Preliminary program 8th Nordic and Baltic GeoGebra Conference, 13/10 – 15/10 2017

Friday, October 13th

14.00 – 14.10 Opening

14.10 – 15.10 Plenary lecture **Hanan Abdelrahman: The use of GeoGebra with migrant students**

The number of students coming from different backgrounds and speaking different languages at home with their parents at my school may seem like a challenge that is hard to undertake. However, in my School, we did take that challenge and transformed it into a source of inspiration that pushes our work further. This challenge encouraged the 10 teachers in the math section in my school to continuously try to find new creative solutions to improve students' levels in mathematics. First, we put a lot of focus on the oral and written use of the language related to/ in relation to mathematics. Secondly, we don't depend on reading and memorizing rules from the book without understanding, but we depend on explaining abstract math by drawing different models in for example GeoGebra , and concretize math by using shapes and figures found in everyday life such as boxes, thermometers, dice, cards, measuring tapes, and we incorporate mathematics in other practical subjects such as sports, arts, science, etc. Thirdly, we encourage students to work in groups in which they actively use mathematic language. Finally, we give different math tasks to meet the different math levels of students.
How can GeoGebra help us with all these goals?

15.10 – 15.30 **Coffee break**

15.30 – 17.00 **Parallel sessions**

Workshops:

Bo Kristensen and Rikke Teglskov: Models of real life phenomenons in GeoGebra

It is often a fun and motivating challenge for students to make models of the world around them in GeoGebra. Many objects and phenomenons in our surroundings make for great constructions and other types of models in GeoGebra.
In this workshop we will focus on geometry and construction. One of the criteria will be, that everything must be constructed from a maximum of two free points. To be able to do this, you need to know your GeoGebra geometry tools well.
The workshop will revolve around two tasks.
1) The Fidget Spinner:
A closed task where you need to follow a step-by-step tutorial to make a spinning Fidget Spinner with changing colors.
2) Design and construct the official flag for the Nordic GeoGebra Network:
An open ended task where you need to use your creativity to design a flag suitable to represent the Nordic GeoGebra Network.
You will be given a few criteria, you need to fulfill. Afterwards you will need to know how to share your design on GeoGebra.org.
To participate in this workshop you'll need the following:
- A computer
- A user account on GeoGebra.org.
- Know how to upload a file to your account.
- Earphones for the tutorials.
- Some knowledge of the geometry tools in GeoGebra.
- A lot of creativity :)

Mats Brunström and Maria Fahlgren: Predict, Be Surprised, and Reflect - A rich student activity that utilizes multiple representations in GeoGebra

In the workshop, the participants will be introduced to a rich student activity, particularly designed for upper secondary school. In the activity, students are supposed to investigate different properties of a geometric object, and then predict the shape, domain and range of the corresponding graphs. The predictions are compared with, and discussed in relation to, results from GeoGebra. Then, students have to find the corresponding algebraic representations, and use GeoGebra to evaluate their suggestions. The activity offers surprises that raise curiosity and stimulate mathematical reasoning.

Meeting

Freyja Hreinsdóttir and Jonas Hall: 1st Meeting for people interested in collaboration on the use of GeoGebra with migrant students

At the conference there will be 2 meetings on this topic, one on Friday and the other one on Sunday. Members of the Nordic and Baltic GeoGebra Network (NGGN) organize these workshops, they are open to everyone interested and the participants decide the topics we will discuss.
The aim of these meetings is to facilitate cooperation among teachers in our countries who are using GeoGebra with students who do not yet know the language of instruction. We (NGGN) hope to establish a group of interested teachers who are willing to cooperate during one year and report on their work at the 9th Nordic and Baltic Conference. This cooperation might involve sharing experiences and material, experimenting and discussing, but how and what is done depends on the participants.
NGGN has funding to organize one meeting on this topic for at least 10 people during the year. The meeting will be held in Finland in March 2018.

The Nordic and Baltic GeoGebra Network has previously organized similar work on different topics e.g. the use of screencast technology in the teaching of mathematics and this has lead to interesting results and innovations.

Short Talks

Louise Meier Carlsen: Lesson study as a tool for developing knowledge on teaching with GeoGebra
In my research, I have been focusing on developing formats to support teachers' transition of implementing GeoGebra in the teaching of mathematics. In this talk, I will share my research findings and experiences with trying out lesson study as a transition tool. What knowledge did the teachers develop? What factors were beneficial for the development of knowledge?

Liis Mardi: GeoGebra study materials for teaching in flipped classroom
The goal of the presentation is to give an overview of flipped classroom model. Also, to introduce digital learning materials to ease teaching in flipped classroom. Learning materials were made for teaching function, proportional dependence and its graph using GeoGebra. For evaluating quality of this learning material, teacher's expert opinion was asked in a questionnaire. Teachers evaluated the digital learning materials to be of high quality. In teacher´s opinion created materials are realistically interesting, interactive and motivating for students.

Sirje Pihlap and Christine Kattai: Using silent screencast in learning parallelograms
The aim of the presentation is to introduce study material for the lesson where students worked in pairs and studied parallelograms (7th grade). Using GeoGebra based silent screencast and worksheet about this screencast students discovered properties of parallelograms. Students and teachers opinions about the lesson are introduced.

17.10 – 18.10 Plenary lecture **Marcus Hohenwarter: Next Generation GeoGebra Apps**
Over the years, GeoGebra's desktop software has become a very versatile and powerful tool for learning and teaching mathematics from primary school to university level. For newcomers, the many tools and options in the user interface can sometimes be overwhelming. That's why we have started to unbundle the power of GeoGebra into several apps with new and simplified user interfaces based on our existing math engine. In this talk, I will show and discuss the background of the new Graphing Calculator and Geometry Calculator apps and demo some of the exciting new possibilities they bring for learning and teaching mathematics.

18.15 – 20.30 **Welcome reception**

Saturday, October 14th
8.30 - 10 **Parallel sessions**
Workshops
Anders Karlsson and Svetlana Yushmanova: Search, destroy and collect – creating and collecting GeoGebra apps aimed at specific learning problems During the workshop we will share our experiences in constructing and organizing apps aimed to destroy specific misconceptions in students. Most of the apps we made so far are focused on primary and lower secondary mathematics, but the concept can be used at any level of education. Examples can be seen at www.bit.do/matteappar.

Bjarnheiður Kristinsdóttir, Jonas Hall, Sigrún Lilja Jónasdóttir, Guðný Lilliendahl and Elín Björk Unnarsdóttir: Mathematical modeling with GeoGebra
In 2016 a book on mathematical modeling with GeoGebra by Jonas Hall and Thomas Lingefjärd was published in English. In this workshop you will hear how the materials from the book were used and introduced to in-service teachers in Iceland during a professional development course in 2017 at the University of Iceland, meet three of the teachers and try out some of their final projects, and last but not least meet Jonas Hall and work with him and the others on the mystery "Who killed the mathematics teacher?".

Hanan Mohamed Abdelrahman: The practical use of GeoGebra in the classroom to help migrant students
Math Visualization and Exploration by Using GeoGebra
Interactive Examples in Teaching and Learning geometry with GeoGebra
Interactive Examples in Teaching and Learning functions with GeoGebra
Interactive Examples in Teaching and Learning algebra With GeoGebra
Interactive Examples in Teaching and Learning number sense with GeoGebra
the use of the applets created with the help of
GeoGebra and the positive effect on the understanding and knowledge of the students.

Markus Hohenwarter: New GeoGebra Social Networking Website
This summer the GeoGebra website was relaunched introducing several new social networking features. In this workshop we will have a closer look at the structure of the new website, try out some of its new features, and discuss how we can further develop it to support close collaboration within the Nordic and Baltic communities of math and science students and teachers.

10.00 – 10.20 **Coffee break**
10.20 – 11.50 **Parallel sessions**
Workshops
Valvo Paat: Geogebra opportunities in flipped classroom for learning mathematics
The workshop gives an overview of the author's experience of using the flipped classroom method in class 8 to study the topic "Calculating the values of algebraic expressions" and students' assessments for such a lesson. Participants in the workshop solve practical tasks using the worksheets and using the GeoGebra CAS module. The solving of tasks will be followed by participants' discussions and exchange of experiences.
Participants should bring a computer with GeoGebra installed.

Hannu Mäkiö: When can you get the answer from graphics window?
The strength in Geogebra is its power to visualize mathematics. Traditionally math is solved analytically, even when the ideas for a solution may be visual. For learning purposes, it is good to have different types of representation of the same mathematical concept. In the workshop, we discuss some problems, which can be solved only using graphics window and then we look how to combine CAS and graphics window solution to get exact answers. In some cases, the visual can lead to new ways to find analytical solution.
The workshop is intended for those who have some basic knowledge of Geogebra.

Short talks
Susanne Stengrundet: Trekant, triangel, kolmikko, ...
This talk suggests how terms related to triangles can be presented in a multi-lingual classroom. Toolbar icons and changes of the language in the program will be a central theme of the talk. Further, we will be discussing advantages and disadvantages with using different working languages in the classroom.

Anete Zača: Teaching Math in Middle East
I have been teaching Math in the United Arab Emirates for two years now. And GeoGebra has been a very helpful tool for me and my students.
Most of my students are children from different Middle East countries, which have English as their second language. Also, some of them studies in English since Kintergarten, there are always some students who are joining with very poor English vocabulary.
Society is different here, and even though a lot of students have all possible technologies at home, still, a lot of students don't even have email, and their parents are not willing to let their children have one.
I have been using GeoGebra books through out all this year as our math blog, where I give students questions, hints, answers and study material.
I will be introducing you with my success and failures in implementing technologies in my students and schools learning environment.

Marius Zakarevičius and Vilija Šileikienė: How advanced 9-12 grade Geogebra users are creating Geogebra book tasks for teaching geometry in grade 5-8.
Last year, after the 7th Nordic and Baltic GeoGebra Conference, we and our pupils in Lithuania have made some studies on how to use Geogebra animation and with some nice pupils projects we participated in national conferences and contests. Now we came to the idea, that our advanced 9-12 grade Geogebra users can help Lithuania teachers by creating some nice animated Geogebra book tasks for teaching geometry our 5-8 grade pupils.
In our talk we will present our project idea, show some pupil made projects, share our experience and maybe we find someone who will be interested in such collaboration project idea.

Short talks
Timothy Brzezinski, (online talk): Using GeoGebra to Discover, Remediate, Differentiate, Assess
In this session, participants will actively experience how GeoGebra can serve as a powerful platform that fosters active, student-centered, discovery-based learning. Participants will also experience how GeoGebra can be effectively used to provide students with meaningful and conceptual remediation. In addition, GeoGebra's ability to naturally help teachers differentiate their instruction will be clearly illustrated through participants' interaction with several pre-made applets. Finally, several examples of GeoGebra's ability to provide both students and teachers with formative assessment opportunities will be clearly illustrated and discussed.

Camilla Söderback: GeoGebra out of a teacher´s perspective
A teacher gives her view on the implementation of GeoGebra in the upper secondary school in accordance with the new curriculum of the Finnish upper secondary school. The digitalization of the matriculation exam in maths in 2019 sets new challenges for the teaching profession and collaborative learning.

11.50 – 13.00 **Lunch**

13.00 – 14.00 Plenary lecture **Anna Helga Jónsdóttir: Using ICT to enhance mathematics education in rural Kenya**
Over the past few years, groups from the University of Iceland and the University of Maseno have been working together on a project designed to enhance mathematics education in rural Kenya. Electricity cannot be relied on and Internet is usually not available in these areas, which introduces some challenges.
A system has been designed to run in these extreme circumstances, named *Education in a suitcase*, including tablets and a small server running off a battery. The small server includes a wireless access point, which connects all the tablets in the vicinity. A learning environment, the *tutor-web*, developed at the University of Iceland runs on the server. Also accessible to learners from the server is the whole of *Wikipedia*, *Khan Academy* and the *Gutenberg library* including over 50.000 electronic books.
The *Education in a suitcase* system will be described in the talk and how implementation in a maximum security prison and in a school on a remote island in Lake Victoria has taken place. Possibilities of including GeoGebra in the next version of the system will also be discussed.

14.00 – 14.15 **Coffee break**
14.15 – 15.45 **Parallel sessions**
Workshop
Mikael Skånström and Torben Blankholm: It depends - investigation with GeoGebra
"It depends…."
How can students in secondary school understand trigonometry by using GeoGebra.
Trigonometry is traditionally a difficult discipline for pupils in the older classes in Denmark.
Pupils in the 9th grade in Islev Skole have been working with trigonometry with an investigative approach, where themselves defined the problems to be solved, found the necessary information needed, constructed models and formed hypotheses. All while the teacher set the scene for learning through cooperative dialogue in the classroom with open and curious questions at the forefront.
This workshop will account for and exemplify the investigative approach to trigonometry, in both theory and practice with GeoGebra as a strong didactical tool.

Short talks
Jón Snæbjörnsson and Lóa Björk Óskarsdóttir: Using GeoGebra in upper secondary school - examples from Laugarvatn
A few examples how we use GeoGebra.
This semester we received a governmental grant for introducing formative assessment in all our math courses. In a standardized digital learning environment where GeoGebra is an indispensable tool creating a more exciting learning experience.

Mikko Rahikka: On the Sequence and Zip –commands
I have made some studies on how to use the Sequence command to produce funny things with GeoGebra. In my talk we will see how the commands works with different objects.
The Sequence-command can be thought kind of as for next loop in programming languages. You can also use nested sequence commands to produce interesting things in 2D and 3D.
The Zip-command is kind of cousin to Sequence.

Jānis Dūrējs: Introducing Lativian students to geogebra
Math teachers at Jelgava State Gymnasium have already been introduced with possibilities of using Geogebra software and everyone is using it to some extent, but the students are introduced to the use of software at the beginning of the first school year (7th form).
Once a week, students have a special ICT lesson where they learn and get the basic knowledge and skills how to work with the Geogebra software. Later the knowledge and skills of using Geogebra are developed at the math classes resolving various tasks, studying mathematical relations and creating drawings.
Students often use Geogebra software when they encounter complex situations.
Geogebra software is a great tool for teachers in building up their own tasks.
It is a great assistant for students to understand different mathematical relations.

Short talks
Arne Amdal: Digitial tools in exams in upper secondary school in Norway
In Norway it is compulsory to use digital tools like a grapher, CAS and spread sheets on the exams in upper secondary school. In this talk I will give you examples of how students use these tools in problem solving.

Lauri Hellsten: ICT + STEM in Finnish upper secondary schools
The new Finnish curriculum for the upper secondary school has been in place for a year and the electronic matriculation exam in math, physics and chemistry will be held in 2019. This transformation has and will drastically change how STEM-

subjects are taught in Finnish upper secondary schools. The new STEM-curriculum includes goals for the students' ICT-skills and in addition, the matriculation exam will test those skills. This presentation will give examples of how teachers have been trained to use ICT (and especially GeoGebra) by the Finnish Association of STEM-teachers from 2015 onward. The presentation will focus on what type of skills and what type of problems have been taught to the teachers from both the teacher's and student's point of view. The speaker will also give examples of how GeoGebra has been used in different math and physics e-books in Finnish upper secondary schools. The speaker has been collaborating with different publishers in the creation of e-materials in math, physics and teacher training. He has also been training Finnish upper secondary school teachers regarding the new curriculum, assessment and electronic matriculation exam.

Anders Sanne: Formative Assessment and ICT
How can assessment promote students' learning and help develop the teaching of mathematics? How can we use ICT tools to promote students' understanding and creativity in mathematics? These are the core questions in an in-service course for teacher specialists in lower secondary school https://www.ntnu.no/videre/larerspesialist-matematikk . In this talk, I will give you a small glimpse into the course.

Workshop
Jonas Hall: A Builder's workshop
GeoGebra has proven itself to be a powerful facilitator of mathematical knowledge. Through demonstrations, visualizations, simulations, investigations and interaction with dynamic mathematical objects students around the world has benefited from it. Now more and more teachers, publishers and governments are creating high quality applets in large numbers to cover syllabuses, align with textbooks or as part of centralized tests. However, while the GeoGebra User Manual competently describes the exact usage of all commands and tools, it is chiefly concerned with users, not builders. Likewise, the developer community is primarily concerned with the continuing development of the software itself, not with building applets.
For this reason, I have created a Builder's Handbook, whose aim is to collect as many of the tips, tricks and techniques useful in building applets as possible. This Handbook covers a wide range of topics, from checkboxes, sliders, input boxes, and dynamic text, through scripting, animation, dynamic colours, LaTeX, immediate feedback and time control to implementation issues such as discussions on templates, how to make applets safe from misuse and efficient production work flow.
While initiated by me, the Handbook is a collaborative effort, gathering some of the best work in the GeoGebra community. It has only just begun, but there is already a fair amount of material in it.
Each page in the Handbook features a construction illustrating a building technique, complete with both clearly written instructions and a screencast of the construction. This workshop will briefly describe the Builder's Handbook and you are thereafter invited to pick any part of the content to work on. The Builder's Handbook can be found at https://www.geogebra.org/m/t6v92Gdz.

17 - 19 **Sightseeing (walk)**
19 -? **Conference dinner**

Sunday, October 15th
9.00 – 10.30 **Parallel sessions**
Workshops
Markus Hohenwarter: New GeoGebra Social Networking Website
This summer the GeoGebra website was relaunched introducing several new social networking features. In this workshop we will have a closer look at the structure of the new website, try out some of its new features, and discuss how we can further develop it to support close collaboration within the Nordic and Baltic communities of math and science students and teachers.

Sigbjørn Hals: How to make stable, interactive GeoGebra apps to enhance learning of basic mathematical skills.
In her plenary speech, Hanan Abdelrahman will show examples of interactive applets that may help students learn basic mathematical skills through visualisation and randomly generated exercises. In this workshop, you will learn how to make such applets, and how to make nice collections of them in a GeoGebra book. You will also learn how to fasten all kinds of objects to a certain position on the screen, so they don't move when zooming or opening the file in another device. (This is easy with texts, but not as obvious with pictures, points and many other objects.) Finally you will get access to a free mapping test that will show which areas of basic mathematics the students are not so familiar with. The test will also suggest which GeoGebra applets will be useful for each student, according to the areas they are struggling with.

Meeting
Freyja Hreinsdóttir and Jonas Hall: 2nd Meeting for people interested in collaboration on the use of GeoGebra with migrant students

Short talks
Sirje Sild, Sirje Pihlap and Aire Kuresson: Notice matematics around you – dance

We organized the 10th "Notice Matematics Around You" competition for pupils in academic year 2016-2017. Pupils had to prepare an animated GeoGebra worksheet where dancers were created. Also, pupils had to create a video where they were dancing like the dancers in their GeoGebra worksheet. We are going to give an overview of the best works of the student competition and analyze students' answers to two questions: 1) what did you enjoy about doing this task and 2) what did you learn.

Rikke Teglskov and Bo Kristensen: A national GeoGebra Championship for primary and lower secondary school
For the second time we have a national GeoGebra Championship for Danish schools.
In this talk we will present the thoughts and materials behind the Championship, and show some of the work that the Danish teachers and students have produced for the national Championship.

Anne-Mari Jensen: The Golden Section in Paintings and Art
In this talk I will show how students can use GeoGebra to analyze how artists may have used the golden section in their paintings. We may also look for the golden section in other art pieces and in architecture.

10.30-10.50 **Coffee break**

10.50–11.50 Plenary lecture **Thomas Lingefjärd: Migration and GeoGebra – possibilities and results**
The crisis around the world has created new challenges for many schoolteachers in countries that were not accustomed to receive new students that not understand the mother tongue in their new home country. Mathematics in its own has an international language, which is well represented in GeoGebra. Nevertheless, the psychology of seeing a definition of a mathematical object written in your own language should not be underestimated. I will show you a way to work around that in my talk.

11.50 – 12 **Closing**
12 **Lunch to go**