Games for Learning Algorithmic Thinking

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E-Learning Projects: New Potentials to Enhance Multilateral Cooperation in Informatics

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DAAD Workshop *Cooperation at Academic Informatics Education across Balkan Countries and Beyond*

Primošten, 5-8.9.2018

Agenda

- UNIRI experiences with EU e-learning projects
- EU Erasmus+ programme - Key Action 2: Innovation and good practices, Strategic partnerships
- Project “Games for Learning Algorithmic Thinking – GLAT”
  - an example of good practice in submitting and managing Erasmus+ projects in the area of e-learning

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EU funding programmes for TEL

- The importance of international cooperation in science and technology is recognised in several European Union initiatives
- Some examples of funding programmes for research and innovation: TEMPUS and FP7 (before), Horizon 2020, COST, Erasmus+ ,…
- E-learning or Technology Enhanced Learning (TEL) – one of the up-to-date topics for EU project proposals

UNIRI and e-learning projects

- University of Rijeka, Department of Informatics (UNIRI) has been involved in several international TEL projects for more than fifteen years:
  - TEMPUS "EQIBELT - Education Quality Improvement by e-Learning Technology„ (2004-2007)
  - FP7 "Mobile Game-Based Learning (mGBL)„ (2005-2007)
  - Erasmus European Tematic network „Future Education and Training in Computing: How to support learning at anytime anywhere - FETCH“ (2013-2016)
  - Erasmus+ project *Creative Classroom* (2014-2016)
  - Erasmus+ project *GLAT* (2017-2019) → UNIRI is coordinator! ☺
  - Erasmus+ project *Coding4Girls* (2018-2020)

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Erasmus+ Projects

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Erasmus+ projects

- Erasmus+ is the EU's programme to support education, training, youth and sport in Europe
- Besides for students, Erasmus+ has opportunities for a wide variety of individuals and organisations → projects/Key Actions
- Key Actions:
  - Key Action 1: Learning mobility of individuals
  - **Key Action 2: Innovation and good practices**
  - Key Action 3: Support for policy reform
  - Jean Monnet
  - Sport

https://ec.europa.eu/programmes/erasmus-plus

Key Action 2: Innovation and good practices

- Designed to modernise and reinforce education, training, and youth systems
- Strategic partnerships to support innovation in the sector as well as joint initiatives to promote cooperation, peer-learning, and the sharing of experience
- Areas: higher education, vocational education and training, school education, adult education, youth
- Applications should be submitted to the National Agency in the Programme Country where the applicant organisation is established

Countries

Erasmus+

Programme countries

EU Countries +

Non-EU Countries −

- The former Yugoslav Republic of Macedonia
- Iceland
- Liechtenstein
- Norway
- Turkey

Partner countries

Partners countries neighbouring the EU

Western Balkans (Region 1) −

- Albania
- Bosnia and Herzegovina
- Kosovo
- Montenegro
- Serbia

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GLAT project

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GLAT Info

- Programme: Erasmus+
- Key Action 2: Cooperation for innovation and the exchange of good practices
- Action Type: Strategic Partnerships for school education
- Project Reference: 2017-1-HR01-KA201-035362
- Full Project Title: Games for Learning Algorithmic Thinking
- Start: 02-10-2017 - End: 01-10-2019
- EU Grant: 90.779 EUR
- glat.uniri.hr & http://ec.europa.eu/programmes/erasmus-plus/projects (https://goo.gl/AKqYsn)

Project's team

- Coordinator
  - UNIRI - University of Rijeka – Department of Informatics
- Partners
  - UF - Faculty of Teacher Education - University of Rijeka (Croatia)
  - TU - Tallinn University (Estonia)
  - UL - University of Ljubljana (Slovenia)
  - UKIM - Ss. Cyril and Methodius University in Skopje (Macedonia)
  - SWU - South-West University Neofit Rilski (Bulgaria)

General goal of the project

- Improving students' attitudes towards coding and the development of algorithmic thinking of younger students (already from the 1st grade of primary school)
- Reducing the "fear" towards coding and increasing students' interest in the selection of future career in the ICT and STEM areas (in the long term)
- Algorithmic thinking primarily develops solving various problems that reflect real issues
  - Related to problem-solving skills, logic and creativity
  - Should be integrated into the daily learning through different school subjects
  - Includes application of knowledge from other areas, especially science, mathematics and logical disciplines

Objectives of the project

- Encouraging the integration of algorithmic thinking into the daily teaching through different subjects from the first to fourth grade of primary school
- Training of teachers including the acquisition of contemporary knowledge and skills connected to different ICT related innovative teaching methodologies such as Problem Based Learning (PBL), Inquiry Based Learning (IBL), Game Based Learning (GBL)
- Creating blended learning e-course in LMS (syllabus, materials in English and (partly) in Croatian) for further using in the partner countries and beyond

Participants

- Direct participants 20 primary school junior grade teachers who are gathered in the focus group, and participate in 3 2-days workshops and in the development of learning scenarios
- Students from the classes of teachers involved in the focus group will be taught based on the prepared learning scenarios (about 300 students form the 1st to the 4th grade)
- Teachers and students will participate in surveys and interviews

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Expected results

- Workshop syllabus and materials (e.g. presentations, texts, examples of games and activities that encourage algorithmic thinking,..) in a form of blended e-course in the LMS Moodle, developed and evaluated by project's experts (English, partly Croatian)
- Learning scenarios designed and implemented in the classrooms by teachers with the help of online mentoring of experts
  - Among 60 learning scenarios the best ones will be translated into English
- Feedback from the teachers and their students through questionnaires and interviews that will check their satisfaction

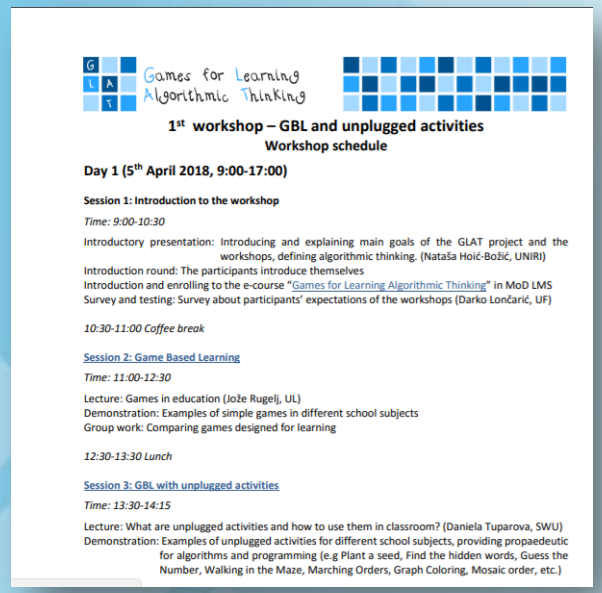
The results of the project will be able to apply not only in Croatia but in a similar manner in all partner countries as well as across Europe

Intellectual outputs of the project

O1 - Workshop syllabus and materials

O2 - Learning scenarios

O3 - The final version of the syllabus and learning materials



Games for Learning Algorithmic Thinking

1st workshop – GBL and unplugged activities

Workshop schedule

Day 1 (5th April 2018, 9:00-17:00)

Session 1: Introduction to the workshop

Time: 9:00-10:30

Introductory presentation: Introducing and explaining main goals of the GLAT project and the workshops, defining algorithmic thinking. (Nataša Hoić-Božić, UNIRI)
Introduction round: The participants introduce themselves
Introduction and enrolling to the e-course "Games for Learning Algorithmic Thinking" in MoD LMS
Survey and testing: Survey about participants' expectations of the workshops (Darko Lončarić, UF)

10:30-11:00 Coffee break

Session 2: Game Based Learning

Time: 11:00-12:30

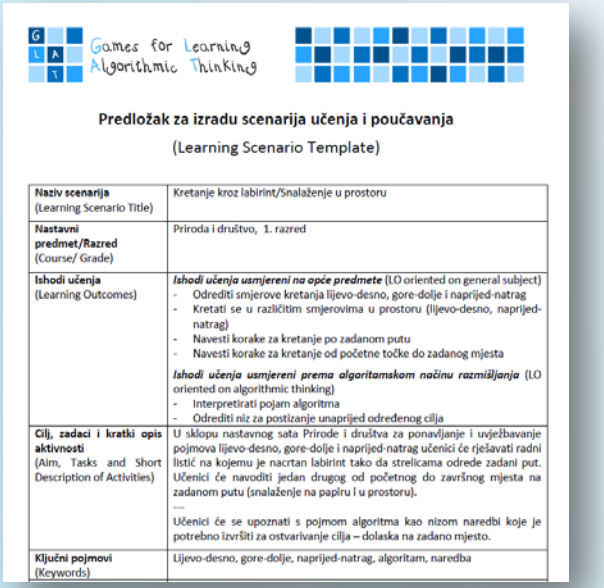
Lecture: Games in education (Jože Rugelj, UL)
Demonstration: Examples of simple games in different school subjects
Group work: Comparing games designed for learning

12:30-13:30 Lunch

Session 3: GBL with unplugged activities

Time: 13:30-14:15

Lecture: What are unplugged activities and how to use them in classroom? (Daniela Tuparova, SWU)
Demonstration: Examples of unplugged activities for different school subjects, providing propaedeutic for algorithms and programming (e.g Plant a seed, Find the hidden words, Guess the Number, Walking in the Maze, Marching Orders, Graph Coloring, Mosaic order, etc.)

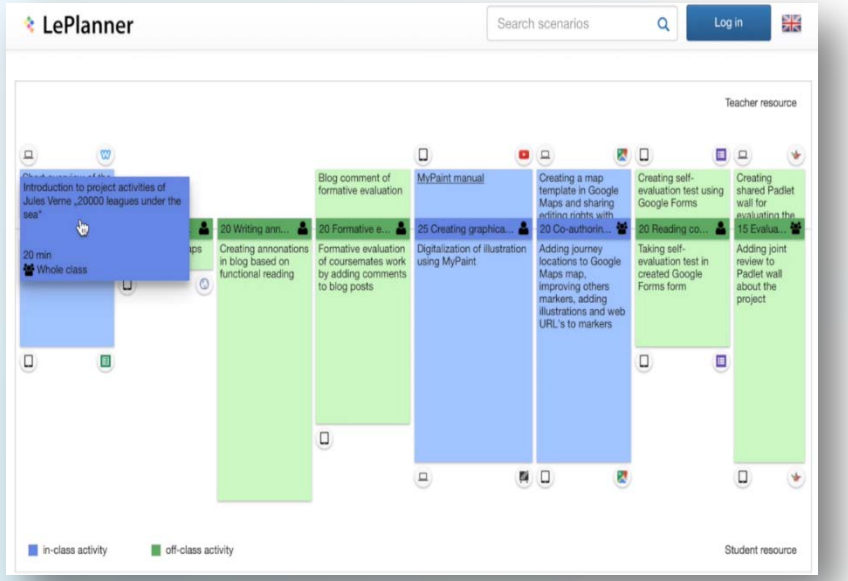


Games for Learning Algorithmic Thinking

Predložak za izradu scenarija učenja i poučavanja

(Learning Scenario Template)

Naziv scenarija (Learning Scenario Title)	Kretanje kroz labirint/Snalaženje u prostoru
Nastavni predmet/Razred (Course/ Grade)	Priroda i društvo, 1. razred
Ishodi učenja (Learning Outcomes)	***Ishodi učenja usmjereni na opće predmete*** (LO oriented on general subject) - Odrediti smjerove kretanja lijevo-desno, gore-dolje i naprijed-natrag - Kretati se u različitim smjerovima u prostoru (lijevo-desno, naprijed-natrag) - Navesti korake za kretanje po zadanom putu - Navesti korake za kretanje od početne točke do zadanog mjesta ***Ishodi učenja usmjereni prema algoritamskom načinu razmišljanja*** (LO oriented on algorithmic thinking) - Interpretirati pojam algoritma - Odrediti niz za postizanje unaprijed određenog cilja
Cilj, zadaci i kratki opis aktivnosti (Aim, Tasks and Short Description of Activities)	U sklopu nastavnog sata Prirode i društva za ponavljanje i uvježbavanje pojmova lijevo-desno, gore-dolje i naprijed-natrag učenici će rješavati radni listić na kojemu je nacrtan labirint tako da strelicama odrede zadani put. Učenici će navoditi jedan drugog od početnog do završnog mjesta na zadanom putu (snalaženje na papiru I u prostoru). --- Učenici će se upoznati s pojmom algoritma kao nizom naredbi koje je potrebno izvršiti za ostvarivanje cilja – dolaska na zadano mjesto.
Ključni pojmovi (Keywords)	Lijevo-desno, gore-dolje, naprijed-natrag, algoritam, naredba



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O1 Workshop syllabus and materials

- Developed for three two-day workshops for focus group of 20 teachers - f2f part of a total of 48 hours and online period for mentoring that follows up each workshop
- Learning outcomes that relate to innovative teaching methodologies in the ICT area such as PBL, IBL, GBL
- Learning with the help of digital didactic games (serious games) for encouraging algorithmic thinking, problem-solving skills, logic and creativity integrated into the daily learning through different school subjects

O2 Learning scenarios

- Learning scenarios design include:
  - f2f workshop sessions for focus group of Croatian teachers, which will be led by the experts from project partners
  - Development of learning scenarios by each teacher
  - Evaluation of the designed learning scenarios
- A total of about 60 scenarios (3x20) will be developed, evaluated by the experts, and tested in the classroom with the students
- The best ones will be chosen and translated into English and included in the final version of the workshop materials as the examples of good practice

O3 The final version of the syllabus and learning materials

- Preparing the questionnaire and interviews that will check the satisfaction of teachers with the education, and collect suggestions for the improvement
- The questionnaire will also be prepared for students who took part in testing of the learning scenarios
- Conducting and analysing the inquiry
- Preparation and evaluation of the final version with English translation

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Workshop syllabus

- Three workshops:
  1. WS1: Game based learning and unplugged activities – April 2018
  2. WS2: Problem based learning, online quizzes and logical tasks – August 2018
  3. WS3: Games and tools for learning programming – January 2019

- Available online

1st Workshop

- Workshop "Game based learning and unplugged activities" was held at the UNIRI on 5th and 6th of April 2018
- A focus group of 24 junior grade teachers participated in the workshop
- The main learning outcomes of this workshop were:
  - describe principles of Game Based Learning,
  - use Web 2.0 tools for creating content for unplugged activities,
  - create learning scenarios in order to develop innovative ideas for carrying out unplugged activities

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1st workshop

2nd Workshop

- Workshop "Problem Based Learning (PBL), online quizzes and logical tasks" was held at the UNIRI on 28th and 29th of August 2018
- The main learning outcomes of this workshop were:
  - Describe principles of Problem Based Learning and teamwork
  - Create learning scenarios in order to develop innovative ideas for carrying out logical tasks and online quizzes
  - Use Web 2.0 tools for creating logical tasks and online quizzes

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2nd Workshop

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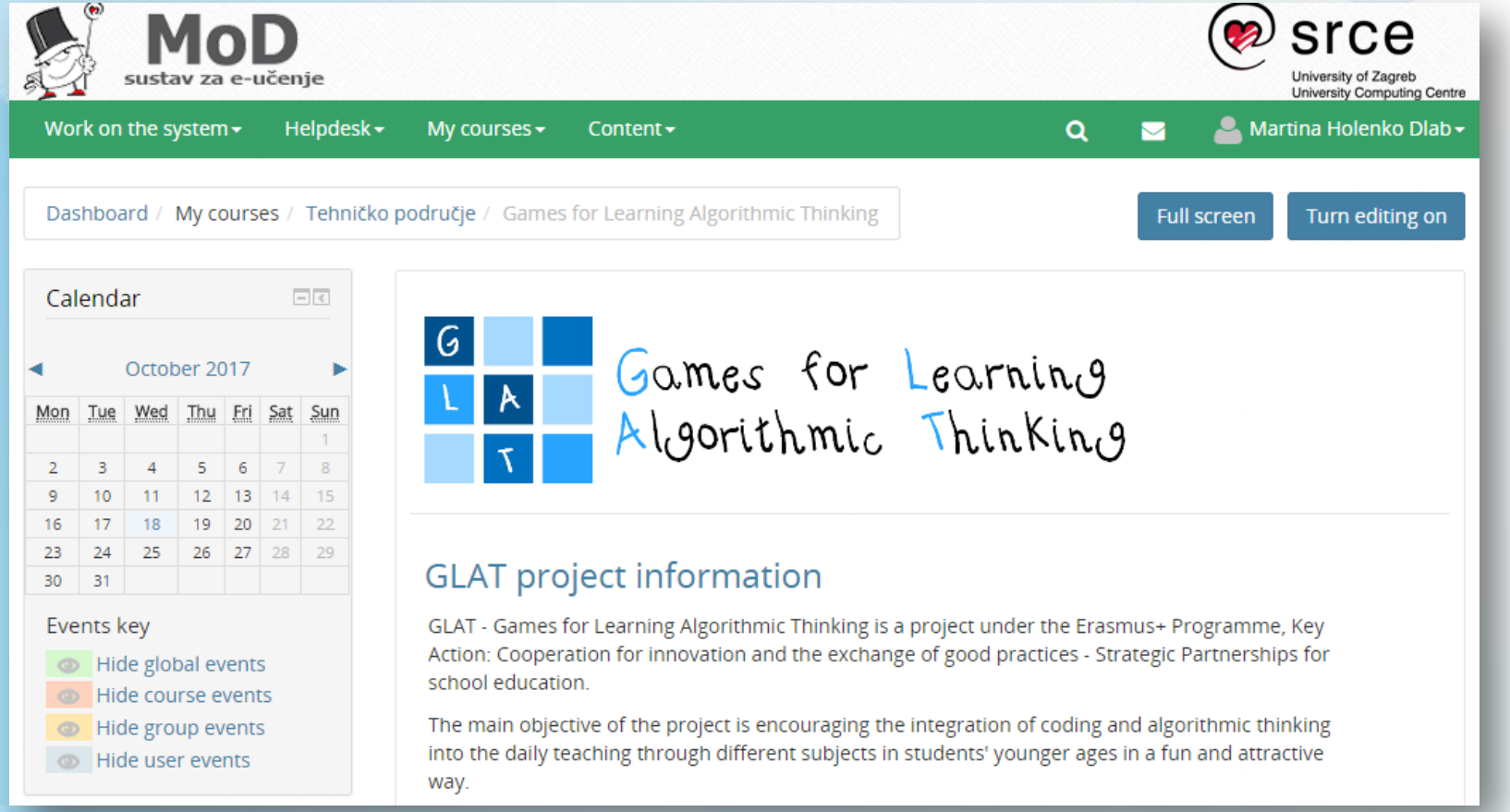
Dissemination

- Visual identity and logo of the project, the project website, Facebook, Moodle as the platform for e-course, written material such as newsletters, reports,…
- Dissemination events such as lectures at schools, presentations at partners' institutions, conferences, …
- Web site and LMS will remain available online after the project
- Organization of informal, non-formal or formal primary junior grade teacher training or study programmes at the institutions that educate future teachers in Croatia, partner countries and beyond

LMS platform for e-course - Moodle

- https://mod.srce.hr/course/view.php?id=284



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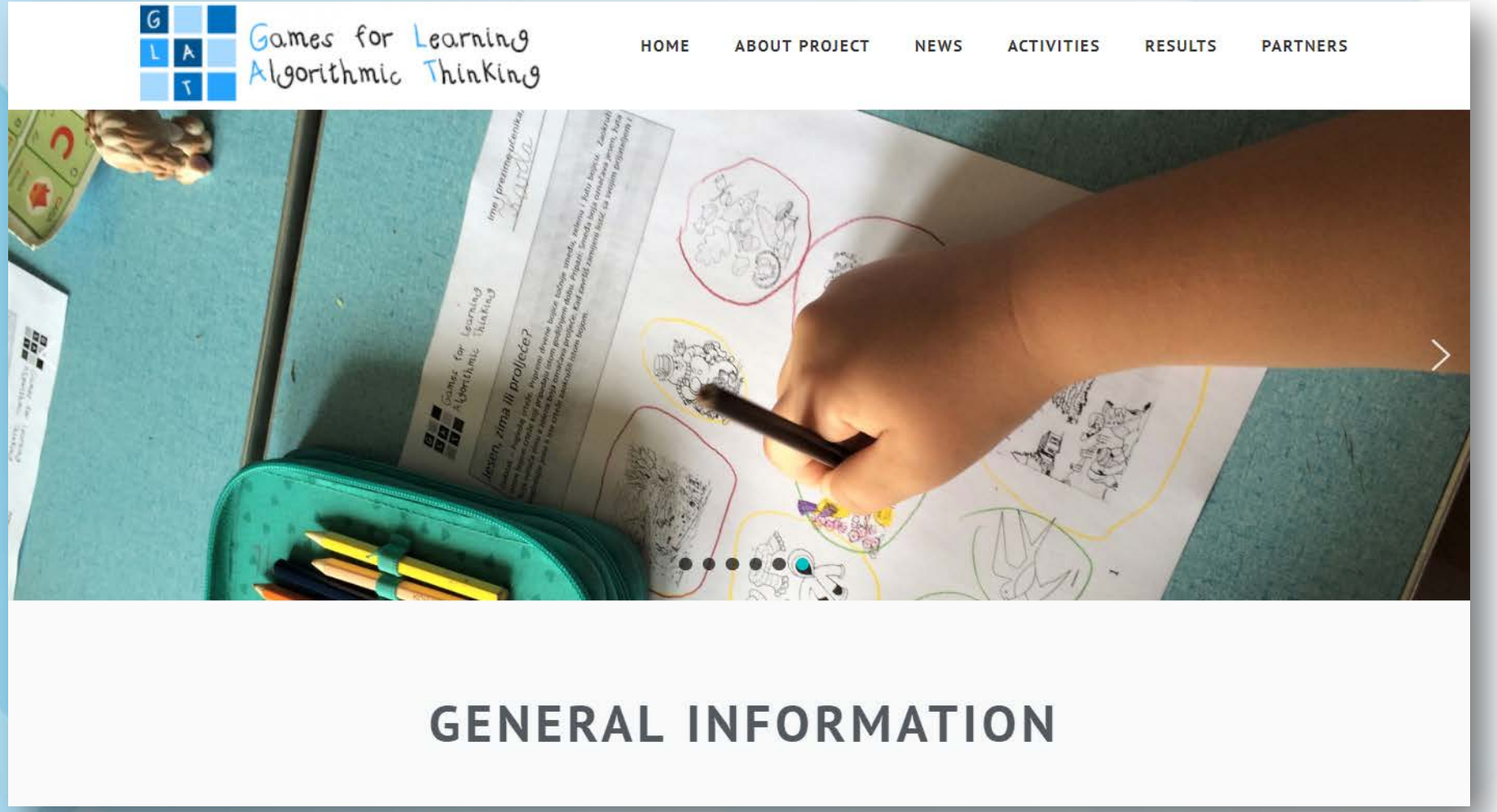
Web page glat.uniri.hr



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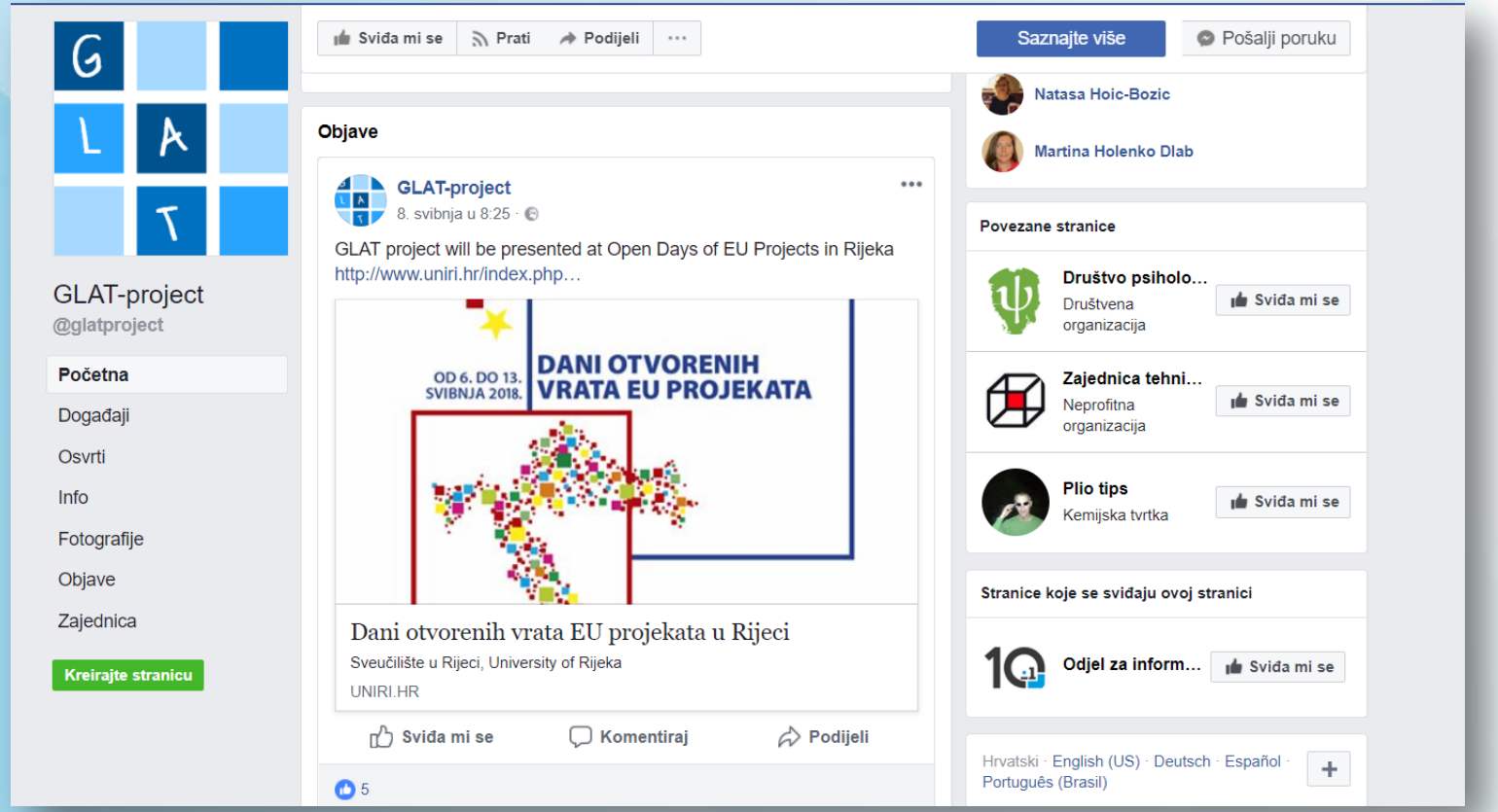
Facebook page

- https://www.facebook.com/glatproject



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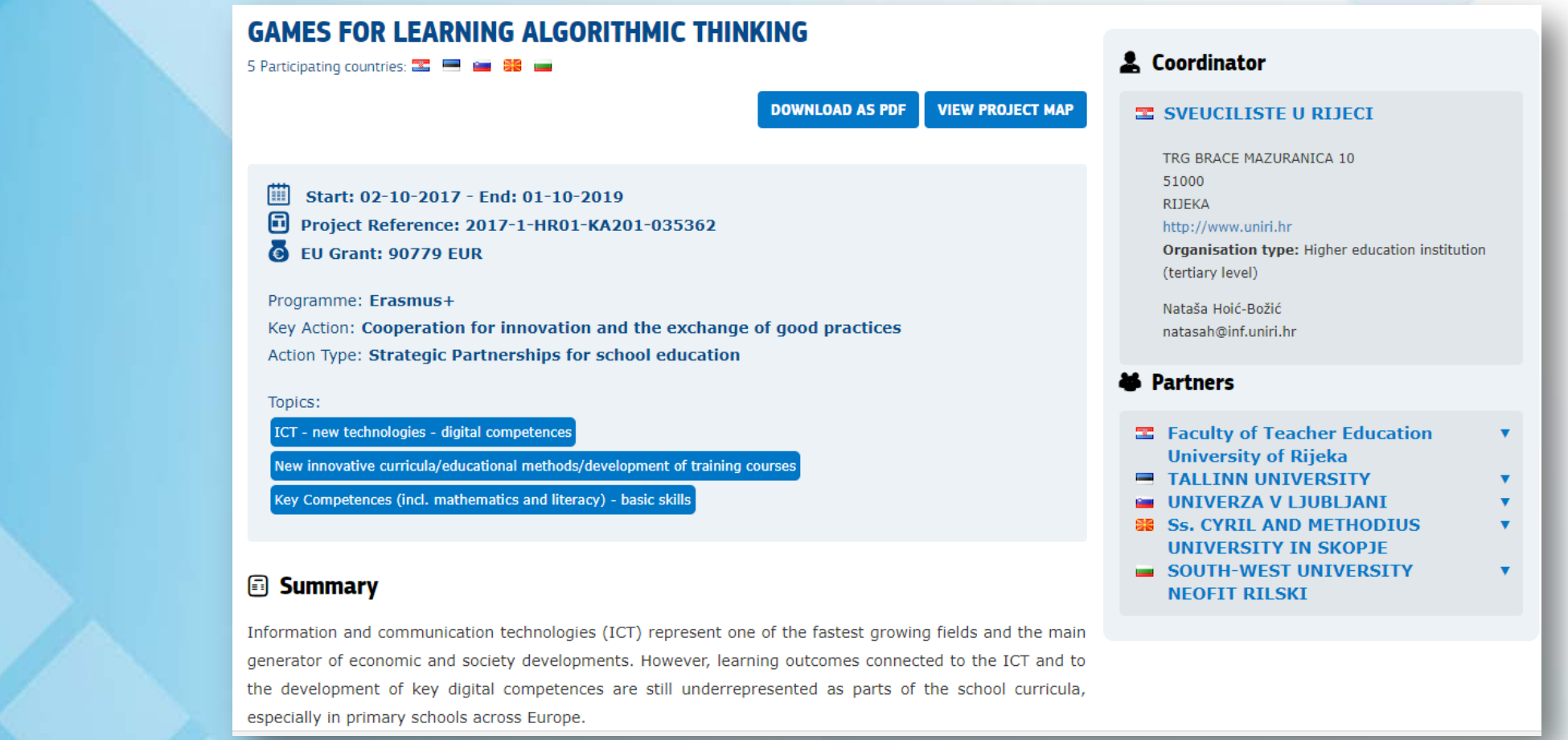
Erasmus+ dissemination platform

- https://goo.gl/AKqYsn



GAMES FOR LEARNING ALGORITHMIC THINKING

5 Participating countries:

DOWNLOAD AS PDF | VIEW PROJECT MAP

Start: 02-10-2017 - End: 01-10-2019
Project Reference: 2017-1-HR01-KA201-035362
EU Grant: 90779 EUR

Programme: **Erasmus+**
Key Action: **Cooperation for innovation and the exchange of good practices**
Action Type: **Strategic Partnerships for school education**

Topics:

- ICT - new technologies - digital competences
- New innovative curricula/educational methods/development of training courses
- Key Competences (incl. mathematics and literacy) - basic skills

Summary

Information and communication technologies (ICT) represent one of the fastest growing fields and the main generator of economic and society developments. However, learning outcomes connected to the ICT and to the development of key digital competences are still underrepresented as parts of the school curricula, especially in primary schools across Europe.

Coordinator

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- TALLINN UNIVERSITY
- UNIVERZA V LJUBLJANI
- Ss. CYRIL AND METHODIUS UNIVERSITY IN SKOPJE
- SOUTH-WEST UNIVERSITY NEOFIT RILSKI

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Future plans, impact and sustainability

Activities and results that will be maintained after the end of the EU funding:

- Project website → will remain available online
- Developed e-course → will be open for further use
- Developed syllabus of the training programme for teachers (materials and scenarios with examples of good practice) → will be used to plan the programme of lifelong learning
- Inclusion of new courses related to the content of the project (UF)
- Implementation of new materials to supplement existing courses (UNIRI+others)

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