



23–25 February 2023
Instituto Superior de
Engenharia do Porto

INFORMATION ON ROSEDA CONFERENCE

Research On STEM Education in the Digital Age
February 23-25, 2023

We welcome you to the ROSEDA Conference on STEM Education in the digital age, which takes place in Porto, Portugal from February 23-25, 2023. Within the conference, we look forward to multiple presentations on the use of technology to improve student's learning. Hereby three topics are addressed: ideas and experiences for the design, conduct, and assessment of online courses (topic 1), innovative approaches of using digital technology in education (topic 2), and research on teaching and learning during the Covid-19 pandemic (topic 3).

Please find below the schedule, an overview of the sessions, the authors' abstracts, and information about the conference venue. More information can be found on the [conference website](#). In case of any questions, please do not hesitate to contact us via email: roseda@asymptote-project.eu.

We are looking forward to meeting you in Porto!

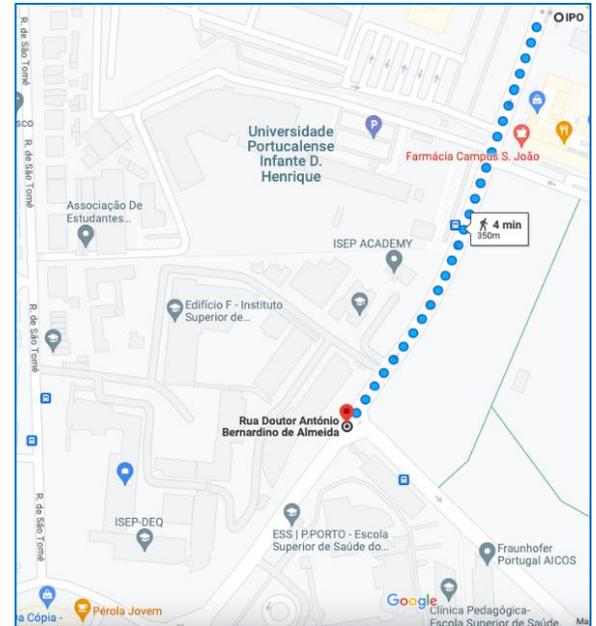
*Matthias Ludwig & Simon Barlovits (on behalf of the International Programme Committee)
Amélia Caldeira & Ana Moura (on behalf of the Local Committee)*

CONFERENCE LOCATION

Instituto Superior de Engenharia do Porto (ISEP)
Rua Dr. António Bernardino de Almeida, 431
4249-015 Porto

To get to School of Engineering by metro, you should take Line D (yellow), direction Hospital de S. João, and you get out at I.P.O.. If your departure is near another Metro Line, then you take it to Trindade Station, where you change to Line D (yellow).

Then you can walk (about 4 minutes) following the directions of the map below, and you will find the main building of ISEP, where ROSEDA will take place.



CONFERENCE ROOMS

ROSEDA Conference takes place in three meeting rooms. These are:

- Sala de Atos: Plenaries, Paper Sessions A, Workshop 2
- Sala de Reuniões: Paper Sessions B, Workshop 3
- Auditório Vítor Santos: Workshop 1

CONFERENCE OFFICE & REGISTRATION

The Conference Office is located in the “Aquarium” (see picture). You can register on Thursday, February 23, from 12:00 to 13:30.

In case of any questions, please do not hesitate to contact the ROSEDA Conference Office or our Local Organizing Committee, led by Amélia Caldeira and Ana Moura.



SCHEDULE

Thursday, February 23

- 12:00-13:30: Registration & Welcome Coffee
- 13:30-14:00: Opening (*Room: Sala de Atos*)
- 14:00-15:00: Plenary by S. Corlu (Norway) (Topic 1) (*Room: Sala de Atos*)
- 15:30-17:15: Paper Session I
- from 17:15: Social Event

Friday, February 24

- 09:00-10:00: Plenary by C. Vaz de Carvalho (Portugal) (Topic 2) (*Room: Sala de Atos*)
- 10:00-10:45: Poster Session incl. Coffee Break
- 10:45-12:30: Paper Session II
- 12:30-14:00: Lunch
- 14:00-15:30: Workshop
- from 15:30: Free Afternoon
- from 20:00: Conference Dinner

Saturday, February 25

- 09:00-10:00: Plenary by O. Swindan (Israel) (Topic 3) (*Room: Sala de Atos*)
- 10:00-10:30: Coffee Break
- 10:30-11:40: Paper Session III
- 11:45-12:15: Closing (*Room: Sala de Atos*)

PRESENTATION FORMATS

Paper Presentations

Each paper has a 30-minute slot. This is divided into 20 minutes to present and 10 minutes to discuss. Between two presentations there is a 5-minute slot for a change of presenter.

The paper presentations take place in two parallel sessions. Each session is chaired by a moderator. The detailed session schedule is available after the end of registration.

Poster Presentations

The poster presentation takes place in an informal setting during the coffee break on Friday, February 24. Please print your poster in A0 size (upright).

Workshops

The workshops take place in the afternoon on Friday, February 24. They have a time slot of 1h and 30 min. Please note that teachers from Porto are also invited to participate in the workshops.

PAPER SESSIONS

Paper Session I: February 23, 15:30-17:15

Session A: Sala de Atos <i>Research on Teaching and Learning during the Covid-19 Pandemic (Topic 1)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>D.-X. K. Oehler, S. Wetzel & M. Ludwig</i> Enhancing Computer Science Projects with Remote Teaching Elements	<i>A. Benito, A. Nolla, A. Gomezescobar, E. Sánchez & C. Ajenjo</i> An Experience with Augmented Math Trails and Service-Learning in Initial Teacher Training
<i>S. Volika, D. Koutsomanoli-Filippaki, G. Fesakis, N. Tzioufas & S. Triantafyllou</i> A Case Study for the Pedagogical Evaluation of the ASYMPOTOTE System	<i>J. R. Barbosa & J. P. Pereira</i> Geometry Mapping Tool: Improvements on a Descriptive Geometry Learning Tool
<i>A. Caldeira, S. O. Lopes, A. R. Costa & I. Figueiredo</i> Learning by Teaching with Videos – an Integration Strategy to Promote Mathematical Communication among Students of Higher Education	<i>T. Läufer & M. Ludwig</i> Bringing 3D Printing into Student Teachers' Mathematics Education
<i>Moderator: M. Kleine</i>	<i>Moderator: E. Taranto</i>

Paper Session II: February 24, 10:45-12:30

Session A: Sala de Atos <i>Ideas and Experiences for the Design, Conduct, and Assessment of Online Course (Topic 1)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>M. Kleine & L. Anhalt</i> Modeling Tasks under the Perspective of 'Grundvorstellungen'	<i>S. Jablonski</i> Digital Support of Mathematical Modelling: The Role of Hints and Feedback in MathCityMap
<i>M. Kleine & C. van Randenborgh</i> Enactive Learning in Mathematics at Home - Theoretical Framework	<i>E. Taranto, S. Barlovits, G. Fesakis, S. Triantafyllou, N. Tzioufas, D. Koutsomanoli Filippaki, S. Volika, M. F. Mammana & M. Ludwig</i> The Effect of the Teachers' Training in ASYMPOTOTE System Reception and Acceptance
<i>J. Zender & M. Geisen</i> Formative Assessment in Online Courses – Ideas and Experiences	<i>R. Carvalho & C. Lázaro</i> Project LEARN+: An Opportunity to Develop Mathematics Learning
<i>Moderator: A. Gavina</i>	<i>Moderator: M. F. Mammana</i>

Paper Session III: February 25, 10:30-11:40

Session A: Sala de Atos <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>R. S. Stäter, T. Läufer & M. Ludwig</i> Teaching Computational Thinking with <colette/>	<i>J. M. Dos Santos Dos Santos, J. Silva and Z. Lavicza</i> Tasks and Learning Paths in ASYMPOTOTE and GeoGebra
<i>A. Caldeira, I. Figueiredo, A. Gavina, I. Pinto & A. J. Viamonte</i> Digital Learning Graphs with Asymptote – Students Feedback	<i>A. N. Cahyono</i> Virtual Reality STEM Trail: A Path to STEM Education in a Digital World
<i>Moderator: G. Fesakis</i>	<i>Moderator: J. Silva</i>

ABSTRACTS OF INVITED PAPERS

Effective Online Professional Development: A Facilitator's Perspective

M. S. Corlu, B. S. Kurutas & S. Ozel

The purpose of this qualitative study is to explore the key elements that contribute to effective online professional development as perceived by facilitators. The research focuses on a specific program aimed at integrating computer science into mathematics education, involving two cohorts of teachers over a period of two years. The lead facilitator, Haynes, has a master's degree in mathematics education and 18 years of teaching experience. The study highlights the importance of sparking interest, enabling participants to teach beyond the curriculum, and offering a personalized and diverse approach to online professional development with a focus on mathematics content. Additionally, the findings underline the value of incorporating STEM education theory through cofacilitation with an experienced teacher education researcher. The findings are further discussed in a keynote speech at the ROSEDA conference.

Technology Supported Active Learning

C. Vaz de Carvalho

Active learning promotes student-centered approaches to the learning process, allowing students to develop skills and competences that traditional, passive learning methods cannot foster. In turn, supporting active learning with digital technology tools creates new possibilities in terms of pedagogical design and implementation. This article shows how active pedagogical methodologies like problem-based learning, design thinking, and others can be effectively supported by digital environments and tools like collaboration platforms, serious games and virtual and augmented reality by presenting several projects that I've been involved in the past few years. Therefore, it is also an overview of my recent research and practitioner activity in that domain.

The Positive Side of the Pandemic, Does It Really Exist?

O. Swidan

The immediate shift from face-to-face to distance instruction caused by the Covid-19 pandemic has raised teachers' awareness of the significant role that digital tools can play in educational processes. This shift forced teachers to use different kinds of digital technologies in various ways to overcome the challenges they encountered as a result of the pandemic. In this keynote talk, I will discuss how teachers use digital tools for educational purposes, aiming to extract insight regarding how such tools can be used beyond the Covid-19 period. In addition, I will present innovative approaches towards using digital tools, the need for which arose during the lockdown period, and how these approaches can be integrated into ordinary educational sessions at schools.

ABSTRACTS OF PAPER SESSION I

Session A: Sala de Atos <i>Research on Teaching and Learning during the Covid-19 Pandemic (Topic 1)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>D.-X. K. Oehler, S. Wetzel & M. Ludwig</i> Enhancing Computer Science Projects with Remote Teaching Elements	<i>A. Benito, A. Nolla, A. Gomezescobar, E. Sánchez & C. Ajenjo</i> An Experience with Augmented Math Trails and Service-Learning in Initial Teacher Training
<i>S. Volika, D. Koutsomanoli-Filippaki, G. Fesakis, N. Tzioufas & S. Triantafyllou</i> A Case Study for the Pedagogical Evaluation of the ASYMPOTOTE System	<i>J. R. Barbosa & J. P. Pereira</i> Geometry Mapping Tool: Improvements on a Descriptive Geometry Learning Tool
<i>A. Caldeira, S. O. Lopes, A. R. Costa & I. Figueiredo</i> Learning by Teaching with Videos – an Integration Strategy to Promote Mathematical Communication among Students of Higher Education	<i>T. Läufer & M. Ludwig</i> Bringing 3D Printing into Student Teachers' Mathematics Education

SESSION A – Paper 1

Enhancing Computer Science Projects with Remote Teaching Elements

D.-X. K. Oehler, S. Wetzel & M. Ludwig

The COVID-19 pandemic called for the ad-hoc implementation of many different types of remote teaching elements such as the use of particular methods and software. Entering the post-pandemic period, the acquired knowledge during this time of crisis can be used to enrich daily educational practice. In this paper, we introduce the Digitechnikum, a project in which students work on socially relevant computer science projects over the course of one school year. Based on the experiences made with various remote teaching elements during the pandemic, we discuss the use of these tools and methods for computer science projects in a school context in the post-pandemic era.

SESSION B – Paper 1

An Experience with Augmented Math Trails and Service-Learning in Initial Teacher Training

A. Benito, A. Nolla, A. Gomezescobar, E. Sánchez & C. Ajenjo

We present the ongoing project developed at the Universidad Autónoma de Madrid (Spain) using math trails in Initial Teacher Training with the aim that they can incorporate this educational resource into their future professional career. The learning experience is an integrated project focused on the creation of math trails by prospective students as a valuable outdoor problem-posing activity. In addition, it includes a two-step evaluation process that, first, allows prospective teachers to assess each other's routes, and secondly, they are tested by students as a service-learning activity. The math trails used in the project include mobile technology as an enriching element, combining the experience of using MathCityMap and the Augmented Reality tools of GeoGebra within the same project.

SESSION A – Paper 2

A Case Study for the Pedagogical Evaluation of the ASYMPOTOTE System

S. Volika, D. Koutsomanoli-Filippaki, G. Fesakis, N. Tzioufas & S. Triantafyllou

This paper examines how primary students use the ASYMPOTOTE system and whether it helps them overcome their misconceptions about fractions. Therefore, a case study was conducted for 6th grade students (Primary School) during their regular school schedule. The results proved that some of the students who engaged systematically with ASYMPOTOTE's affordances managed to overcome, to a considerable extent, their misconceptions with the support of their teacher.

SESSION B – Paper 2**Geometry Mapping Tool: Improvements on a Descriptive Geometry Learning Tool***J. R. Barbosa & J. P. Pereira*

the past decades, the technological presence has been increasing in education, producing new applications and digital platforms to assist with learning. This technological shift raises the achievement of students and promotes better school performance. This paper aims to explore the improvements made on Geometry Mapping Tool, a web application to support the teaching of Descriptive Geometry, specifically, the Monge method. The improvements were result of gathering criticism from students and professors in the field of study. The decisions made to improve the tool can provide useful insights to other educational tools. The web app was then re-evaluated to capture the feedback on the changes made and additional improvements.

SESSION A – Paper 3**Learning by Teaching with Videos – an Integration Strategy to Promote Mathematical Communication among Students of Higher Education***A. Caldeira, S. O. Lopes, A. R. Costa & I. Figueiredo*

This paper intends to present the LIGHTS (LearnInG by teachIng wiTh videoS) project that aims to promote a better academic inclusion of new students in an engineering school (ISEP), in the sense of their full integration into the new academic life, making use of their mathematical knowledge and communication skills. The pandemic affected face-to-face communication and in-person socialization. We present the students' opinions about the challenge they faced when participating in the LIGHTS project during the Covid-19 pandemic.

SESSION B – Paper 3**Bringing 3D Printing into Student Teachers' Mathematics Education***T. Läufer & M. Ludwig*

3D printing has been used in classes by teachers previously in several studies. In Germany, a lot of schools lack the funds or opportunities to use 3D printing in classes on a broad scale. Therefore, a seminar is in development and in the second iteration at Goethe University to train student teachers (educators) to create their own manipulatives for mathematics classes, where they worked intensely on mathematical and didactical aspects of their manipulatives. We present the underlying theory of 3D printing, and an ongoing teaching experience with student teachers using 3D printing for mathematics education. Additionally, students' expectations were evaluated to improve future iterations of the seminar. Some manipulatives from the seminar are presented.

ABSTRACTS OF PAPER SESSION II

Session A: Sala de Atos <i>Ideas and Experiences for the Design, Conduct, and Assessment of Online Course (Topic 1)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>M. Kleine & L. Anhalt</i> Modeling Tasks under the Perspective of 'Grundvorstellungen'	<i>S. Jablonski</i> Digital Support of Mathematical Modelling: The Role of Hints and Feedback in MathCityMap
<i>M. Kleine & C. van Randenborgh</i> Enactive Learning in Mathematics at Home - Theoretical Framework	<i>E. Taranto, S. Barlovits, G. Fesakis, S. Triantafyllou, N. Tzioufas, D. Koutsomanoli Filippaki, S. Volika, M. F. Mammana & M. Ludwig</i> The Effect of the Teachers' Training in ASYMPTOTE System Reception and Acceptance
<i>J. Zender & M. Geisen</i> Formative Assessment in Online Courses – Ideas and Experiences	<i>R. Carvalho & C. Lázaro</i> Project LEARN+: An Opportunity to Develop Mathematics Learning

SESSION A – Paper 1

Modeling Tasks under the Perspective of 'Grundvorstellungen'

M. Kleine & L. Anhalt

In automated training in mathematics, as in the ASYMPTOTE project (Adaptive Synchronous Mathematics Learning Paths for Online Teaching in Europe), modelling tasks are a challenge in their creation and technical implementation. In modelling tasks, working with mathematics is concretised in the application area. Mathematical work is understood as a process of modelling: First, mathematical models are derived from a real problem; then the mathematical model is solved; finally, the mathematical solution is interpreted with regard to reality and the original problem is validated by the solution. This process focuses on the transition between the reality and the mathematical level. This paper focuses on this transition and its requirements and explains design principles of modelling tasks using examples from proportion and percentage **calculation**.

SESSION B – Paper 1

Digital Support of Mathematical Modelling: The Role of Hints and Feedback in MathCityMap

S. Jablonski

Mathematical modelling addresses numerous demands of modern mathematics education: The learning of mathematics is directly linked to reality and students learn impressively what they can use mathematics for. At the same time, these tasks are very challenging for students, especially when the tasks need to be structured and validated without the immediate help of a teacher. Modern approaches, such as MathCityMap, pursue the support of modelling activities with digital technologies. In this paper, the potential of MathCityMap features like hints, solution validation, and sample solution are explored in modelling tasks in different contexts. The results show that especially the solution validation feature makes clear that sometimes a second run of the modeling circle may be necessary. Furthermore, practical observations on hint usage emerge, which should be considered in future activities, i.e. in terms of modelling activities in the context of distance and online education.

SESSION A – Paper 2

Enactive Learning in Mathematics at Home - Theoretical Framework

M. Kleine & C. van Randenborgh

The project "Enactive Learning in Mathematics at Home (EnLeMaH)" aims to promote enactive work of pupils in the area of functional relationships. This paper establishes the theoretical foundations with respect to an understanding of 'enactive learning', learning fundamental, and experimental work in mathematics. This paper is thus the theoretical basis for a workshop on enactive working.

SESSION B – Paper 2**The Effect of the Teachers' Training in ASYMPTOTE System Reception and Acceptance**

E. Taranto, S. Barlovits, G. Fesakis, S. Triantafyllou, N. Tzioufas, D. Koutsomanoli Filippaki, S. Volika, M. F. Mammana & M. Ludwig

This paper aims to present the first studies on an innovative technological system, ASYMPTOTE, designed after the Covid-19 pandemic to enable the teaching and learning of mathematics online. A training course (Long-Term Curriculum) on ASYMPTOTE was offered by three European institutions. The results regarding the reception of the training by the course participants are presented and their willingness to use ASYMPTOTE is investigated. The results show that the participants, both future teachers and in-service teachers, positively perceived the system and plan to integrate it into their teaching practices.

SESSION A – Paper 3**Formative Assessment in Online Courses – Ideas and Experiences**

J. Zender & M. Geisen

Formative assessment is known for its positive effects on learning outcomes. However, there is still a need for research on the use and successful implementation of this approach. In this article, a university online course about math trails for pre-service teachers is presented, who took the key strategies of formative assessment into account. The concept and the implementation of the course will be presented especially with regard to these key strategies showing how formative assessment can be used and what potential lies in it.

SESSION B – Paper 3**Project LEARN+: An Opportunity to Develop Mathematics Learning**

R. Carvalho & C. Lázaro

In this communication, we present the LEARN+ project and the teacher training model using the MILAGE LEARN+ platform for the teaching and learning of mathematics, which have been carried out by the Associação de Professores de Matemática (APM) from Portugal and the Federación Española de Sociedades de Profesores de Matemáticas (FESPM) from Spain, partners institutions in the Erasmus+ LEARN+ project.

ABSTRACTS OF PAPER SESSION III

Session A: Sala de Atos <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>	Session B: Sala de Reuniões <i>Innovative Approaches of Using Digital Technology in Education (Topic 2)</i>
<i>R. S. Stäter, T. Läufer & M. Ludwig</i> Teaching Computational Thinking with <colette/>	<i>J. M. Dos Santos Dos Santos, J. Silva and Z. Lavicza</i> Tasks and Learning Paths in ASYMPTOTE and GeoGebra
<i>A. Caldeira, I. Figueiredo, A. Gavina, I. Pinto & A. J. Viamonte</i> Digital Learning Graphs with Asymptote – Students Feedback	<i>A. N. Cahyono</i> Virtual Reality STEM Trail: A Path to STEM Education in a Digital World

SESSION A – Paper 1

Teaching Computational Thinking with <colette/>

R. S. Stäter, T. Läufer & M. Ludwig

Computational Thinking (CT) is a necessary skillset to navigate and participate in our digitalized world. It is, thus, imperative to teach this skillset in school. Because CT is not automatically acquired simply by using digital tools, but it needs to be taught deliberately. However, a lack of easy-to-use teaching material and teacher training has been shown to hinder the adoption of CT-specific education in the classroom. Here we show a low-threshold approach to teaching CT using the <colette/> web portal and app. The web portal provides a convenient way for teachers to create tasks and the app allows students to display, solve, and review the tasks. Teachers create custom paths by adapting the predefined task family templates, each addressing a specific CT-skill. In this way, <colette/> facilitates teaching CT and integrating it into various school subjects.

SESSION B – Paper 1

Tasks and Learning Paths in ASYMPTOTE and GeoGebra

J. M. Dos Santos Dos Santos, J. Silva and Z. Lavicza

Automatic tutoring systems allow teachers to design tasks to assist students' learning processes. Here we analyse mathematics automatic feedback tasks built with GeoGebra and Asymptote; each task included a series of decisions about pedagogical and curricular strategies inherent to the tasks proposed, related with a hypothetical learning trajectory. In this exploratory study, we aim to understand views about ATS by analysing data collected from six future teachers and two secondary students. The results reveal that the analysed tasks and learning graph were adjusted, provoked interest in the students, and there is evidence to have triggered a-didactic and mathematical situations with user engagement. Although automatic feedback GeoGebra tasks can provide several mathematics representations and ways of user interaction, they require more creator domain technology; hence, constructing the learning graph is easier with Asymptote.

SESSION A – Paper 2

Digital Learning Graphs with Asymptote – Students Feedback

A. Caldeira, I. Perdigão Figueiredo, A. Gavina, I. Mendes Pinto & A. J. Viamonte

The success of digital technology in mathematics education includes the design of digital tools. The ASYMPTOTE system has been developed and improved since March 2021 an effective, powerful, and user-friendly digital tool for online mathematics education. This article aims to present an exploratory study of the use of the ASYMPTOTE system in the classroom. The participants of this exploratory study are engineering students of different degrees of the School of Engineering of the Polytechnic of Porto (ISEP) and in different subjects. In some subjects the ASYMPTOTE was used in an evaluation context and in others in a training context.

SESSION B – Paper 2

Virtual Reality STEM Trail: A Path to STEM Education in a Digital World

A. N. Cahyono

This study explores how STEM-based math trails may be conducted virtually. We used the STEM Education approach, math trails concept, and virtual reality technology to develop a town-based STEM learning environment. In this project, a virtual reality mobile app was produced that can be used with Cardboard VR.

Teachers build virtual trails with mathematics tasks related to municipal landmarks. Students utilize a virtual reality program on their phones to explore the trail. They employ the mathematical modeling cycle to solve real-world STEM problems. These activities can be done anywhere, anytime using cutting-edge technology. Experiments and deployment in several contexts are needed.

ABSTRACTS OF WORKSHOPS

Workshop 1: Auditório Vítor Santos

The ASYMPTOTE Project: Developing a System for Adaptive and Synchronous Online Learning

S. Barlovits, D.-X. K. Oehler, S. Jablonski & M. Ludwig

Auditório Vítor Santos

Automatic tutoring systems allow teachers to design tasks to assist students' learning processes. Here we analyse mathematics automatic feedback tasks built with GeoGebra and Asymptote; each task included a series of decisions about pedagogical and curricular strategies inherent to the tasks proposed, related with a hypothetical learning trajectory. In this exploratory study, we aim to understand views about ATS by analysing data collected from six future teachers and two secondary students. The results reveal that the analysed tasks and learning graph were adjusted, provoked interest in the students, and there is evidence to have triggered a didactic and mathematical situations with user engagement. Although automatic feedback GeoGebra tasks can provide several mathematics representations and ways of user interaction, they require more creator domain technology; hence, constructing the learning graph is easier with Asymptote.

Workshop 2: Sala de Atos

Mobile Learning Outside the Classroom with MathCityMap

S. Jablonski, S. Barlovits, I. Gurjanow, P. Larmann, M. Ludwig, D.-X. K. Oehler & S. Wetzel

Discovering mathematics in one's own environment inspires students. Numerous everyday objects offer potentials for posing interesting and motivating measuring tasks. To organize the mathematics lesson outdoors, teachers can create so-called math trails in their environment using the MathCityMap system: a web portal and a smartphone app are available to prepare and conduct a math trail. Equipped with the app and measuring tools, the students work in small groups on the object side. Hereby, the MathCityMap app supports the independent and collaborative learning of students offering hints and direct answer validation. In the following paper, the components of MathCityMap are presented.

Workshop 3: Sala de Reuniões

How <colette/> Facilitates Teaching Computational Thinking

R. S. Stäter, T. Läufer & M. Ludwig

Although the everyday life of students becomes increasingly digitalized, this process does not necessarily lead to a proficient use and understanding of digital tools. Students must be taught how to use them, but the lack of easy-to-use teaching materials hinders teachers to include Computational Thinking in their lessons. <colette/> is an easy-to-use two-component-system to include Computational Thinking in a variety of school subjects. <colette/> guides teachers to create meaningful tasks and gives students an environment to work on those tasks.