

Individual method

Innovative technologies and computational thinking introduction through unplugged activities

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1. Aims

The aim of this method is to brainstorm ideas about digital innovations and computational thinking based on teachers' and schools' individual pedagogical practices and experiences. The Innovative Technologies workshop is important for introducing new themes on computational thinking or new educational tools to primary and secondary school teachers. The method is suitable to be used in phases 5. *Acquiring new perspectives* and 6. *Collaborative development actions* in the school mentoring process.

This method of brainstorming ideas about digital innovations and computational thinking based on individual pedagogical practices and experiences can be used in a variety of ways to support teacher professional development and improve student learning outcomes.

Here are a few examples:

1. Professional learning communities: The workshop can be used as a starting point for professional learning communities (PLCs) where teachers can continue to collaborate and share ideas about digital innovations and computational thinking.
2. Project-based learning: Teachers can use the ideas generated during the workshop as the basis for project-based learning activities that allow students to develop their computational thinking skills while exploring new technologies.

3. Student-centered learning: By incorporating new technologies and computational thinking concepts into their teaching practice, teachers can create more student-centered learning experiences that allow students to engage with digital content in meaningful ways.
4. Assessment and evaluation: The workshop can also be used to develop new assessment and evaluation strategies that take into account the use of immersive technologies and computational thinking concepts.

Overall, the Innovative Technologies workshop is a valuable tool for introducing computer science topics and educational tools to teachers and supporting their ongoing professional development. By following a structured process that includes mapping development needs, acquiring new perspectives, and reflecting on their practice, teachers can improve their ability to incorporate digital innovations and computational thinking into their teaching practice and support student learning outcomes.

2. Description

Innovative technologies have the potential to revolutionize the way we interact with digital content and the world around us. As these technologies continue to develop and become more accessible, we can expect to see them used in an increasing number of applications in education.

The Innovative Technologies workshop is designed for teachers who want to learn about computer science topics and educational tools and improve their ability to incorporate digital innovations and computational thinking into their teaching practice. The workshop is a valuable tool for teachers who want to support student learning outcomes through the use of technology in the classroom. The workshop is also suitable for teachers who are interested in ongoing professional development and want to learn new perspectives on teaching with technology.

Duration of the activity is about 40-60 min.

3. Context

This method could be implemented in face to face or online or using a hybrid methods, but it is important to create small groups. If the teachers participating in the workshop come from different schools, we recommend to mix group members, because it gives teachers an opportunity to share their own practices. We organized workshops based on this method in Lithuania. Six schools from different regions participated in same workshops. Participants were primary school teachers with no computer science background.

4. Requirements for implementing and resources needed

You need to prepare a presentation about the idea and principles of the workshop, because teachers should be aware of the content at the start. Also clear steps of the workshop should be prepared so that the participants know how to work during the workshop and why it is important.

The workshop can be organized as a face to face meetings or in virtual spaces (using, e.g., Zoom or Teams) but the virtual participation is much exhaustive. It is important to have material for virtual groups about how data in the group work will be collected (worksheets and other programs like Padlet table, Word document, Power Point, etc.). These tools allows the working in groups. The presentation should also include instructions for the group work.

A lot of resources can be found and adapted from the “Computer Science without a computer” website:

<https://www.csunplugged.org/en/>

Computer Science Unplugged adopts a constructivist methodology where students are presented with challenges based on simple rules, allowing them to discover powerful ideas on their own. This approach not only enhances retention but also fosters a sense of empowerment among learners by demonstrating that the concepts are within their reach. Additionally, the activities involve a lot of physical movement, and the use of bigger materials is preferred.

The constructivist approach enables teachers to learn alongside the students. It is necessary to familiarize oneself with the activity before presenting it to the class. There are also videos available for many of the activities, which can help teachers visualize them. As students explore and comprehend the principles behind the Computer Science topics, teachers can identify the patterns and ideas they are uncovering.

5. Structure

The structure of the Innovative technologies and computational thinking workshop is the following:

- A. Introduction to the topic, presentation of the topic and discussion with the teachers. In our case, we collected participants' comments and questions using Padlet, then we as mentors answers some questions, other questions were answered by teachers themselves.
- B. Short tasks, to deepen the knowledge of the presented topic.
- C. Participants are divided into pairs, each pair gets the material (printed tasks) for the unplugged activity.
- D. The rules of unplugged activity are explained and showed on the screen.
- E. Unplugged activity starts, duration is about 40-60 min. During the activity, the members of the mentoring team mentors the participants.
- F. Reflection of all the activities and workshop topics.

Each team discusses about the difficulties and challenges that they had in completing the tasks. It is very important that teams can share their feelings about how they started to understand new ideas, what ideas did the teachers get for applying the theme/tool in their own teaching etc. Each team could tell one highlight or the teams can share their results in pair teams if there is no time for all teams to present, etc.

6. Actions after implementing the method

After implementing the Innovative technologies and computational thinking workshop method, some actions that can be taken are:

1. **Collect feedback:** It is important to collect feedback from the participants to evaluate the effectiveness of the workshop. Feedback can be collected through surveys, questionnaires, or focus group discussions.
2. **Analyze the feedback:** The feedback collected should be analyzed to identify the strengths and weaknesses of the workshop. This analysis can help in improving the workshop in the future.
3. **Review the material:** The material used for the workshop should be reviewed to ensure it is up-to-date and relevant. Any outdated or irrelevant material should be replaced with current and relevant material.
4. **Revise the tasks:** The tasks used for the short tasks and unplugged activity should be reviewed and revised based on the feedback received from the participants. This can help in improving the learning outcomes of the workshop.
5. **Plan for follow-up:** After the workshop, it is important to plan for follow-up activities that can help the participants apply the knowledge and skills they learned during the workshop. Follow-up activities can include online support, additional resources, or further training sessions.
6. **Share the results:** The results of the workshop, including the feedback received, improvements made, and follow-up activities planned, should be shared with relevant stakeholders such as management, supervisors, or funders. This can help in demonstrating the impact of the workshop and securing support for future workshops.

7. Recommendations

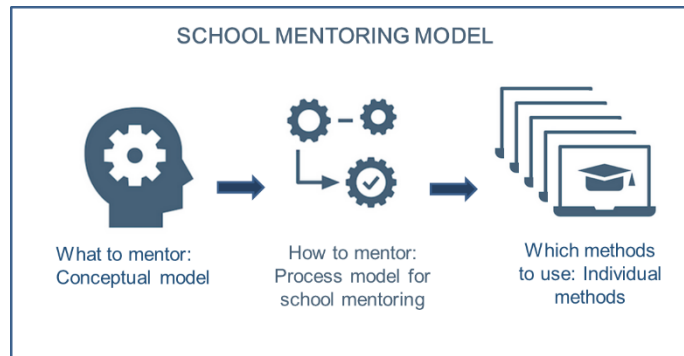
We would like to provide some recommendations for organizing the workshop:

1. **Determine the mode of delivery:** Depending on the availability of resources, the workshop can be organized as a face-to-face meeting or in virtual spaces. If the workshop is held virtually, it is important to ensure that all necessary tools and materials are provided to facilitate group work and interaction.
2. **Provide clear instructions:** To ensure that all participants understand the purpose and format of the workshop, it is important to provide clear and concise instructions on how to participate. This can include guidelines for accessing the virtual space, instructions for using the tools and materials provided, and an overview of the activities and their objectives.
3. **Adapt materials to suit the audience:** The workshop materials should be adapted to suit the level and needs of the teachers from example primary education.
4. **Use a constructivist approach:** To maximize learning outcomes, the workshop should adopt a constructivist approach, where learners are presented with challenges based on simple rules and are encouraged to discover powerful ideas on their own. This approach fosters a sense of empowerment and helps learners retain the concepts they learn.
5. **Use physical movement and interesting materials:** To enhance engagement and participation, the workshop should involve physical movement and the use of interesting materials for example Bebras tasks or Bebras cards (www.bebras.org).
6. **Collect feedback:** To evaluate the effectiveness of the workshop, it is important to collect feedback from participants. This feedback can be used to identify areas for improvement and to refine the workshop for future iterations.

This material is part of the School mentoring model

The aim of the model is to foster the adoption of digital innovation at school level.

The focus is on teachers' understanding of digital technology and practices to implement technology in a pedagogically meaningful way.



The model promotes teachers' professional learning with peers and school management to create the culture and practices for evidence-informed implementation of digital innovation.

The model is created in the iHub4Schools project (2021-2023).

