giessen - Germany.

It opens a new door to mathematics. At stations with interactive experiments the children can independently make mathematical experiences. Access is via their own experience: they can lay puzzles, build bridges and see themselves mirrored endlessly. Visitors experiment at the Puzzle Table, paint with view into a mirror or build a city. Genuine understanding does not work because learners passively absorb knowledge, but by actively building knowledge, that is, constructing.

They can discover forms, numbers, patterns and learn to distinguish shapes: round and square, those with few corners and those with many, even and spatial. Patterns are created by putting together shapes in a way that fits them perfectly. Numbers can be used to describe shapes and patterns. They can distinguish triangles from squares and name them. This elementary approach to mathematics opens their eyes. They learn to see, learn to distinguish and to perceive. If they have mathematical shapes and patterns in mind, they can see more of the world.

EU PROJECT AND TRAVELING EXHIBITION

The traveling exhibition Maths for Minis consists of 15 exhibits and is aimed at children between the ages of four and eight - it is a bridge project for older children in Kindergartens and younger elementary school children. The exhibits, adapted to the age of the children, encourage children's attention to engage as quickly and directly as possible with the mathematical phenomenon. The success of the constructive acquisition of knowledge is expressed in the high communication needs of the children among each other. The exhibited exhibits can be found on the net at www.ibe-goettingen.de

MATH MAKES
EVERYBODY HAPPY!

EXAMPLES

Puzzle Table

This table is a collection of six different puzzle games: cross or square, two-piece cube, three-piece cube, sphere pyramid, square puzzle and triangle.

Soap Skins

Different metal racks can be dipped in soapy water. The result is beautiful soap skins - minimal surfaces you would not have expected.

Mirror House

If you crawl into the mirror house, you will see yourself mirrored endlessly from many different directions.

We are building A City

With different building blocks you can copy the shadow wall. Gradually, a city with houses, towers and churches will emerge.

Look in the mirror and paint

Recreate a character or write your own name: actually quite simple - but not if you can only look in the mirror.

All pictures come from Minimathematikum Giessen



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Report on the implementation of the exhibition

Minimathematikum in Skopje,

February 11th – 22nd 2019

1. The exhibition “Minimathematikum” in Skopje, Macedonia, in the context of the project “Maths for Minis”

In accordance with the project aims and planning, the first journey of the travelling exhibition “Minimathematikum” was to Macedonia. Its’ first destination was Skopje – the capital, where it was exhibited in the period 11-22 February 2019, in line with the project timeline. This project activity was conducted by the project partner Lifelong Learning Center. In general, this activity was implemented with success, as arranged and planned.

2. Implementation

2.1. Preparatory phase

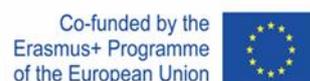
The preparations for the exhibition began in early December, with internal meeting of the team of Lifelong Learning Center, for the development of an action plan of activities, time arrangements, resources plan etc. for a successful conduction of the responsibilities related to the preparation of the exhibition.

According to these arrangements, in the period December – January 2019, comprehensive preparations were made in order to find a suitable exhibition space and to identify schools, kindergartens and other potential educational centers for the children aged 4-8 years as target group of Minimathematikum.

Identification of suitable space. An important part of this segment of the preparatory work was the contact and communication with the office of the Mayor of City of Skopje, in cooperation with whom a suitable space was identified. Several different public institutions which are under the patronage of the municipality of Skopje were considered as potential space. After the analysis of 6 such institutions, the decision was made to set up the exhibition in the Public Institution House of Culture “Kocho Racin” – Skopje.

Preparation of promotional material. An integral segment of the preparation was the development of promotional and informational materials for the project in general with special emphasis of the exhibition in Skopje. This included translation and printing of the leaflet, translation of the newsletter, drafting of a cover letter for communication etc.

Promotion of the exhibition in educational facilities. For this purpose, the project and the exhibition were promoted in several schools and kindergartens and other facilities, such as





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day care centers. In this context, the schools and kindergartens were invited to join in by organizing group visits for their pupils in the age range 4-8 years.

Development of an exhibition schedule. In order to organize and conduct the exhibition in the best possible manner, with maximum efficiency and effectiveness, it was decided to make a schedule of visits. In the communication with the educational facilities, it was decided that the exhibition will be visited by the classes, led and accompanied by their teachers.

Logistical/technical coordination and preparation. This phase included intensive communication with the project coordinator and partners from Germany, for the successful transport from Germany to Macedonia and setting up of the exhibits. Another segment was the preparation of the space, with a range of measures to adjust and organize it for the purposes of Minimathematikum and to create best suitable conditions.

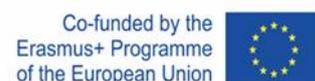
Coordination with project partner Sumnal – Bitola. During the whole process of preparation as well as during the implementation and evaluation phases, regular everyday communication was maintained with the project partner Sumnal from Bitola. This was especially important because Sumnal was to receive the exhibits and organize the exhibition in Bitola.

Conduction of a Learning/Training/Teaching Activity. This meeting, held in the period 9-11 February 2019, was a very important part of the preparation of the exhibition, as it offered introduction into the technical aspect of the exhibition as such, but moreover it aimed at equipping the team with the information, knowledge and know-how on the idea, concept and background of “Minimathematikum” in general and with instructions and recommendations on approaching and guiding the young visitors through each play station. The gained knowledge was very valuable and used in practice throughout the everyday work with the children.

2.2. Conduction

The exhibition was held in the period 11 – 22 February 2019. Three elementary schools (grades 1st to 3rd) and two afterschool day care centers participated. In addition, in the frames of a family day held February 16th, additional children were welcomed. A total of 568 children in the age 4-8 years visited Minimathematikum. *The schedule, as well as an overview on the exact figures of children is presented in point 2.3. of this report.*

It is important to underline that the schools showed great interest and motivation to get involved in the exhibition. Unfortunately, although several attempts were made to involve the kindergartens (telephone calls, e mails, meetings etc.), none of the kindergartens gave positive answer to the invitations.





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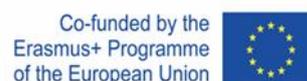
The team members of Lifelong Learning Center, who received introductory training, were hosting the visits. As recommended, one visit lasted 90 minutes. The class teacher/s who led and came with the pupils, were asked to fill out the questionnaires.

3. Evaluation of results

The analysis of the project documentation (participants lists, questionnaires) showed following figures:

- a) Teaching staff **38**
- b) Children in total **558**
 out of which, **298 girls** and **260 boys**. Out of them, **5** are with disability and **29** are Roma.
- c) Parents **13**

Date	Female Children	Male Children	Roma Children	Disabled Children	Total
11.02.	15	8	3	/	23
12.02.	10	14	/	2	24
13.02.	17	10	/	/	27
13.02.	16	16	/	1	32
13.02.	15	5	/	/	20
14.02.	16	12	2	/	28
14.02.	7	8	/	/	15
15.02.	12	16	1	/	28
15.02.	7	15	22	/	22
16.02.	7	6	/	/	13
18.02.	6	11	/	1	17
18.02.	21	11	/	/	32
18.02.	14	17	/	/	31
19.02.	12	8	/	/	20
19.02.	13	11	/	/	24
19.02.	17	20	/	/	37
20.02.	12	10	/	/	22
20.02.	17	15	/	/	32
21.02.	22	10	/	1	32
21.02.	12	8	/	/	20
22.02.	15	14	/	/	29
22.02.	15	15	1	/	30
Total	298	260	29	5	558





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The feedback from the teachers in the questionnaires, is summarized in a separate document enclosed to this report.

4. Dissemination

For the purposes of dissemination of information about the project and its activities in Skopje, Lifelong Learning Center prepared promotional materials, conducted meetings with managerial and teaching staff of kindergartens, elementary schools, cultural houses, day care centers for children etc.

Information was spread through the website, as well as on the FB profile of the Lifelong Learning Center, through which **3132** people were reached through the reporting during the exhibition period.

In addition, Lifelong Learning Center created a separate page Minimatematikum Macedonia, where info and pictures from the exhibitions were posted on daily basis. A total of **1143** people were reached through this page in the period of the exhibition in Skopje.

After the completion of the exhibition, the administration of this page was handed over to the partner Sumnal, in order for them to continue reporting with their exhibition. *More detailed overview of the dissemination activities is given in the Dissemination grid.*

5. Experiences / Findings / Recommendations

The participation of the Lifelong Learning Center in this project in general, and the opportunity to organize and host the exhibition Minimatematikum, was a unique experience. For the team of the Center it was a valuable new experience and an extraordinary learning opportunity.

Logistics. Although it was challenging to manage the 1,5 tons heavy exhibition and to create all necessary conditions for putting it together, it was managed smoothly.

- In this regard, all instructions that came from the side of the German partners were crucial and very useful for successful technical management at the beginning and the end of the exhibition.

Observations during group visits: From the two-week hosting and guidance of 22 groups of 558 children, following experiences were made:

- The children are impressed as they enter and see the exhibits and they are euphoric*
- The teachers are also amazed and thrilled and also actively play and explore*





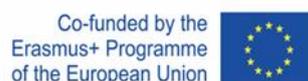
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- *In the first 15 – 20 minutes, the children have a rather disoriented behavior, they explore all play stations. After that, they slow down and begin to play with more attention and start choosing to play with preferred play stations.*
- *The educators' team of Lifelong Learning Center had the experience that the 90 minutes foreseen for one visit, are too long. It was anticipated that after approx. 60 minutes, children start to get hyperactive and lose attention. Therefore, in most of the cases the sessions lasted 70-75 minutes.*
- *It was very useful to give introduction at the beginning and to communicate several rules to the children*
- *The play station Gearwheel (Zahnräder) turned out to be rather “dangerous” (in cases when children tended to pull the gears, which are heavy. Another “risky” situation is when one child is spinning the lower gear with the handle and others touching the board with the hands). Additional attention in general needed to be paid in order to prevent injury.*

General recommendations:

- ***From the discussions led with the managerial staff and the teachers of the elementary schools and their feedback about Minimathematikum, it is clear that this kind of approach in bringing mathematical concepts closer to children, is not present in the formal school education in Macedonia. Due to various factors, the current circumstances in the constant changing of curricula for children from 1st to 4th grade, there is a gap related to practical educational work, which creates a need for such concepts as Minimathematikum.***
- ***The interest and willingness of elementary schools for visiting Minimathematikum was much bigger than the capacities to accept them in the given period of 15 days. From that aspect, there is a need for addressing the lack of practical methods and suitable equipment and learning environment in schools for teaching and learning mathematics. The presence of Minimathematikum for a longer period of time (6 – 12 months), in the form of a project cooperation, would be a possibility to cover more schools, not only in Skopje, but also countrywide.***





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6. Photo gallery





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Report of the implemented observation regarding the project:

“MATHS FOR MINIS”

Erasmus registration number: 2108-1-DE02-KA202-005080

Bitola, March 2019



INTRODUCTION

The project "Maths for minis" has the goal to offer new dimension of learning Math through which the children will gain mathematical experiences by themselves. From the museum "Mathematicum" in Gissen, Germany, were brought 15 different 'play stations' and the children involved in the project in Bitola had the opportunity to explore and learn by direct contact with the exposed objects thus finding logical solutions to the mathematical challenges. The traveling exposition "Maths for minis" is a collection of exponats for children from 4 till 8 years old. In a time frame of 90 minutes, groups of 20 – 30 children had the opportunity to visit the exposed exponats in Bitola in the period between 25th of February and 08th of March 2019. They learned individually by playing simultaneously developing their logic and also developing love towards the Math as a subject. The idea for developing a project like this came from the need to overcome the present situation form which is evident that the potential of the small children for approaching the mathematical phenomena is not accordingly promoted and has no priority in early education of children. The early childhood development is of exceptional importance for the development of children; it influences the right development of the brain at children and increases their readiness for school and later life. This project enables the children to get the chance for facing the mathematical phenomena and the everyday orientation in an important phase of their social education.

During the implementation of the project it is planned to implement observation of the children during their visit of the exhibition which would give a clear picture for their motivation during the use of the mathematical exponats, whether they are happy and enthusiastic with the activities, which 'play stations' left the biggest impact in them and which were less favorite, and also whether the children had difficulties in solving the mathematical challenges or they could solve them easily without any problems. Apart from the general observation of the children's behavior, SUMNAL has the goal to analyze the motivation and the success of the Roma children from Bitola, their capability to realize the activities by themselves and the level of positive results at the end of the activities. For this purpose we were able to include 23 Roma children, 10 male and 13 female.

OBSERVATION AND RESULTS

The implemented observation was created according to planned directions and methodology of research. The observation was intended for defined goal example of 42 groups of children in Bitola form primary schools and kindergartens. The exhibition was visited by 891 children and for the purpose of the research were filled 47 questionnaires. It was visited by children from 1st to 3rd grade from the following primary schools in Bitola: "Dame Gruev", "Gjorgji Sugarev", "Kliment Ohridski", "Stiv Naumov", "Kiril i Metodij", Goce Delcev", "Elpida Karamndi", "Trifun Panovski", and children from the kindergarten "Snowflake". To the exhibition also came 44 students from the Faculty of pedagogy in Bitola in order to upgrade their studies regarding pedagogy and enrich their experience with innovative and interactive teaching methods.

The basic questions of the research which were supposed to be answered, are the following:

“MATHS FOR MINIS”

- What is the children’s motivation during the exhibition?
- Do children communicate between themselves and with the adults during the exhibition?
- Do children use all 15 ‘play stations’?
- To which extent are the adults included actively during the activities?

Collecting data is an organized activity focused towards recording of the teachers’ attitudes and opinions regarding the contribution of this kind of exposition to the target group as well as the achieved results from the visit of the exposition.

The basic method which is used in the research is the method of test as a base for collecting empirical data through written testimonies given by the respondents. The basic technique applied in the research is a survey, and the instrument is a questionnaire. In this research the written survey is used, which is implemented on respondents with developed written communication skills. The survey includes standardized questionnaire with 42 questions (see appendix 1). The questionnaires were given in printed form to the respondents, and the data was statistically processed in Excel by given percentage. The analysis and the interpretation of the received data is presented in this report, including the summary at the end. The following charts explain the respondents’ attitudes and opinion. From the aspect of the demographic characteristics of the respondents, the gender and ethnicity are also included which are another part of the research.

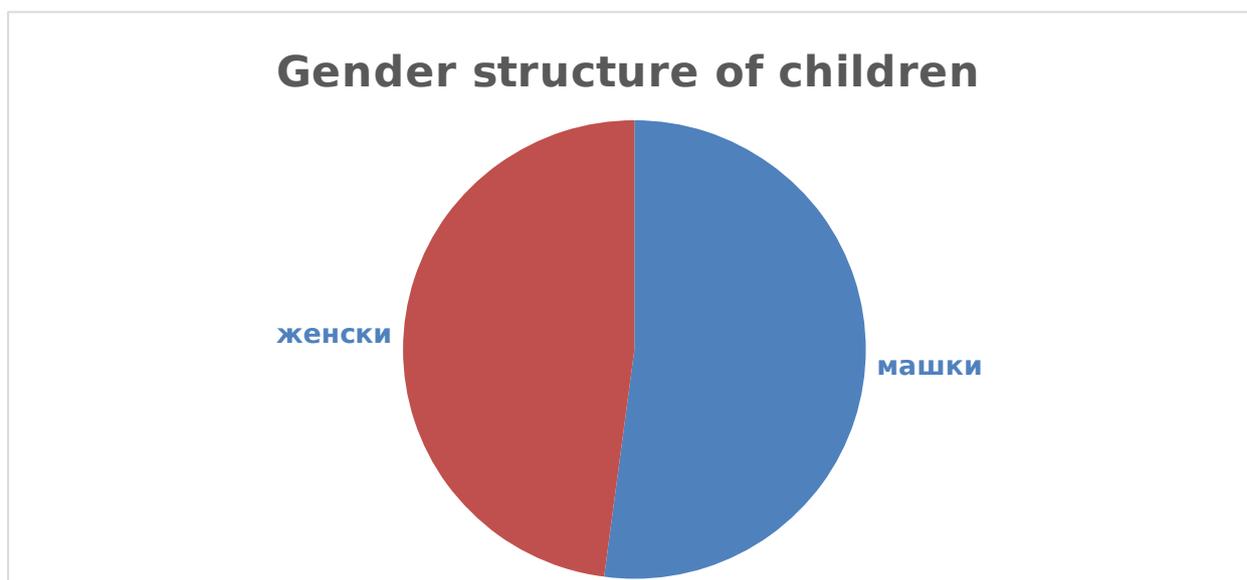


Chart 1. Gender structure of children

Chart 1 gives review of the gender structure of children. According to the received data it is seen that in the research were included almost the same amount of male and female children. According to this there were 52 % male and 48% female children included in the research.

CHILDREN’S MOTIVATION

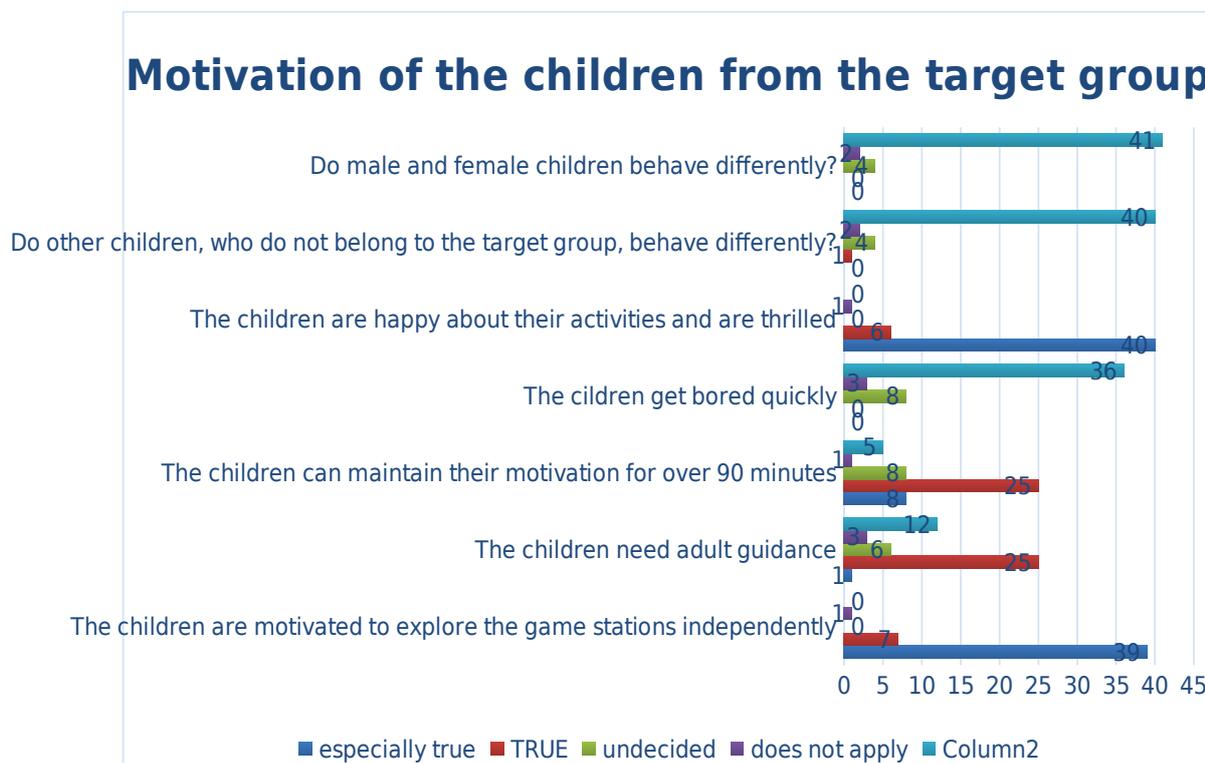


Chart 2. Motivation of the children from the target group

From chart 2 can be seen that the majority if the children were motivated during the activities. 39 responded (83%) that this is especially true, which means that the children show a lot of motivation during the activities. 15% decided to respond that this is true. Only 1 of the respondents, which is 2%, decided that this does not apply to the group.

Regarding the question: Do children need help from an adult?, only 1 responded wrote that this is especially true, 25 respondents or 53% wrote that it is true, 6 respondents could not decide, and 3 respondents wrote that it does not apply to the group. 12 respondents or 26% wrote that it is not correct at all. According to the results, we can conclude that more than half of the respondents perceived that children need adult guidance during the activities, while 26 % wrote that children can solve the mathematical problems by themselves with no help. Most of the teachers, which are 8 in number or 17%, responded that it is especially true, and 25 teachers or 53% responded that the statement ‘Children can maintain their motivation for more than 90 minutes’ is true. 8 teachers (17%) responded that it cannot be decided, 1 responded that it does not apply to the group, and 5 that it is not tru at all (11%).

Regarding the statement ‘Children get bored quickly’, none of the teachers responded ‘especially true’, or ‘true’. 8 teachers or 17% wrote that it cannot be decided, 6% that it does not apply to the group, and the majority (36 teachers -77%) responded that it is not true at all.

The majority of the teachers – 40 teachers (85%) perceived that the statement ‘Children are happy and thrilled with the activities’ is especially true, and 6 teachers (13%) responded that it is true. Only 2% of the respondednts, or 1 teacher wrote that it cannot be decided, which

proves that the exhibition was successful and left a big and positive effect on children resulting with their happiness and satisfaction.

Regarding the question if other children which do not belong to the target group act differently, the majority of the respondents wrote that it is not true (42 teachers or 89%), while 1 responded wrote that it does not apply and that it is true. 4 teachers (9%) responded that it cannot be decided.

There are similar observations from the respondents for the next question: ‘Do male and female children act differently’? 1 teacher responded that it is especially true, 2 teachers could not decide, other 2 responded that it does not apply, while 42 teachers or 89% responded that male and female children were equally involved in the activities. As additional statements regarding this question, teachers wrote: ‘Children work according their interest and knowledge, not according gender or ethnicity.’

CHILDREN’S ACTIVITIES

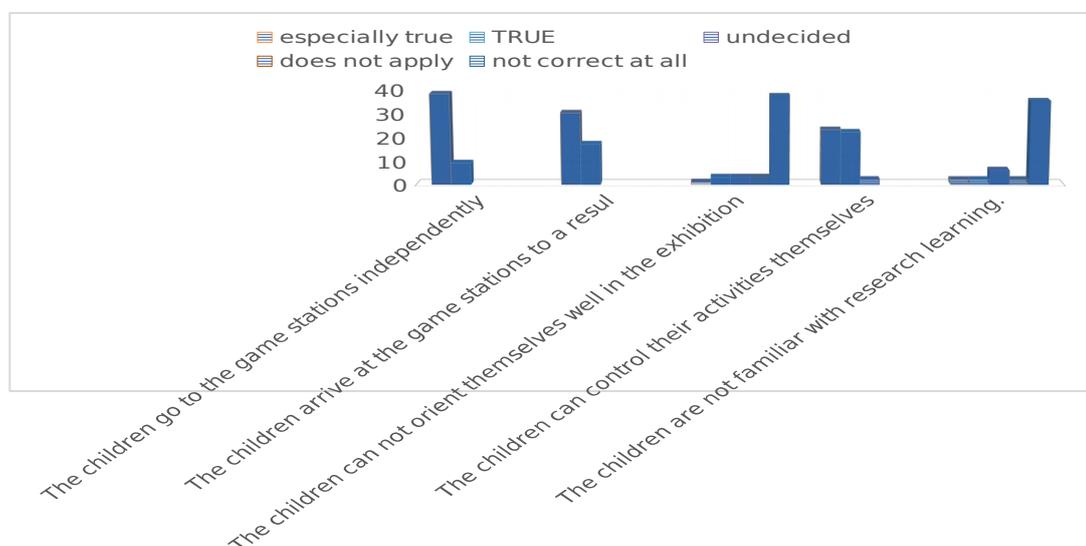


Chart 3. Children’s activities

Chart 3 gives us information about the number of children which are actively involved in the activities. From that aspect the data shows that 38 respondents or 81% wrote that it is especially true that the children can approach the stations independently, and 19% or 9 teachers wrote that this is true. From the received data it can be concluded that all teachers perceived that the children feel enough confident and desire to approach the stations independently, without adult guidance. From the aspect of the achieved results at the play stations, 30 teachers or 64% responded that it is especially true, and 17 teachers (36%) responded that it is true. According to this it can be seen that all teachers evaluated that the exhibition is positive and think that the children successfully solved the given mathematical challenges.

Regarding the statement: ‘The children cannot orient well at the exhibition by themselves’, only 1 respondent wrote that it is especially true, 3 teachers- 6 % responded that it is true, same number of teachers responded that it cannot be decided and that it does not apply,

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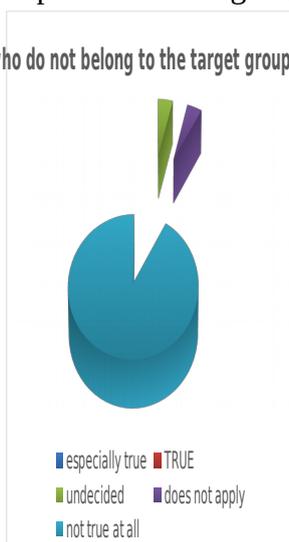
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while the majority of teachers (37 or 79%) responded that it is not correct at all, which concludes that the children could orient themselves without problems around the space of the exhibition.

Positively, or 23 teachers (49%) responded that it is especially true, and 47% or 22 teachers responded that it is true to the statement that the children can control the activities by themselves. The teachers have the opinion that the children can finish the activities by themselves with minimal adult guidance.

To the statement that ‘The children are not familiar with research learning’, the majority of the teachers, or 35 (74%) responded that they do not agree, 2 respondents wrote that it does not apply, 6 respondents (13%) could not decide, while 2 responded that it is true, or especially true. As a conclusion we can state that children had the opportunity to learn different mathematical operations through research.

Do other children, who do not belong to the target group, behave differently?



Do male and female children behave differently?

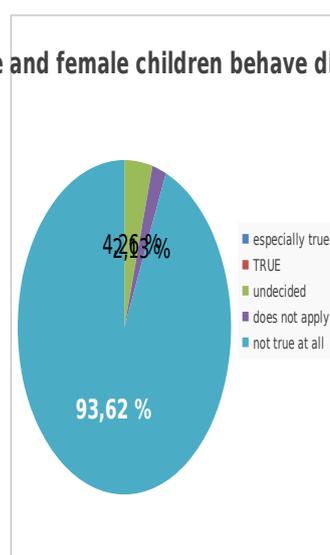


Chart 4 and 5: Do other children, who do not belong to the target group, act differently?/ Do male and female children act differently?

The received data from Chart 4 and 5 show that teachers have similar opinions regarding these questions. None of the teachers thinks that children act differently during the activities, 4% think that children act differently, other 4% could not decide, 2% responded that it does not apply, while 94% responded negatively regarding this question.

In the additional section for comments, teachers stated: “All children individually and in groups reach results during the activities.”

COMMUNICATION BETWEEN THE CHILDREN

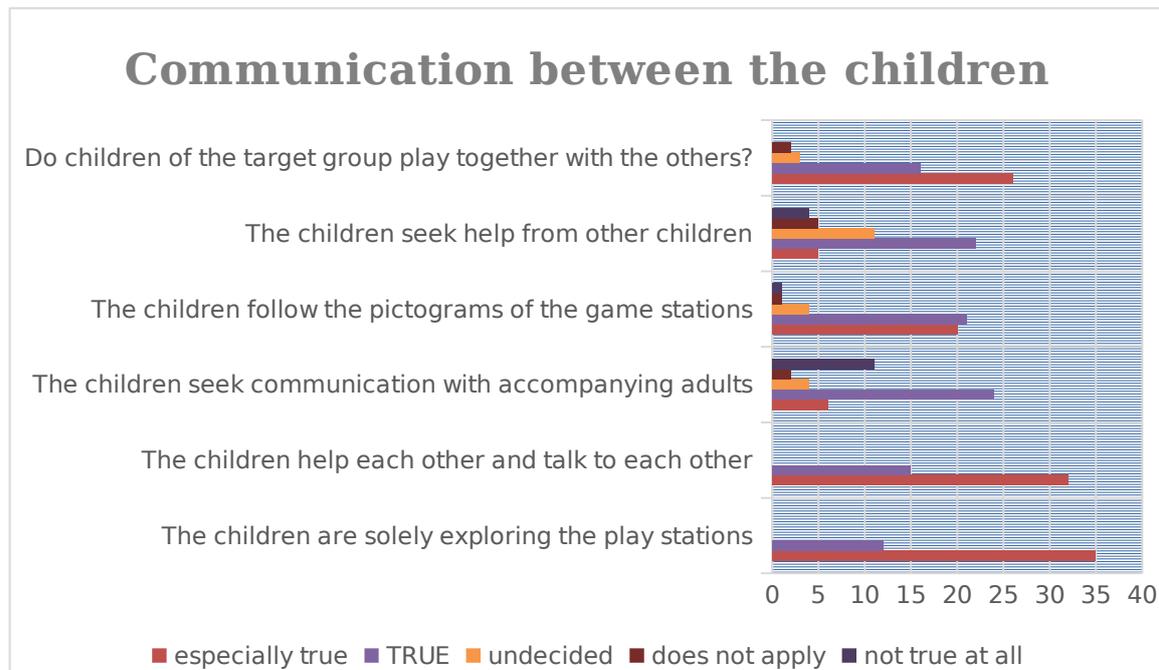


Chart 6: Communication between the children

The results shown in the chart 6 give summary of the state regarding the communication between the children during the exhibition, and between the children and the adults who accompany them. From 47 teacher respondents, 35 or 74% wrote especially true regarding the statement that ‘the children solely explore the paly stations’, while the rest 12 teachers or 26% decided that it is true.

Similar results are received from the analysis of the second statement: ‘Children talk to each other and help each other’. 30 teachers (64%) perceived that the children very much communicated between each other and helped each other during the activities, and the rest 36% wrote that this is true. From the received results it can be concluded that the children preferred to seek help from their friends and to solve the difficulties together with them, and very rarely decided to seek help from adults.

However, for the next statement ‘Children seek communication with the adults who accompany them’, 6 teachers, or 13% responded that this is especially true, and 24 teachers (51%) responded that this is true. 4 of the teachers could not decide, and 2 responded that it does not apply. 11 teachers or 23% responded that the statement is not true at all. This means that half of the respondent think that children needed help from the adults regarding directions for some of the play stations, while 23% think that children could successfully and with no help from the adults solve the given tasks.

Positively, or 43% (20 respondents) responded that it is especially true, and 45 % (21 respondent) responded that it is true regarding the statement that ‘Children follow the pictograms from the play stations’ and act according the instructions given on the picture. Only 8% could not decide, 2% responded that it does not apply, and other 2% responded that it is not true at all.

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Analyzing the results from the next statement (Children seek help from other children), we come to conclusion that the majority of the teachers, or 11% and 47%, think that the statement is especially true and true. The results show that children seek help from other children while playing in a group in order to solve the same task, or the children who have already solved it give instructions to the other children who need help. From the rest teachers, 23% could not decide, 11% or 5 teachers responded that it does not apply, and 4 teachers responded that the children did not seek help from other children and that they individually solved the task.

The majority, or 55% responded ‘especially true’ and 34% ‘true’ and from this it can be concluded that the children from the target group (the Roma children) played together with the other children as a team and solved together the mathematical operations. 3 teachers could not decide, 2 responded that it does not apply, and none of the teachers thought that the children from the target group did not want to play with the other children.

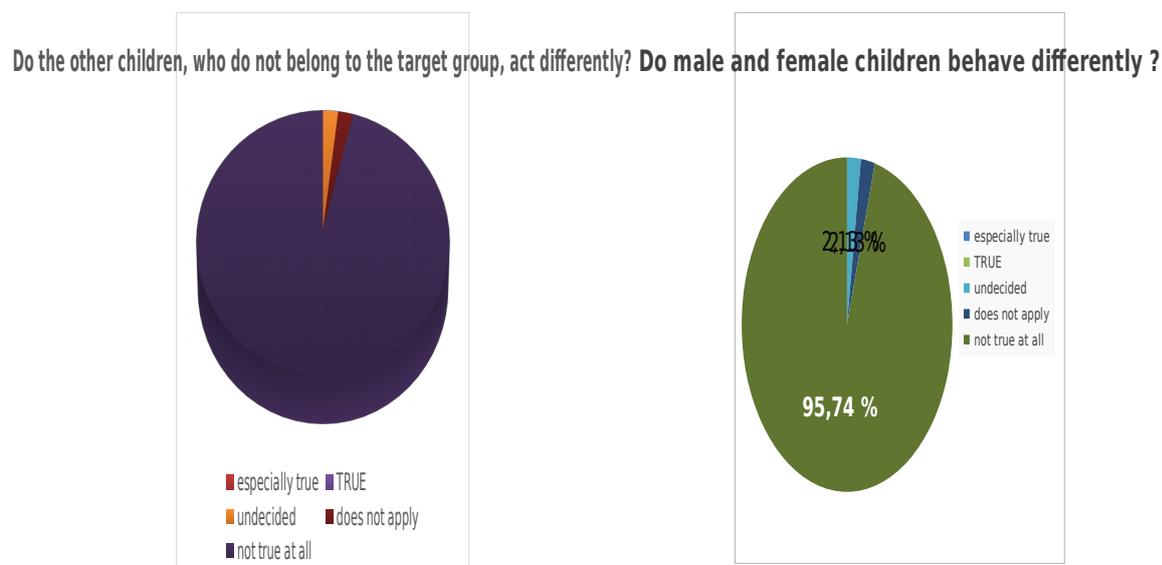


Chart 7 and 8: Do other children, who do not belong to the target group, behave differently? / Do male and female children behave differently?

The received data from the chart 7 and 8 show that teachers have similar opinion regarding these questions. None of the teachers thinks that children behave differently during the activities, 2% responded could not decide and the same percent responded that it does not apply, while 96% responded negatively regarding this questions.

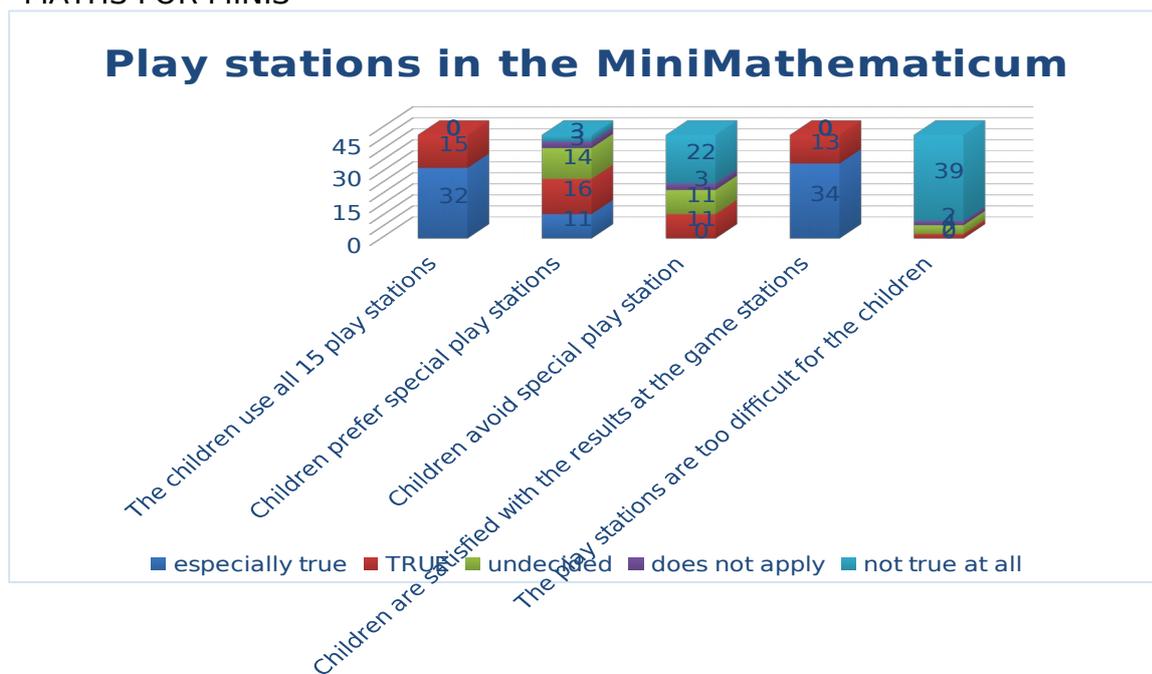


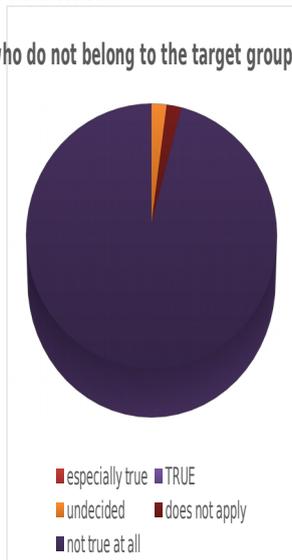
Chart 9: Play stations in the MiniMathematicum

Chart 9 gives overview and analysis of the play stations in the MiniMathematicum. All 47 teachers, or 100% think that children had the opportunity to visit all 15 stations in the given 90 minutes. 11 teachers, or 23% responded that children especially prefer some play stations, and 16 teachers (34%) share the same opinion by responding 'true' to the statement. From the rest, 14 teachers, or 30% responded that could not decide, 3 teachers responded that it does not apply, and also 3 teachers responded that the children did not have favorite play stations. To the question: 'Which of the play stations is their favorite?', the majority of the teachers responded that it is the station where children play with soap water, and then follow the station with drawing while looking in the mirror, the pyramid with mirrors and the station with the city of shadows.

While analyzing the statement: 'Children avoid special play station', 23% responded that this is true. From the rest of the teachers, 11 or 23% could not decide, 3 teachers responded that it does not apply, and 22 teachers or 47% responded that children did not avoid special play stations. From this we can conclude that the majority of the children had fun during the activities at each play station. The teachers who decided about the first option, stated that the least favorite play stations were the one where children had to touch objects and match them with the pictures and the association with numbers.

34 teachers responded 'especially true' and 13 'true' to the statement 'Children are satisfied with the results at the play stations'. The received results show that the children felt confident while solving the mathematical tasks and could successfully solve them, while their teachers evaluate their results as excellent. Contrary to this, only 2 teachers think that the play stations are too difficult for the children, while 39 teachers, or 83% think that the play stations were not difficult for the children and the majority of the children could solve the given tasks.

Do other children, who do not belong to the target group, behave differently?



Do male and female children behave differently?

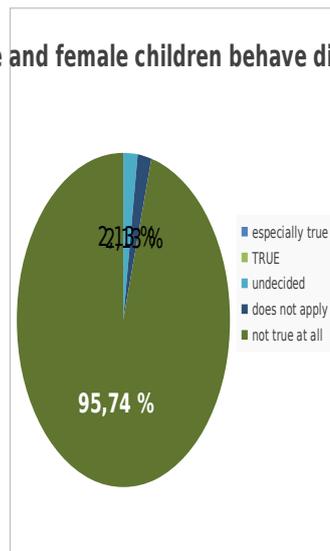


Chart 10 and 11: Do other children, who do not belong to the target group, behave differently? / Do male and female children behave differently?

The received data from the chart 10 and 11 show that teachers have similar opinion regarding these questions. None of the teachers thinks that children behave differently during the activities, 2% responded could not decide and the same percent responded that it does not apply, while 96% responded negatively regarding this questions.

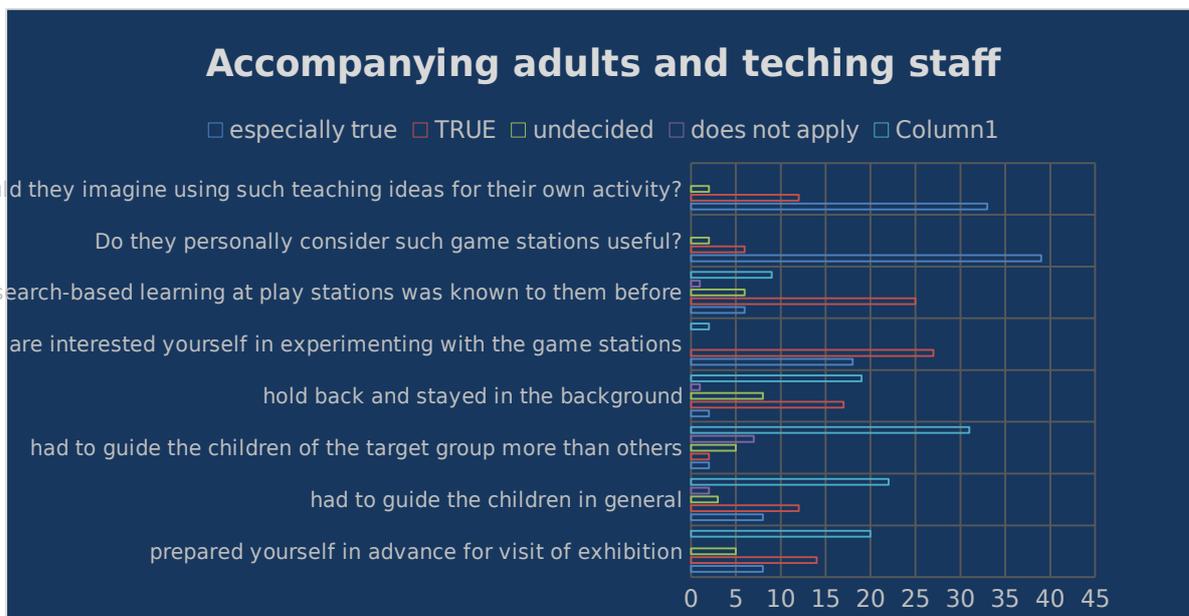


Chart 12: Accompanying adults and teching staff

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From the received results in chart 12 we can see the opinion of the adults about the play stations. For the first statement we can notice divided opinion among teachers. 8 teachers or 17% wrote ‘especially true’ and 14 teachers or 30% wrote ‘true’ to the statement that they prepared in advance for the exhibition. From the rest 25 teachers, 20 stated that they did not prepare in advance (43%), while 5 teachers (11%) did not give a specific opinion. 20 teachers or 43% (17% with ‘especially true’ and 26% with ‘true’) responded that they felt the need to guide the children during the exhibition. 3 teachers or 6% could not decide, while the rest 2 teachers responded that it does not apply. The majority of the teachers – 47%, responded that they did not need to guide the children through the play stations and left them to explore by themselves.

A considerably big number of teachers with ‘not true at all’ (31 teachers-66%) stated that they did not dedicate additional attention and did not guide more the children from the target group in comparison to the other children. 9% of the teachers responded that they guided the children from the target group more than the other children, 7 responded that it did not apply, and 5 could not decide. From the results regarding the fourth statement, we can see that 2 teachers think it is especially true and 36% true about the statement that they were reserved during the exhibition and stood in the background observing. 8 teachers (17%) could not decide, 1 teacher responded that it did not apply, and 19 teachers or 40% did not stand in the background and actively followed the children at each of the play stations.

The majority of the teachers (96%) had interest and desire to experiment themselves and solve the mathematical challenges together with the children, and only 4% responded that this is not true at all.

From the 47 respondents, 6 teachers wrote that it is especially true, and 25 true about the statement that the teachers we already familiar with different methods and techniques for learning through research. The mathematical stations only helped them to expand their horizon and get new ideas for teaching Math so that their students can show better results. 9 teachers or 19% learned about research-based learning for the first time, and 6 teachers could not decide if they had the opportunity to learn about research-based learning.

83% of the teachers responding ‘especially true’ and 13% with ‘true’ think that the play stations are useful and helpful for the children in order to learn and understand the Math curriculum and the mathematical operations and forms, as well as for the development of their logics. The teachers have similar opinion about the last statement. 33 teachers wrote ‘especially true’ and 12 ‘true’ (96% in total) to the statement that the play stations were of great use and helped them to get ideas on how to implement them during teaching in their class. Only 2 teachers or 4% could not decide.

SUMMARY AND RECOMENDATIONS

Taking in consideration the received results from the observation, the conclusions and recommendations should be directed towards giving educational and strategic support to schools in order to develop interactive curriculum for Math, include innovative methods which will motivate the children to develop their mathematical capabilities and develop their interest for learning Math from their early ages through play and research.

The implementation of the observation as part of the project, gave the opportunity to get a clear picture for several aspects regarding the importance to develop the capacities of children from their early age:

- The children develop their own approach and stile towards learning Math;
- They are motivated to select activities from the offered ones regarding their personal interest and their way of understanding and acceptance;
- Develop the capability to initiate an activity and show bigger persistence in its realization till its finalization;
- They build a personal opinion regarding learning.

The data shows that the method for learning Math through research results as a positive model and children learn a lot of things connected to Math, but also with the everyday life. During the observation, it was concluded that research-based learning of Math in the early grades has positive effects regarding teaching Math in the first cycle of the primary education.

Recommendations:

- Implementing innovative and contemporary techniques and methods in teaching Math with which the children would have the opportunity to learn the mathematical operations individually through research;
- Organizing training for teachers in order to change their opinion towards teaching and learning Math so that they leave the traditional approaches and accept modern style of teaching.

In regards to the behavior, motivation and the success of the Roma children from Bitola, their capability to realize the activities by themselves and the level of positive results at the end of the activities, we could conclude that there is no difference in comparison to the other children.



Report of the implemented observation regarding the project:
"MATHS FOR MINIS"

Report on the implementation of the exhibition

Minimathematikum in Tolmezzo, Italy

May 6th – 24th 2019

1. The exhibition “MiniMathematikum” in Tolmezzo, Italy, in the context of the project “Maths for Minis”

In accordance with the project aims and planning, the second journey of the travelling exhibition “MiniMathematikum” was to Italy. The second destination was Tolmezzo, situated in the north east of Italy, where it was exhibited in the period 6-24 May 2019, in line with the project timeline. This project activity was conducted by the project partner Cramars – Tolmezzo.

In general, this activity was implemented with success, as planned.

2. Implementation

2.1 Preparatory phase

The preparations for the exhibition began in early January 2019, with internal meeting of a small group of Cramars staff, for the development of an action plan of activities, time arrangements, resources plan etc. for a successful conduction of the responsibilities related to the preparation of the exhibition.

According to these arrangements, in the period January – February 2019, comprehensive preparations were made in order to find a suitable exhibition space and to identify schools, kindergartens and other potential educational centres for the children aged 4-8 years as target

group of Minimathematikum.

Identification of suitable space. The most difficult part was to identify the space, we contacted the referent of the network Sbilfs that are in direct contact and work as councillors with local schools. They proposed us to share a space in Gemona del Friuli, but the idea was to host the museum in Tolmezzo so we tried another way by contacting directly directors of all Tolmezzo schools discovering that mainly schools building are owned by the Municipality of Tolmezzo.

We fixed some appointments with the municipality and at the end we got 2 rooms by the Secondary Public School of Tolmezzo, one was the room of the secretariat (because they moved to another public building) and the other the conference room.

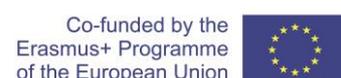
Preparation of promotional material. An integral segment of the preparation was the development of promotional and informational materials for the project in general with special emphasis of the exhibition in Tolmezzo. This included translation and printing of the leaflet, translation of the newsletter, drafting of a cover letter for communication etc.

Promotion of the exhibition in educational facilities. For this purpose, the project and the exhibition were promoted in all the local schools and kindergartens via e-mail, first of all to the main districts then specifically to the single institutes of Carnia, then also to the school districts of all the Udine province. Following the previous experience of Skopje partners the schools and kindergartens were invited to join in by organizing group visits for their pupils in the age range 4-8 years.

We were lucky in dealing with the regional press and having an article written in the Messaggero Veneto as well as promote the initiative via a radio interview by the national RAI 1 – dealing at regional level.

Development of an exhibition schedule. In order to organize and conduct the exhibition in the best possible manner, with maximum efficiency and effectiveness, it was decided to make a schedule of visits. In the communication with the educational facilities, it was decided that the exhibition will be visited by the classes, led and accompanied by their teachers, defining maximum numbers of participants and visit shifts as following:

- Max 30 children per shifts
- Two shifts every morning from 09.00 to 10.30 and from 10.30 to 12.00 than on Wednesday, Thursday and Friday also an afternoon shifts from 14.00 to 16.00.



Logistical/technical coordination and preparation. This phase included communication with the project coordinator and partners from Germany, for the successful transport from Germany to Italy and setting up of the exhibits. The previous experience of the Macedonian partners were very useful to this purpose.

Conduction of a Learning/Training/Teaching Activity. This meeting was held in 3 days' time the 03rd, 04th and 06th of May 2019 and was a very important part of the preparation of the exhibition, as it offered introduction into the technical aspect of the exhibition as such, but moreover it aimed at equipping the team with the information, knowledge and know-how on the idea, concept and background of "Minimathematikum" in general and with instructions and recommendations on approaching and guiding the young visitors through each play station. The gained knowledge was very valuable and used in practice throughout the everyday work with the children. We also recorded some videos of explanations to share with the school involved in the project as alternation school/work.

Involving Secondary School students to the exhibit. In collaboration with the Institute Linussio of Tolmezzo, a high school that deals with training young people on the subject of pedagogy and preparing them for their future university studies in the field of education, we involved 7 students in the afternoon shifts for their project, managed by the school, of alternation school / work. This with the aim to give them the opportunity, for didactical reasons, to directly observe the behaviour of the little ones in the training / play activities of the exhibits.

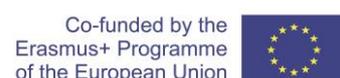
2.2 Conduction

The exhibition was held in the period 6 – 24 May 2019. Eleven elementary schools (classes 1 to 3) and ten kindergarten participated. In addition, children with parents, a community for disabled, a secondary school were welcomed.

A total of 494 children in the age 4-8 years visited MiniMathematikum. Also, a group of disabled adults visited the exhibition.

All the schools, that took part at the exhibition, showed great interest and motivation. Especially a school asked, after first visit, to be able to come again.

As recommended one visit lasted 90 minutes. The game stations were divided in two rooms, so children staid about 40 minutes in each room. The last 10 minutes have been used to ask feedback and impressions to the children.



3. Evaluation of results

The analysis of the project documentation showed following figures:

- Teaching staff: about 90
- Children in total: 494 (228 girls and 266 boys). Out of them, 35 children from immigrant families, 1 Roma, 12 with disability.

Date	Female Children	Male Children	Children from immigrant families	Roma Children	Disabled	Total
7.5	11	9	2 (f)	/	/	20
8.5	10	10	/	/	/	20
9.5	12	10	/	/	/	22
10.5	9	9	1 (m)	/	/	18
10.5	11	7	/	/	/	18
14.5	7	16	1 (m)	/	/	23
15.5	5	3	1 (m)	/	/	8
15.5	11	15	/	1 (m)	/	26
15.5	13	10	/	/	/	23
16.5	4	9	/	/	/	13
16.5	13	10	1 (m); 2 (f)	/	/	23
16.5	1	8	/	/	/	9
17.5	5	8	1 (m); 1 (f)	/	/	13
17.5	10	8	1 (m); 3 (f)	/	/	18
20.5	4	10	/	/	/	14
20.5	13	9	1 (m); 4 (f)	/	/	22
21.5	5	4	/	/	/	9
21.5	5	7	1 (m); 1 (f)	/	/	12
21.5	3	3	/	/	3 (m); 3 (f)	6
22.5	13	13	2 (m); 2 (f)	/	/	26
22.5	9	14	6 (m); 3 (f)	/	/	23
22.5	2	1	/	/	/	3
22.5	7	7	/	/	/	14
23.5	7	23	1 (m)	/	/	30
23.5	2	4	/	/	4 (m); 2 (f)	6
23.5	6	9	/	/	/	15
24.5	8	5	/	/	/	13
24.5	11	11	/	/	/	22
	228	266	35	1	12	494

4. Dissemination

For the purposes of dissemination of information about the project and its activities in Tolmezzo, Cramars prepared promotional materials, conducted meetings with Municipality, managerial and teaching staff of kindergartens, elementary schools, cultural houses, day care centres for children etc.

Information was spread through the website, as well as on the FB profile Cramars, through which 3132 people were reached through the reporting during the exhibition period.

In addition, Lifelong Learning Center created a separate page Minimatematikum Macedonia, where info and pictures from the exhibitions were posted on daily basis. A total of 5832 people were reached through this page before and in the period of the exhibition in Tolmezzo.

More detailed overview of the dissemination activities is given in the Dissemination grid but just to list it we had a great interest and a lot of articles online and on newspapers as well as a radio interview at:

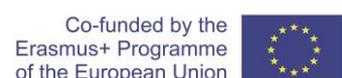
- Friulionline.com
- ildiscorso.it
- Ifriuli.it
- instart.info
- It.geonews.com
- Messaggero Veneto
- news.rsn.it 28.05.19
- news.rsn.it 29.04.19
- studionord.news 28.05.19
- studionord.news 29.04.19
- TGR FVG - rainews.it
- Virgilio

5. Experiences/ Findings/ Recommendations

The participation of Cramars in this project in general, and the opportunity to organize and host the exhibition Minimatematikum, was a unique experience. For the team of the Center it was a valuable new experience and an extraordinary learning opportunity, especially because we normally deal with adults, but we found out that dealing with children is really funny.

Logistic:

Although it was challenging to manage the 1,5 tons heavy exhibition and to create all necessary conditions for putting it together, it was managed smoothly.



In this regard, all instructions that came from the side of the German partners were crucial and very useful for successful technical management at the beginning and the end of the exhibition. For security reasons we used the exhibits to cover some dangerous points so that the children could not see them and did not stumble.

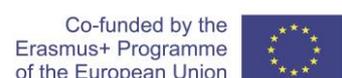
Observations during group visits:

From the three-weeks hosting and guidance of 29 groups of 494 children, following experiences were made:

- The children are impressed, they are euphoric; lot of them ask where they can buy soap station to make the big bubble.
- Favourite games: big soap bubble, mirror hut, ball race track, gears, bricks building.
- Children avoid special play stations: stations that need bigger effort or attention to focus in order to solve the task (for example the pyramid construction) and draw looking the mirror.
- Children asked help to build the bridge.
- It was not intuitive the play at the table where they have to recognize hidden objects.
- The children don't follow the pictograms of the game stations.
- Children of elementary school lose attention in some stations (ducks are too simple for them).
- Children begin to play with preferred play stations. They were bound by their teachers to test more difficult and challenging stations.
- Trend to abandon more challenging stations, if they fail to complete the game.
- At the end of the 90 minutes foreseen for the visit, someone asks to stay more time.
- Children climb mirror hut.
- Useful to give introduction at the beginning and communicate some directions (for example use big soap bubble one by one).
- From the discussions with the teachers it is clear that, in the majority of cases, this kind of approach in bringing mathematical concepts in a practical and playful game is not present in the formal school education in Italy.
- Some schools could not participate for logistic and transport reasons.

6. Conclusions and recommendations:

As far as the logistics and organization of the exhibition are concerned, the next working groups are advised to start disseminating the initiative well in advance as it is difficult for schools to ask for permission from the school or parents, organize the bus and include the activity formally from an educational point of view.



Attention to the safety of the spaces made available to prevent accidents and injuries, for example we have covered all protruding corners, closed any pipes or power outlets.

Keep the net within reach to foam the soap bubbles to allow the use of the game station in the most correct way.

With the help of the previous experience and the report developed by the Macedonian partners we developed a checklist which we recommend to follow not to forget advice and key indication.

It is necessary to explain to the children the exposition and introduce the games in an area far from the games themselves, at the entrance or in the lobby because when they see the plays, they absolutely lose the concentration for the great curiosity.

Make a discussion circle at the end of the meeting to ask the children for an evaluation of the experience, for example, ask kindergarten children what were the most interesting games for them and in addition, for children from the elementary schools, what was teaching behind or if they learned anything from the plays.

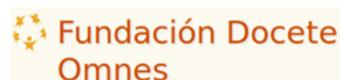
If the location is divided into two rooms, calculate the right time for each room in each group by 40 minutes plus the final 10 minutes for feedback for all - divide the groups into games or by room if numerous.

The children, especially the smaller ones, did not get bored after 90 min. indeed they asked if there were other games available or if they could return for a second meeting.

If the games are to be divided into different rooms, it is better to think about the interest and attractiveness of each play to be able to distribute them in the best way so that both rooms have at least 2 more "interesting" or "attractive" games.

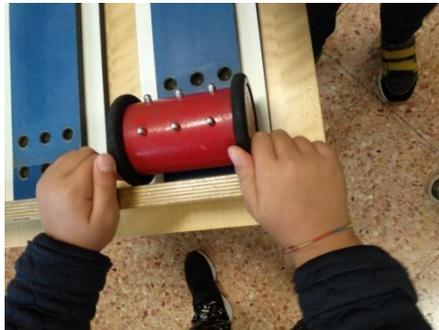
The activity to be done at the table of the recognition of hidden objects was not very intuitive, so it is necessary to give at least the indication to the teacher so they can more easily guide the children.

Ask help from teachers to better deal with water games especially the big bubble. The children alone don't understand that, for security reasons and for the fact that the floor will be slippery after the first bubble, they have to stay in line and follow some rules.



We have experimented the play stations even with a group of disabled people (physical and mental), adults aged 25 to 50 years, after the previous supervision by their educators and the result was really positive. They showed enthusiasm and surprise in the various games especially the water games also if they could not access them (for example because of the wheelchair). Apart from the water games for which they had not access, all others were within their physical and mental reach.

7. Photo Gallery



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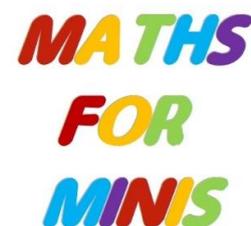


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Zubia \(Andalusia\)](http://www.doceteomnes.com/)
<http://www.doceteomnes.com/>



Report on the implementation of the exhibition

Minimathematikum in Granada, Spain

OCTOBER 14th – 25th 2019

1. The exhibition “MiniMathematikum” in Tolmezzo, Italy, in the context of the project “Maths for Minis”

In accordance with the project aims and planning, the third journey of the travelling exhibition “MiniMathematikum” was to Spain. The second destination was Granada, situated in the south east of Spain, where it was exhibited in the period 14-25 October 2019, in line with the project timeline. This project activity was conducted by the project partner Fundación Docete Omnes – La Zubia, Granada.

In general, this activity was implemented with success, as planned.

2. Implementation

2.1 Preparatory phase

The preparations for the exhibition began in early January 2019, with internal meeting of a small group of F.D.O staff, for the development of an action plan of activities, time arrangements, resources plan etc. for a successful conduction of the responsibilities related to the preparation of the exhibition.

According to these arrangements, in the period January – February 2019, comprehensive preparations were made in order to find a suitable exhibition space and to identify schools,



kindergartens and other potential educational centres for the children aged 4-8 years as target group of Minimathematikum.

Identification of suitable space. The most difficult part was to identify the space, we contacted the many schools to see if they would allow us to use their facilities to carry out the exhibition. We also contemplated using the Foundation's own space but decided against that due to the location of schools and the difficulty of getting to the location for many of schools that we would be asking to attend. We got in touch with Ave Maria. This is a school located in the heart of Granada. They were open towards allowing us to use their hall for the exhibition. They also have a primary school associated with their organisation and were interested in their students participating in the exhibition. We got in contact with schools before the summer break and directly after as well.

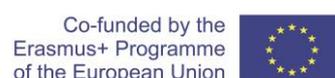
Preparation of promotional material. An integral segment of the preparation was the development of promotional and informational materials for the project in general with special emphasis of the exhibition in Granada. This included translation and printing of the leaflet, translation of the newsletter, drafting of a cover letter for communication etc. This was sent to every school in Granada before the summer break with follow up calls after the break.

Promotion of the exhibition in educational facilities. For this purpose, the project and the exhibition were promoted in all the local schools and kindergartens via e-mail and letters with brochures. We took the experience of our Italian and Macedonian partners into account and we invited many schools to join in by organizing group visits for their pupils in the age range 4-8 years.

Development of an exhibition schedule. In order to organize and conduct the exhibition in the best possible manner, with maximum efficiency and effectiveness, it was decided to make a schedule of visits. In the communication with the educational facilities, it was decided that the exhibition will be visited by the classes, led and accompanied by their teachers, defining maximum numbers of participants and visit shifts as following:

- Max 30 children per visit
- Two shifts every morning from 09.00 to 11.30 and from 11.45 to 13.15 Monday to Friday.

Logistical/technical coordination and preparation. This phase included communication with the project coordinator and partners from Germany, for the successful transport from Germany to Italy and setting up of the exhibits. The previous experience of both the Macedonian and Italian partners were very useful to this purpose.



Conduction of a Learning/Training/Teaching Activity. This meeting was held the week previous to the exhibition and was a very important part of the preparation of the exhibition, as it offered introduction into the technical aspect of the exhibition as such, but moreover it aimed at equipping the team with the information, knowledge and know-how on the idea, concept and background of “Minimathematikum” in general and with instructions and recommendations on approaching and guiding the young visitors through each play station. The gained knowledge was very valuable and used in practice throughout the everyday work with the children. We also recorded some videos of explanations to share with the school involved in the project as alternation school/work.

Involving teachers in training in the exhibit. In many of the schools we had contacted they had teachers who were doing their internships and so it was decided to send them information before the groups would come to the exhibition. This had the aim of give them the opportunity, for didactical reasons, to directly observe the behaviour of the little ones in the training / play activities of the exhibits. They were instructed not to explain any of the activities to the young students until they had explored each activity themselves.

2.2 Conduction

The exhibition was held in the period 14 – 25 October 2019. Thirteen elementary schools (classes 1 to 3) participated. In addition, children with parents, a community for disabled, a secondary school were welcomed.

A total of 576 children in the age 4-8 years visited MiniMathematikum.

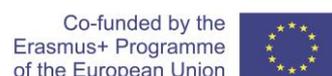
All the schools, that took part at the exhibition, showed great interest and motivation. Especially a school asked, after first visit, to be able to come again.

As recommended a visit lasted 90 minutes. The game stations were all in one hall, so children stayed about 80 minutes in the exhibition. The last 10 minutes were used to ask the participants for feedback and the children thoughts and feelings.

3. Evaluation of results

The analysis of the project documentation showed following figures:

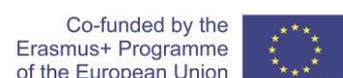
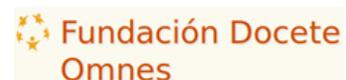
- Teaching staff: about 70+
- Children in total: 576 (305 girls and 271 boys). Out of them, 51 children from migrant families, 24 Roma, 46 with disability.



Date	Female Children	Male Children	Children from migrant families	Roma Children	Disabled	Total
14.10	20	11	/	/	/	31
14.10	9	7	/	/	7 (m); 9 (f)	16
15.10	11	13	/	/	/	24
15.10	12	13	/	/	/	25
16.10	12	9	/	/	1 (f)	21
16.10	13	13	/	/	/	26
16.10	7	5	/	/	7 (m); 5 (f)	13
17.10	13	12	/	/	/	25
17.10	12	10	/	/	/	22
17.10	14	16	2 (m)	1 (m); 1 (f)	1 (m); 1 (f)	30
18.10	16	9	2 (m); 3 (f)	2 (m); 5 (f)	/	25
18.10	15	13	6 (m); 5 (f)	4 (m); 5 (f)	1 (m)	28
21.10	11	13	1 (m); 1 (f)	/	/	24
21.10	18	13	/	/	4 (m); 1 (f)	31
21.10	9	11	/	1 (m); 2 (f)	3 (m)	20
22.10	14	9	/	/	/	23
22.10	15	11	/	/	/	26
23.10	9	14	2 (m); 2 (f)	/	2 (m); 1 (f)	23
23.10	15	10	1 (m); 1 (f)	/	/	25
23.10	7	16	4 (m)	/	/	23
24.10	13	12	1 (m); 4 (f)	2 (m); 1 (f)	/	25
24.10	16	8	4 (m); 8 (f)	/	2 (m); 1 (f)	24
25.10	11	11	2 (m); 2 (f)	/	/	22
25.10	13	12	/	/	/	25
	305	271	51	24	46	576

4. Dissemination

F.D.O shared information on our website, as well as on the Docete Omnes FB profile, through In addition, Lifelong Learning Center created a separate page Minimathematikum Macedonia, where info and pictures from the exhibitions were posted on daily basis. There was also a press release with ahoragranada.com that has been got upwards of 3000+ views.



5. Experiences/ Findings/ Recommendations

F.D.O's role in this project in general, and the opportunity to organize and host the exhibition Minimatematikum, was a great experience was a great opportunity for our organisation to get to know schools and centres interested in collaborating in innovative projects. For our team it was a valuable new experience and an extraordinary learning opportunity, especially because we normally deal with adults with mental disabilities, but we found out that dealing with children is extremely interesting.

Logistics:

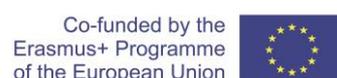
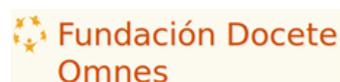
The exhibition was held in a very central location in Granada and it made the logistics a little difficult, however, it was all managed well and there were no major incidents to report in both the assembly and disassembly of the exhibition.

In this regard, all instructions that came from the side of the German partners were crucial and very useful for successful technical management at the beginning and the end of the exhibition. For safety reasons we used the exhibits to cover some dangerous points so that the children could not see them and did not stumble.

Observations during group visits:

From the two-weeks hosting and guidance of 25 groups of 576 children, following experiences were made:

- The children were happy and enthusiastic. When asked if they would like to participate again in future exhibitions the answer was always overwhelmingly positive.
- Favourite games: big soap bubble, mirror hut, ball race track, gears, bricks building.
- Children avoid special play stations: stations that need bigger effort or attention to focus in order to solve the task (for example the pyramid construction) and draw looking at the mirror.
- Children asked help to build the bridge.
- It was not intuitive the play at the table where they must recognize hidden objects and the children were so curious that they could not help themselves from looking underneath to see what they were touching.
- The children don't follow the pictograms of the game stations. They adapted to nearly all the games using their intuition.
- Some children found certain stations too easy (ducks are too simple for them).



- Used less of the more challenging stations at the start but went to them later.
- At the end of the 90 minutes many participants wanted to continue.
- Useful to give introduction at the beginning and communicate some directions (for example use big soap bubble one by one).
- From the discussions with the teachers it is clear that, in the majority of cases, this kind of approach in bringing mathematical concepts is present in many primary schools in Granada and the children who had used this method before were very good at solving the more difficult game stations.
- Some schools could not participate for logistic and transport reasons.

6. Conclusions and recommendations:

As far as the logistics and organization of the exhibition are concerned, the next working groups are advised to start disseminating the initiative well in advance as it is difficult for schools to ask for permission from the school or parents, organize the bus and include the activity formally from an educational point of view. We made contact before Summer and straight after Summer and only through hard work and persistence did we managed to get the number of participants that we did.

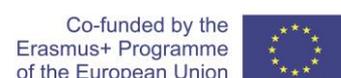
Attention to the safety of the spaces made available to prevent accidents and injuries, for example we have covered all protruding corners, closed any pipes or power outlets.

Keep the net within reach to foam the soap bubbles to allow the use of the game station in the most correct way.

With the help of the previous experience and the report developed by the Macedonian partners we developed a checklist which we recommend to follow not to forget advice and key indication.

It is necessary to explain to the children the exposition and introduce the games in an area far from the games themselves, at the entrance or in the lobby because when they see the games, they start focusing on the games you need to give them some basic rules.

Make a discussion circle at the end of the meeting to ask the children for an evaluation of the experience, for example, ask kindergarten children what were the most interesting games for them and in addition, for children from the elementary schools, what was teaching behind or if they learned anything from the plays.



The children, especially the smaller ones, did not get bored after 90 min. indeed they asked if there were other games available or if they could return for a second meeting.

The activity to be done at the table of the recognition of hidden objects was not very intuitive, so it is necessary to give at least the indication to the teacher so they can more easily guide the children.

Ask help from teachers to better deal with water games especially the big bubble. The children alone don't understand that, for security reasons and for the fact that the floor will be slippery after the first bubble, they have to stay in line and follow some rules.

7. Photo Gallery



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Maths for Minis
Bückeberg,
06.-18. January 2020

**Report of the implemented observation in
Bückeberg / Germany regarding the project:
“MATHS FOR MINIS”**

BERUFSBILDENDE SCHULEN RINTELN



Maths for Minis in Bückeberg January 2020

- List of content

1. Participation
2. Numbers of participants
3. Observation Points
4. Examples of comparisons and their results
5. Children's motivation: feeling well?
6. Reaction and communication: positive emotions ?
- 7.1. Endurance and time: enough time?
- 7.2. Endurance and time: get bored?
8. Accompanying adults: asking for help?
9. Impressions
10. Summary

1 Participation

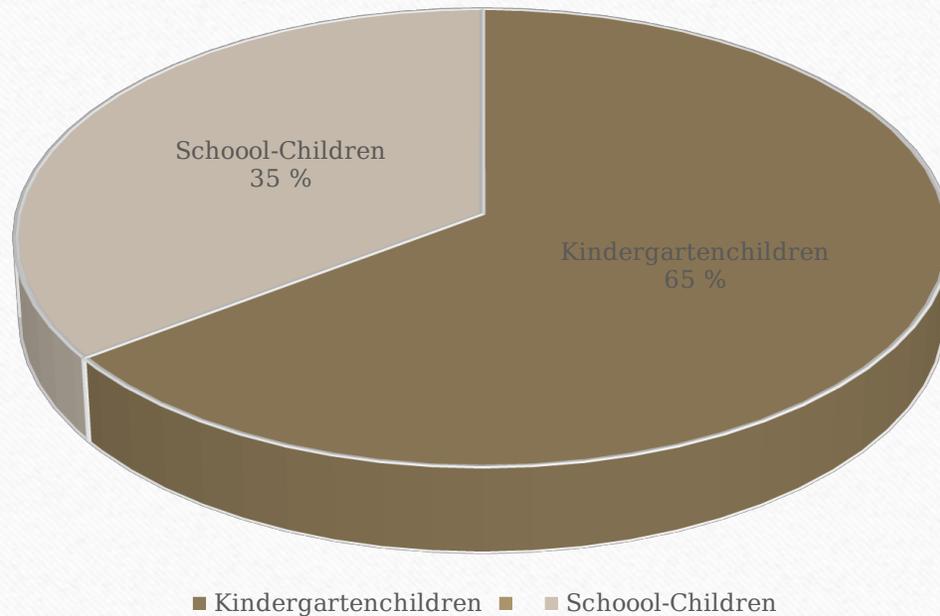
- Total Number of children:

Kindergarten: 559

Elementary School: 303

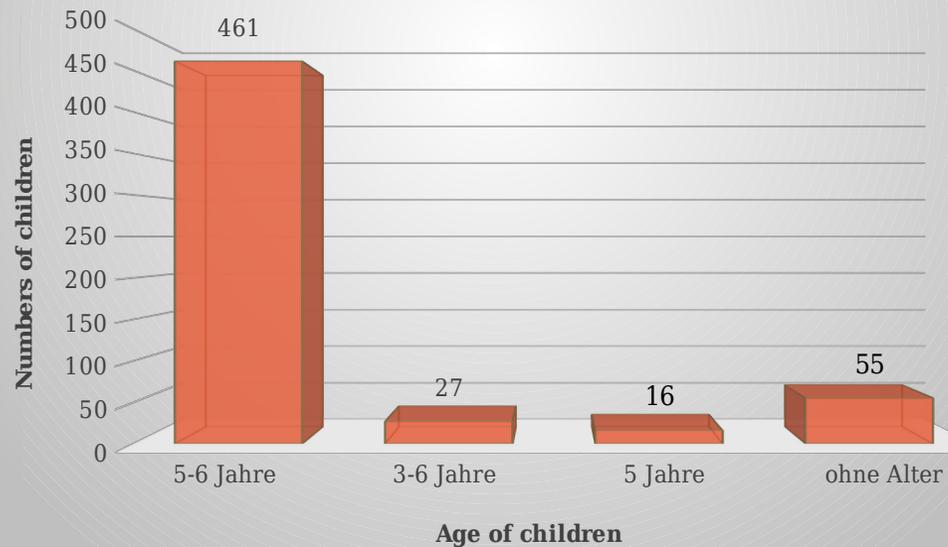
Total Number: 862

Total numbers of participants: 862 (children)

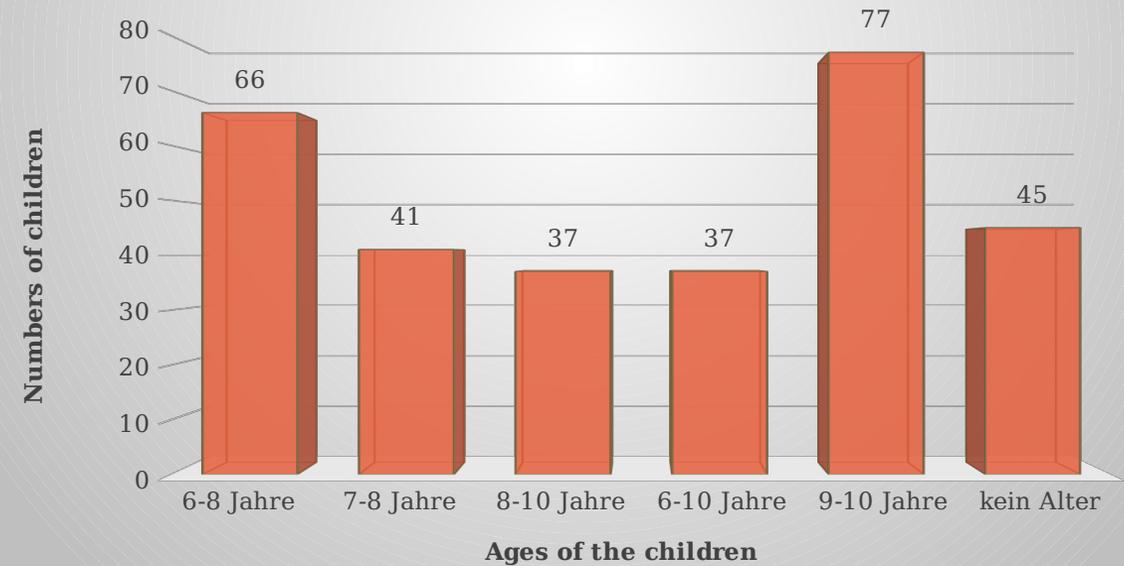


2 Numbers of participants

Numbers of Kindergarten Children (559)



School-Children (303)



3 Observation points

- The main focus of this observation was on children from Kindergarten and from elementary schools in order to compare both groups
- Total number of analyzed questionnaires:
12 (elementary school) + 36 (kindergarten)
- (Two questionnaires without any data about the numbers, which were not evaluated in our study)

BERUFSBILDENDE SCHULEN RINTELN
Logo:

Mini Mathematikum

Grundschkinder
Name (Beobachtete): Victoria Wulfenky Datum: 12.01.20 Uhrzeit: 8:00

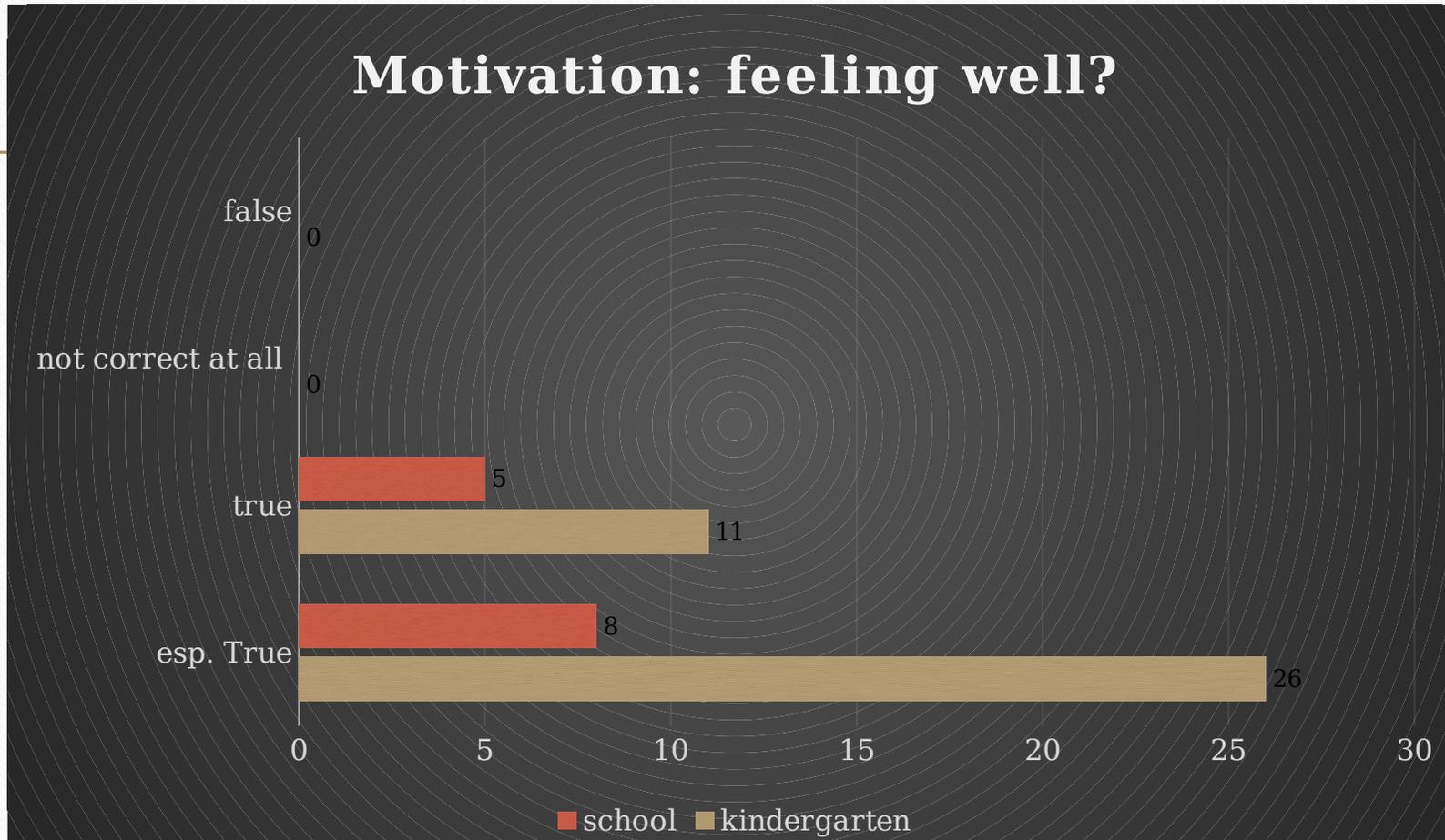
Angaben zur Gruppe: 9-10 Jahre
Beobachtete Gruppe: 9-10 Jahre
Alter der Kinder: 10
Gruppengröße / Anzahl der Kinder: 10
Anzahl der begleitenden Erwachsenen: 1

	Trifft voll zu	Trifft eher zu	Trifft eher nicht zu	Trifft nicht zu
Thema: Motivation				
1. Können sich die Kinder für die Spielstationen frei entscheiden?	<input checked="" type="checkbox"/>			
2. Haben die Kinder Interesse an den Spielstationen?		<input checked="" type="checkbox"/>		
3. Fühlen sich die Kinder wohl in der Ausstellung?		<input checked="" type="checkbox"/>		
4. Können die Kinder die Spielstationen erkunden?		<input checked="" type="checkbox"/>		
Thema: Reaktion und Kommunikation				
5. Zeigen die Kinder positive Emotionen? (Begeisterung, Freude, etc.)			<input checked="" type="checkbox"/>	
6. Sprechen die Kinder über das Erlebte?			<input checked="" type="checkbox"/>	
7. Nehmen die Kinder Kontakt zu anderen Kindern auf? <i>→ siehe Beobachtung</i>			<input checked="" type="checkbox"/>	
8. Konzentrieren sich die Kinder an den Spielstationen?		<input checked="" type="checkbox"/>		
Thema: Ausdauer und Zeit				
9. Gehen die Kinder an viele Spielstationen?		<input checked="" type="checkbox"/>		
10. Sind 90 Minuten ausreichend Zeit?		<input checked="" type="checkbox"/>		
11. Langweilen sich die Kinder?			<input checked="" type="checkbox"/>	
12. Beschäftigen sich die Kinder über einen längeren Zeitraum?			<input checked="" type="checkbox"/>	

4 Examples of comparisons and their results

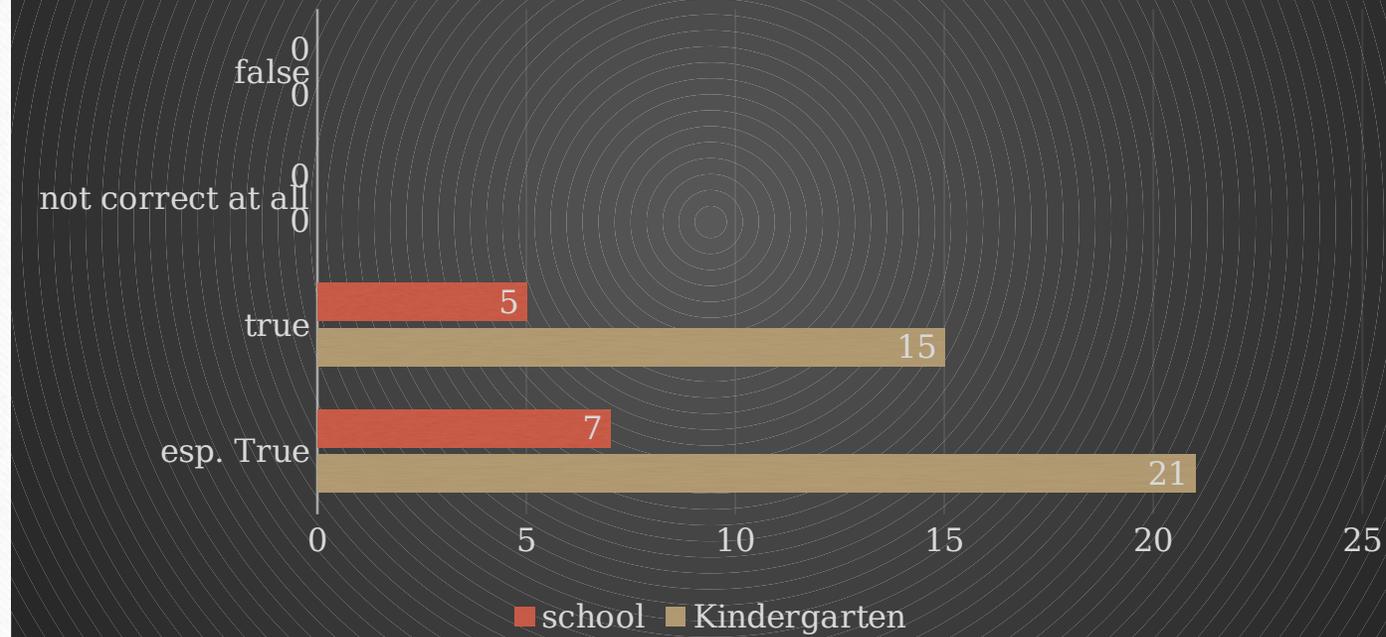
- Can we observe differences in behaviour between Kindergarten children and school children?
- E.g. Motivation: Do children feel well in the exhibition?
- E.G. Reaction and communication: Are children happy at the playstations?
- E.G. endurance and Time: Are 90 Minutes enough for children to explore all the exhibits?
- E.g. accompanied adults: are children searching for contact to adults (in order to get help by them)?

5 Children's motivation

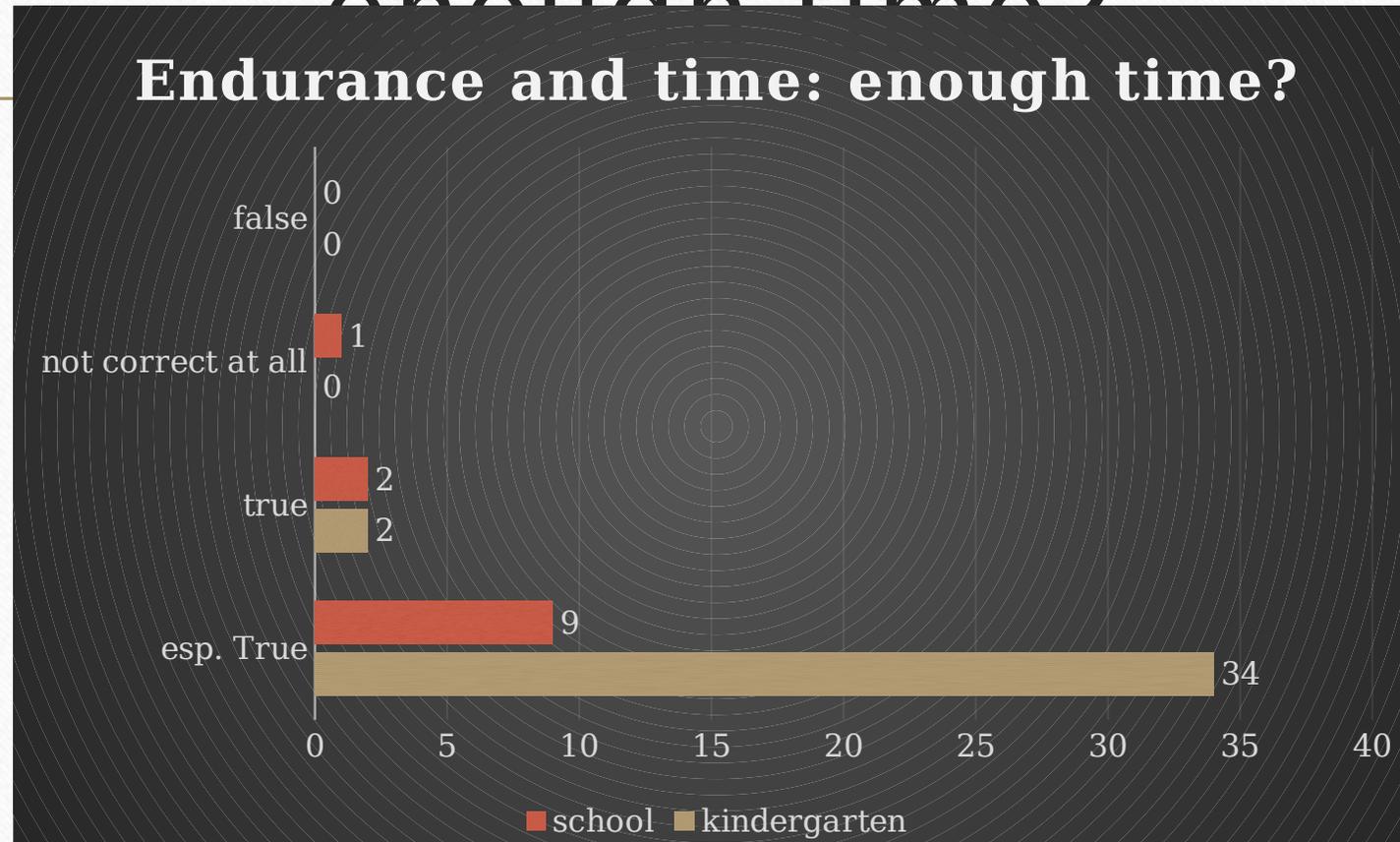


6 Reaction and communication: feeling well?

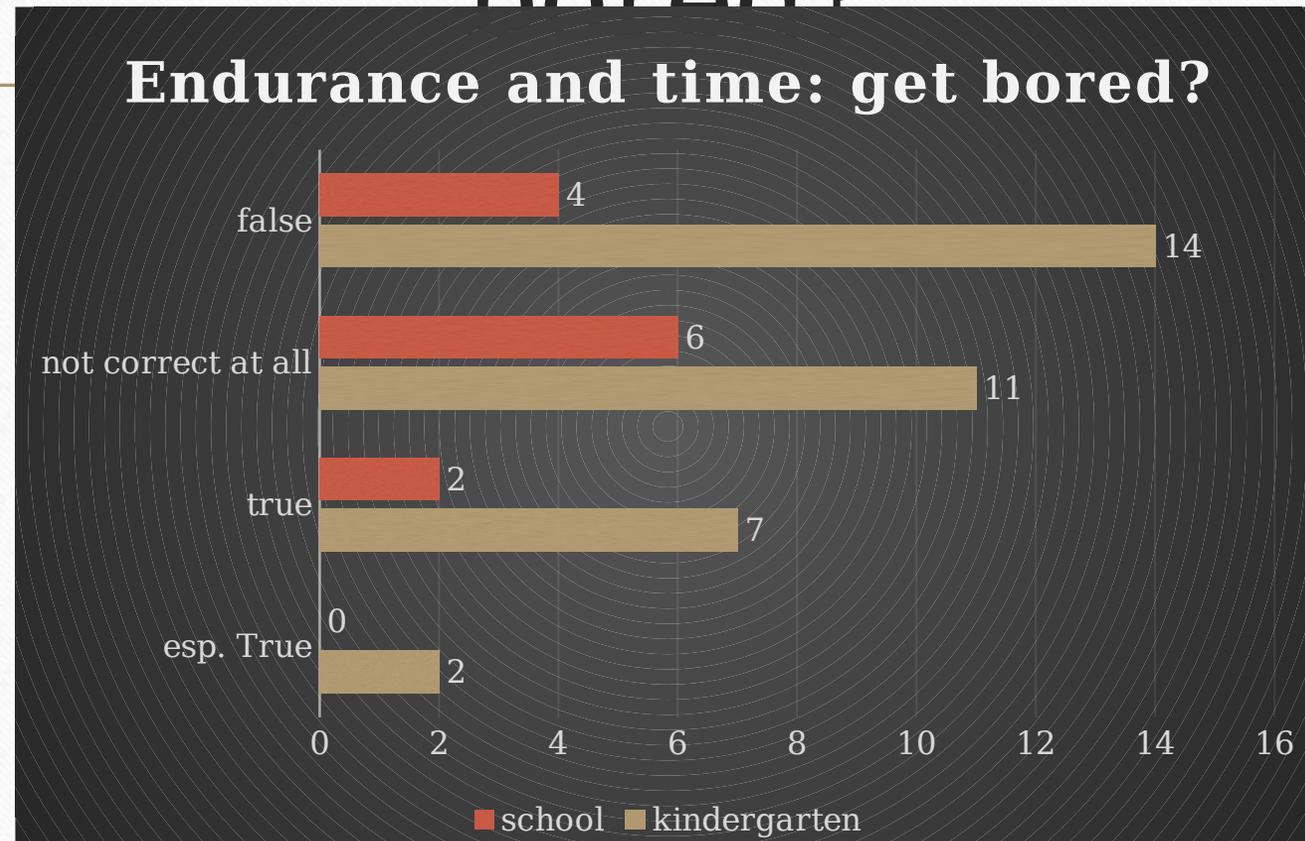
Reaction and communication: positive emotions?



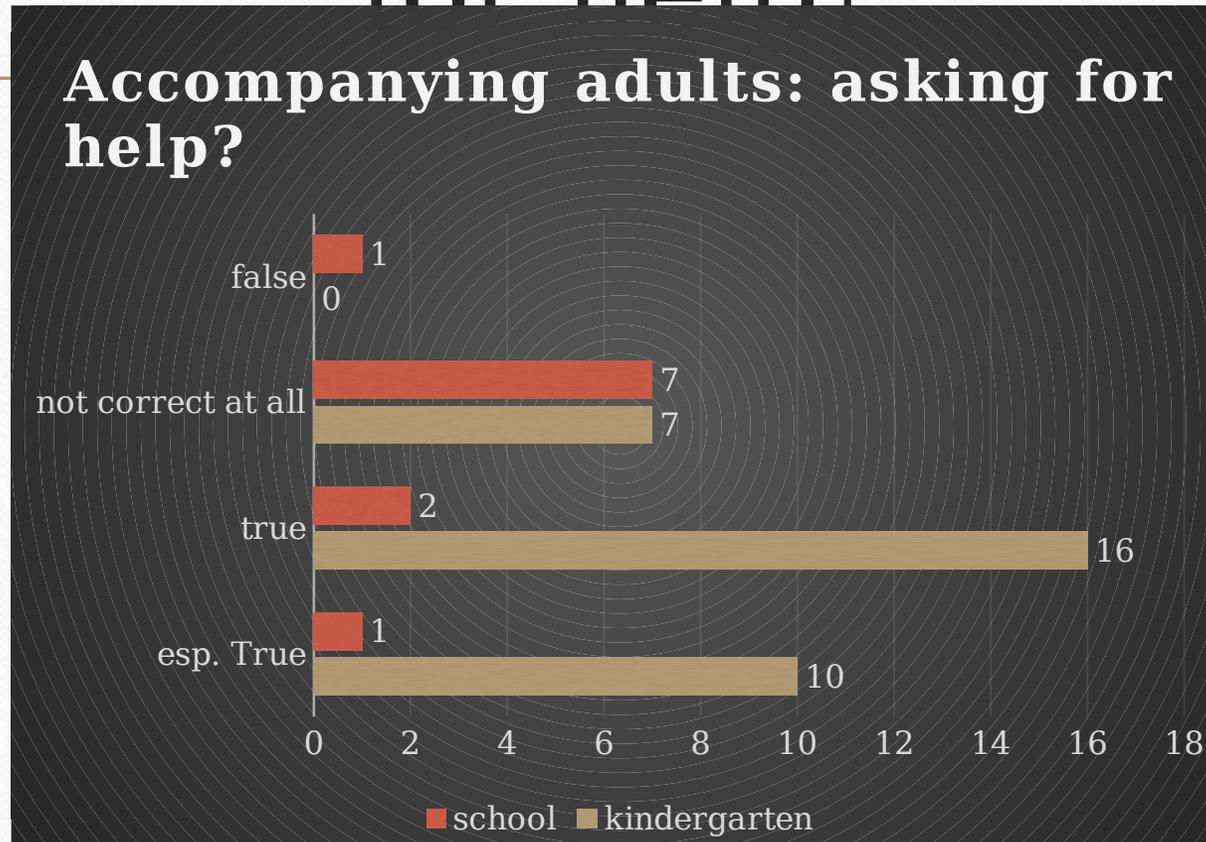
7.1. Endurance and time: enough time?



7.2. Endurance and time: get bored?



8 Accompanying adults: asking for help?



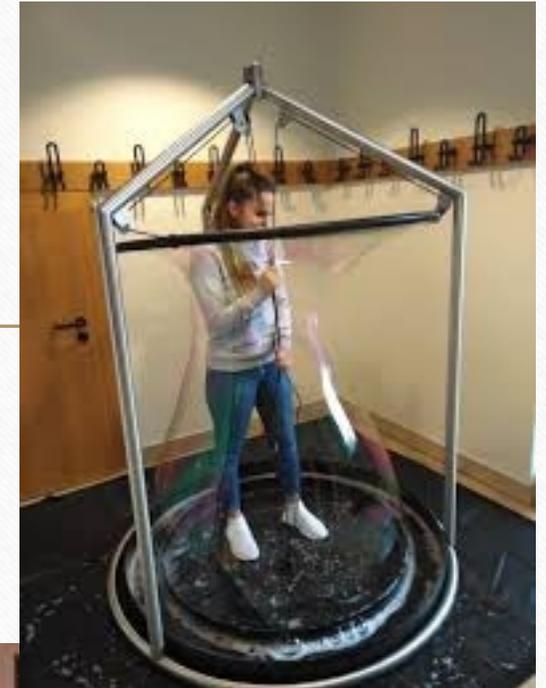
9 Impressions



9 Impressions



Impressions



10 Summary

- All the children had fun and were impressed .

- In discussions with the students the time of 90 minutes were criticized as a too long period of time. The students very often observe, that children get bored during that time and began running or losing their concentration. In discussions with teachers and other accompanying educators those adults told, that 90 minutes are exact the right time for all the children. This different result of observation of students and educators would be an interesting

10 Summary

- There seems to be significant differences in playing with the exhibits between older children and younger ones. Those differences couldn't be detected by our observations, because there were not enough older children for a comparison with significant results.

Thank you!



Observatory MiniMathematikum

This observatory is designed for the adults who observe the children in the MiniMathematikum. It is a help for a systematic observation and gives the possibility to document the observations. This observation sheet is suitable for the observation of all children - it is divided into different parts. We assume that each child is in the MiniMathematikum for 90 minutes and is research-based learning at 15 play stations.

How many children are being watched?

(If the exact number is not known please estimate.)

Total	Female	Male

The main focus of this observation is on children ...

(If the exact number is not known please estimate.)

<u>Target Group</u>	From Roma Families	From Migrant Families	Female Children	Disabled Children
<u>Please tick:</u>				
How many males belong to this group?			XXXXXXXXXXXXXXXXXXXXXX	
How many females belong to this group?				



Motivation of Children of the Target Group

	(Multiple answers are possible)	especially true	true	undecided	does not apply	Not correct at all
1. The children are motivated to explore the game stations independently.						
2. The children need adult guidance.						
3. The children can maintain their motivation for over 90 minutes.						
4. The kids get bored quickly.						
5. The children are happy about their activities and are thrilled.						
6 a. Do other children, who do not belong to the target group, behave differently?*						
6 b. Do male and female children behave differently?*						

* Please describe, if possible: _____

Please use the back for more comments.



Children's Activities

	(Multiple answers are possible)	especially true	true	undecided	does not apply	Not correct at all
6. The children go to the game stations independently.						
7. The children arrive at the game stations to a result.						
8. The children can not orient themselves well in the exhibition.						
9. The children can control their activities themselves.						
10. The children are not familiar with research learning.						
11 a. Do other children, who do not belong to the target group, behave differently?*						
11 b. Do male and female children behave differently?*						

* Please describe, if possible: _____

Please use the back for more comments.



Communication between the children

(Multiple answers are possible)	especially true	true	undecided	does not apply	Not correct at all
12. The children are solely exploring the play stations.					
13. The children help each other and talk to each other.					
14. The children seek communication with accompanying adults.					
15. The children follow the pictograms of the game stations.					
16. The children seek help from other children.					
17. Do children of the target group play together with the others?*					

* Please describe, if possible: _____

18a. Do other children, who do not belong to the target group, behave differently?*					
18b. Do male and female children behave differently?*					

* Please describe, if possible: _____

Please use the back for more comments.



Play stations in MiniMathematikum

	(Multiple answers are possible)	especially true	true	undecided	does not apply	Not correct at all
19. The children use all 15 play stations.						
20. Children prefer special play stations. *						
21. Children avoid special play stations. **						
22. Children are satisfied with the results at the game stations.						
23. The play stations are too difficult for the children.						

* If yes, which? _____

**If yes, which? _____

24a. Do other children, who do not belong to the target group, behave differently? Do they prefer or avoid other play stations?*					
24b. Do male and female children behave differently? **					

*Please describe, if possible: _____

**Please describe, if possible: _____

Please use the back for more comments.



Accompanying adults and teaching staff (Self-Assessment)

You ...	(Multiple answers are possible) especially true	true	undecided	does not apply	Not correct at all
25. ... prepared yourself in advance for visit of exhibition					
26. ... had to guide the children in general.					
27. ... had to guide the children of the target group more than others					
28. ... hold back and stayed in the background.					
29. ... are interested yourself in experimenting with the game stations.					
30 Research-based learning at play stations was known to you before.					
31. Do you personally consider such game stations useful?					
32. Could you imagine using such teaching ideas for your own activity?					

Do you have suggestions for improvement?

Please use the back for more comments.

Name:

Vocational Training (if relevant in this context):

Organization:

Place of Exhibition:

Date:

Signature:

What (activity)	When (dd/mm/yyyy)	Where (place/city) or link to website	To Whom (target audience)	How many (No. Of participants, people reached, etc.)
Partner: IBE, Germany				
Article in Göttinger Tageblatt	29.11.18	<u>Göttinger Tageblatt</u>	Newspaper subscribers	25000
Traveling exhibition MiniMathematikum in lectures by Prof. Beutelspacher, notes on the Erasmus + program regarding the investigation of specific target groups,	15.10. - 27.10.2018	Industriemuseum Lohne/Niedersachsen,	full-time teachers and educators as well as parents	about 100 educators, teachers and adults who looked after the 1500 children in the exhibition
Traveling exhibition MiniMathematikum in lectures by Melanie Schmidt, notes on the Erasmus + program regarding the investigation of specific target groups,	29.10. - 10.11.2018	Heimatmuseum in Leer/Niedersachsen	full-time teachers and educators as well as parents	About 85 educators and teachers who looked after the 1300 children in the exhibition
Evaluation meeting concerning the utilisation of the exhibits in view of certain target groups	13.11.18	Heimatmuseum in Leer/Niedersachsen	fulltime teachers and educators as well as local stakeholders	Two Teachers and the Direktor of the Museum
Meeting concerning the utilisation of the Minimathematikum in view of certain target groups and the Erasmus+ program	22.11.18	<u>Kaufbeuren/ Bayern</u>	fulltime teachers and educators as well as local stakeholders	Two Teachers and the Direktor of the Government

Meeting with Prof. Beutelspacher (University of Giessen) about the introduction to the Minimathematikum in European context	29.11.18	Giessen/ Hessen	experts and employees of the Museum for Mathematics in Giessen	Prof. Beutelspacher
Meeting with Prof. Beutelspacher on the shipment, set-up, dismantling and educational introduction to the exhibition at the partners in the Erasmus + program at the Mathematikum in Gießen	14.01.19	<u>Giessen/ Hessen</u>	experts and employees of the Museum for Mathematics in Giessen	3 Persons
Discussion with the head of the Industrial Museum in Delmenhorst regarding the use of experience from the Erasmus + project for the design of a new exhibition	31.01.19	<u>Delmenhorst/ Niedersachsen</u>	stakeholders and experts	Mr. Jöhk Direktor
Neues Design für die Internetpräsenz	30.02.2019			
Discussion with Mrs. Wellmann, Custody of the University of Goettingen, regarding the use of the exhibition in the "Forum Wissen" of the University after completion of the building and integration of the results of the Erasmus + program	25.03.19	Goettingen/ Niedersachsen	stakeholders and experts	Mrs. Wellmann
Discussion with Catrin Witt, Fachberatung KITA in the district of Schaumburg on the use of the MiniMathematikum and its results in the Erasmus + program for the facilities of the district	17.05.19	<u>Schaumburg niedersachsen</u>	Stakeholders, experts and local authorities	Catrin Witt, Landkreis Schaumburg

Discussion with Thomas Vodde, Kurverwaltung Juist / Lower Saxony, on the construction of the MiniMathematikum and use of the results in the Erasmus + program on the island of Juist in the summer holidays for island children and families with younger children	23.05.19	<u>Juist /Niedersachsen</u>	stakeholder and local authorities	Thomas Vodde und the Direktor of the School of Juist
Discussion with Sinja Doberstein, Berufsbildende Schule Rinteln, on the preparation of school classes of the BBS for the traveling exhibition as part of the Erasmus + program in Bückeberg on July 12, 2019	12.07.19	<u>Rinteln/ Niedersachsen</u>	experts, educators and stakeholders	Sinja Doberstein and Denise Winter/BBS Rinteln
Meeting with Mrs. Müller, Kreissparkasse Verden, and teachers in Verden / Lower Saxony on the construction of the traveling exhibition MiniMathematikum using the results of the Erasmus + program there in February 2020	03.09.19	Verden/ Niedersachsen	stakeholder and local authorities	Mrs. Müller and three teachers
Preparation of four school classes of the BBS Delmenhorst (educator training), presenting the first results of the Erasmus + program for the care of a similar exhibition in the Industrial Museum Delmenhorst from 11 November 2019 to 30 November 2019	10.09.19	<u>Delmenhorst/ Niedersachsen</u>	experts, educators, students	80 Students

First steering group meeting of the district of Schaumburg, two KITAs and a primary school for the use of the MiniMathematikum using the results of the Erasmus + program in the accompaniment of the three institutions for the further development of research learning in the transition from KITA to elementary school	11.09.19	Bueckeberg/ Niedersachsen	experts, educators, students and stakeholders	10 Educators
Vorstellung des MiniMathematikums	21.10.19	Landfrauenschule Bückeberg	KITA Leitungen LK Schaumburg	40
Besprechung Aufbau MiniM und Einführung Delmenhorst	29.10.19	Uni Göttingen	Frau Dr. Allemeyer Direktion	
Vorbereitung MiniM Friesoythe	10.11.19	Industriemuseum	Eröffnung mit Interessierten	50
Besprechung Evaluation	18.11.19	BBS Friesoythe	Betreuer	80
röffnung MM	06.12.19	Landfrauenschule Bückeberg	Experts Educators	10 60
ressegespräch MM	06.01.20	KSK Verden	Experts	10
Vorstellung MM	07.01.20	Bückeberg	SuS Minden	60
ange Nacht der Mathematik	08.01.20	Bückeberg	Familien	50
Besprechung röffnung MM	17.01.20	Insel Juist	Thomas Vodde	
Vorstellung MM	27.01.20	KSK Verden	Experts, Educators	60
röffnung MM	10.02.20	Gym. Friesoythe	SuS der BBS	60
Auswertung MM	24.02.20	Gym. Friesoythe	Educators	40
Eröffnung MM	25.02.20	GS Bückeberg	Experts	10
Besprechung	17.05.20	Inselschule Juist	Children, Teachers	50
Besprechung	19.07.20	Kurverw. Juist	Thomas Vode, Direktion	Dir.
valuation MM	12.08.20	Uni Göttingen	Nina Knohl	
Besprechung	31.08.20	Bückeberg	Experts	2
Besprechung	30.09.20	Uni Göttingen	Nina Knohl	
Besprechung	12.01.21	Uni Göttingen	Nina Knohl	
	23.02.21	Uni Göttingen	Nina Knohl	

Übergabe der Ausstellung

16.02.21 Forum Wissen der Uni Presse
Goettingen

Partner: Cramars, Italy

Post in Cramars Facebook Page	03.12.18	https://www.facebook.com/pg/cramars/posts/	Cramars Facebook page followers	939
Cramars Website - information about the project	08.01.19	https://www.coopcramars.it/attivita/progetti-	all members of Cramars website	
Post in Cramars Facebook Page	09.04.19	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	1512
Post in Cramars Facebook Page	29.04.19	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	1154
Article in Ilfriuli.it	29.04.19	http://www.ilfriuli.it/	Big public following the site	
Article in geonews.com	29.04.19	geonews.com	Big public following the site	
Article in studionord.news	29.04.19	https://www.studionord.news/	Big public following the site	
Article in Virgilio	29.04.19	Virgilio. It	Big public following the site	
Article in Cramars Newsletter	29.04.19	via e-mail	Cramars newsletter subscribers	7389 sent 1722 openers
Article in Friulionline.com	04.05.19	http://www.friulionline.com/	Big public following the site	
Post in Cramars Facebook Page	06/05/19_1	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	770
Post in Cramars Facebook Page	06/05/19_2	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	923
Article in Messaggero Veneto newspaper	05.05.19	Messaggero Veneto Newspaper of 05/05/2019 pag. 25	Big public buying the newspaper	
Interview with Sara Danelon about the project on the Radio TGR FVG and rainews.it at 12:10	06.05.19	http://www.rainews.it/	Big public following the site	
Article in Cramars Newsletter	14.05.19	via e-mail	Cramars newsletter subscribers	7180 sent 1130 openers

Post in Cramars Facebook Page	24.05.19	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	669
Article in Cramars Newsletter	27.05.19	via e-mail	Cramars newsletter subscribers	7942 sent 1316 openers
Article in Ildiscorso.it	28.05.19	http://ildiscorso.it/	Big public following the site	
Article in News.rsn.it	28.05.19	News.rsn.it	Big public following the site	
Article in instart.info	28.05.19	http://www.instart.info/	Big public following the site	
Article in studionord.news	28.05.19	https://www.studionord.news/	Big public following the site	
Post in Cramars Facebook Page	28.05.19	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	875
Post in Cramars Facebook Page	06.06.19	https://www.facebook.com/pg/cramars/posts/?ref=page_internal	Cramars Facebook page followers	828
Article in Cramars Newsletter	10.06.19	via e-mail	Cramars newsletter subscribers	8372 sent 1068 openers
Article in Friulionline.com	16.06.19	Friulionline.com	Big public following the site	
Article in Uspinews.it	16.06.19	Uspinews.it	Big public following the site	

Partner: Sumnal, North Macedonia

Notification about the visit to Germany, including the museum in Gissen	04.12.2018	https://bitolanews.mk/2018/12/04/%D1%84%D0%B0%D1%82%D0%BC%D0%B0-%D1%81%D0%BE-%D1%81%D1%83%D0%BC%D0%BD%D0%B0%D0%BB-%D0%B3%D0%BE-%D0%BD%D0%BE%D1%81%D0%B8-%D0%BC%D1%83%D0%B7%D0%B5%D1%98%D0%BE%D1%82-%D0%BC/	Bitola readers	Big public following the site
Notification about the exhibition in Bitola	25.02.2019	https://a1on.mk/archives/1019815	Macedonian readers	153 people read the article

This was also notification about the exhibition, but for some reason it is not accessible now		https://vesti24.mk/%D0%BC%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0-%D0%B7%D0%B0-%D0%BC%D0%B0%D0%BB%D0%B8-%D0%B2%D0%BE-%D0%B1%D0%B8%D1%82%D0%BE%D0%BB%D1%81%D0%BA%D0%B0%D1%82%D0%B0-%D0%B1/?fbclid=IwAR30t4EqM-xLrNnN2VQge9RSLegSgd5Dra1B7LxdG8zsDseAtLUF8dt9Dnw		Big public following the site
Notification about the exhibition in Bitola	25.02.2019	https://mms.mk/2019/02/25/%D0%BC%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0-%D0%B7%D0%B0-%D0%BC%D0%B0%D0%BB%D0%B8-%D0%BF%D1%80%D0%B5%D0%BA%D1%83-%D0%B8%D0%B3%D1%80%D0%B0-%D0%BF%D0%BE%D1%81%D1%82/?fbclid=IwAR02Mx9cE4jePp4zjb9nAJ7bhJCovVG5ih70_FCXTrnBleaiFd5ODS0WIMns	Macedonian readers	Big public following the site
Notification about the exhibition in Bitola	25.02.2019	https://setaliste.com.mk/vesti/binfo/%D0%9C%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0-%D0%B7%D0%B0-%D0%BC%D0%B0%D0%BB%D0%B8-%D0%B2%D0%BE-%D0%B1%D0%B8%D1%82%D0%BE%D0%BB%D1%81%D0%BA%D0%B0%D1%82%D0%B0-%D0%B1/?fbclid=IwAR3BIPE48mbOrWsEFiswMOcy693kmZRsGdiNhnvRmqOrR82_hld15aQHnjk	Macedonian readers	Big public following the site

Notification about the exhibition in Bitola	25.02.2019	http://www.bitola.gov.mk/%D0%BC%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0-%D0%B7%D0%B0-%D0%BC%D0%B0%D0%BB%D0%B8-%D0%B2%D0%BE-%D0%B1%D0%B8%D1%82%D0%BE%D0%BB%D1%81%D0%BA%D0%B0%D1%82%D0%B0-%D0%B1/?fbclid=IwAR2jL3qPwDmxC3KOYcP9jqrIO5PkgVMN7IAVnRM17u2zYX3Qvx_fdOVZmg	Bitola people	Big public following the site
Notification about the exhibition in Bitola	25.02.2019	https://setaliste.com.mk/vesti/binfo/%D0%9C%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0-%D0%B7%D0%B0-%D0%BC%D0%B0%D0%BB%D0%B8-%D0%B2%D0%BE-%D0%B1%D0%B8%D1%82%D0%BE%D0%BB%D1%81%D0%BA%D0%B0%D1%82%D0%B0-%D0%B1/	Bitola readers	Big public following the site
Notification about the exhibition in Bitola	25.02.2019	https://setaliste.com.mk/zivot/patuvanja/%D0%A4%D0%BE%D1%82%D0%BE-%D0%9F%D0%BE%D1%81%D0%B5%D1%82%D0%B0-%D0%BD%D0%B0-%D0%BC%D1%83%D0%B7%D0%B5%D1%98%D0%BE%D1%82-%D0%9C%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D1%83%D0%BC/	Bitola readers	Big public following the site

Presentation of the results of the exhibition and the project in Bitola municipality	11.04.2019	http://www.bitola.gov.mk/%d1%80%d0%b5%d0%b7%d1%83%d0%bb%d1%82%d0%b0%d1%82%d0%b8%d1%82%d0%b5-%d0%be%d0%b4-%d0%bf%d1%80%d0%be%d0%b5%d0%ba%d1%82%d0%be%d1%82-%d0%bc%d0%b0%d1%82%d0%b5%d0%bc%d0%b0%d1%82%d0%b8%d0%ba%d0%b0/	Employees in the municipality and Bitola audience	No info
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Partner: Lifelong Learning Center - Skopje

Presentation of the project and project`s aims	21.12.2018	House of culture "Karposh" - Skopje (Offer request)	Managerial/teaching staff	5
Presentation of the project and project`s aims; Meeting about exhibition room	09.01.2019	Cultural Info Center "Kic"	Stuff - Education center	6
Info meeting with the Office of Mayor of City of Skopje	09.01.2019	Office of Mayor of City of Skopje (E-Mails)	Employees	3
Presentation of the project and project`s aims	10.01.2019	PI House of Culture "Koco Racin" – Skopje (Offer request)	Managerial/teaching staff	4
Info meeting with local school	04.02.2019	Elementary School "Goce Delcev" - Skopje (Invitation)	Managerial/teaching staff	9
Info meeting with local kindergarten	04.02.2019	Kindergarten " 13 Noemvri" (Invitation)	Managerial/teaching staff	2
Info meeting with local kindergarten	04.02.2019	Kindergarten "Rade Jovcevski Korcagin" (Invitation)	Managerial/teaching staff	2

Info meeting with local school	05.02.2019	Elementary School "Johan Hajnrih Pestaloci" - Skopje (Invitation)	Managerial/teaching staff	17
Info meeting with local school	05.02.2019	Elementary School "Strasho Pindzur" – Skopje (Invitation)	Managerial/teaching staff	9
Producing a Flayer in Macedonian language; Distribution in local schools and education centers	08.02.2019	Skopje	Public	50
Creating a facebook page - Maths for Minis Macedonia;	08.02.2019	Macedonia Screenshots; Link: https://www.facebook.com/MiniMathematikumMK/?epa=SEARCH_BOX	Public	244 followers 1143 reached people
Presentation on Facebook page - Lifelong Learning Center	11. - 22.02.2019	Macedonia Screenshots; Link: https://www.facebook.com/Lifelong-Learning-Center-%D0%A6%D0%B5%D0%BD%D1%82%D0%B0%D1%80-%D0%B7%D0%B0-%D0%B4%D0%BE%D0%B6%D0%B8%D0%B2%D0%BE%D1%82%D0%BD%D0%BE-%D1%83%D1%87%D0%B5%D1%9A%D0%B5-545091115634192/	Public	790 followers 3132 reached people
Presentation on Facebook page - Lifelong Learning Center	04.06.2019	Macedonia https://www.facebook.com/Lifelong-Learning-Center-%D0%A6%D0%B5%D0%BD%D1%82%D0%B0%D1%80-%D0%B7%D0%B0-%D0%B4%D0%BE%D0%B6%D0%B8%D0%B2%D0%BE-%D1%82%D0%BD%D0%BE-%D1%83%D1%87%D0%B5%D1%9A%D0%B5-545091115634192/	Public	822 followers 248 reached people

Partner: Docete Omnes Spain

Banner and article in Docete Omnes website	29.04.19	http://www.doceteomnes.com	Internet users	??
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Post on FDO's Facebook Fan Page about the Project	02.05.19	https://www.facebook.com/FDoceteOmnes/	Facebook followers across Europe	415
Post on FDO's Facebook Fan Page about the Meeting in Tolmezzo	04.06.19	https://www.facebook.com/FDoceteOmnes/	Facebook followers across Europe	244
Post on FDO's Facebook Fan Page about the Exhibition in Granada	30.10.19	https://www.facebook.com/FDoceteOmnes/	Facebook followers across Europe	184
Presentation the proyect	20/05/2019-31/05/2019	Phone calls	Teachers and experts	Specialized schools 15 General schools 45
Notification the event in Granada	03/06/2019-02/09/2019	Email	Teachers, experts and parents	Specialized schools 15 General schools 45
Inviting schools to the event	15/07/2019 - 27/08/2019	Post mail	Teachers and experts	Specialized schools 15 General schools 45
Keeping in contact with shools	03/06/2019-12/07/2019	Phone calls	Teachers, experts and parents	Specialized schools 15 General schools 45
Info meeting with schools	27/05/2019-12/07/2019	On premises	Teaching staff	Specialized schools 5 General schools 4
Info meeting with schools	02/09/2019-20/09/2019	On premises	Teaching staff	Specialized schools 1 General schools 13
Reminder date and timetable event	09/09/2019-07/10/2019	Phone calls	Teaching staff and parents	Specialized schools 4 General schools 7
Post on Agustinos' Fan Page about their visit to the exhibition in Granada	17.10.2019	https://www.facebook.com/AgustinosGR/posts/1381524658688769	Facebook followers	??
Press release	29.10.2019	https://www.ahoragranada.com/noticias/m	Readers Ahora Granada media	Big public following the site
Post on FDO's Facebook Fan Page about the Exhibition in Granada	30.10.19	https://www.facebook.com/FDoceteOmnes/	Facebook followers across Europe	184
Press release	31.10.2019	https://www.amgr.es/web/2019/11/12/enriqu	Internet users	Big public following the site
Post on FDO's Facebook Fan Page about the meeting in Granada	18.11.19	https://www.facebook.com/FDoceteOmnes/	Facebook followers across Europe	445