

# Coding to learn

## Narrative

Marianne is a maths teacher in lower secondary school, and has obtained good results from letting the students use the algebra game DragonBox. She feels that this has helped motivate the class to master a subject that many find difficult. She is therefore interested in investigating other methods and approaches that can add some variety to the teaching of maths. She speaks with John, who teaches Norwegian and who has worked for a while with role play, myths and narratives with one of his classes. John believes that mathematics can be seen as a type of narrative, and that DragonBox helps make this clear to the students. He also says that the role-play sessions he constructs with his students often make use of mathematical principles, such as probability calculus, and that there may be advantages to be gained across subjects if suitable tools or resources can be found.

John and Marianne start to follow debates and discussion on games-based learning, and are encouraged by the principal to look for opportunities for projects in their classes.

The school is approached by Carl, a local computer scientist who is involved in the initiative Let's Teach the Kids to Code. The initiative has been developed by organizations and private individuals in the IT sector, and its aim is to arouse interest in coding among children and adolescents. The reason is that there is a huge need for knowledge of coding and programming in the labour market, but this is not reflected in school subjects and curricula. Let's Teach the Kids to Code is in the process of establishing a collaboration with the local after-school programme, where students at the lower secondary level teach those at the primary level how to program games with the aid of visual programming languages such as KODU and Scratch.

The principal sends the request to John and Marianne, who feel uncertain whether they can help Carl, since few students are very knowledgeable about KODU and Scratch. Carl emphasizes to them that they do not need to have these tools at their fingertips; he is looking for lower-secondary students who have strong maths skills, since this is a good starting point for learning programming.

John suggests to Carl that students who are not so good at maths, but who are good at storytelling or constructing things in Minecraft, could also be included in the scheme for the after-school programme. Carl agrees, and underscores that the coding movement in many ways regards it as more important to code in order to learn than to learn how to code. The skills that are developed can be used in a wide range of school subjects and activities, since programming requires the participant to think systematically. On the basis of this meeting, they therefore decide to engage in collaboration with the after-school programme and Let's Teach the Kids to Code.

After some weeks of collaboration, the teachers notice that the students who have been put to work at the after-school programme have started to learn a systematic approach to the programming tasks, and that they also spend a lot of time on additional self-learning at home. Other students in the class have also started experimenting with Computercraft, which allows them to code with the aid of the programming language Lua in Minecraft. The teachers also take notice of the films students make of their Minecraft creations.

Marianne and John start looking at curricula and competence goals with new eyes. Marianne realizes that the tools that are already being used at school, such as GeoGebra and spreadsheets, can be used more actively for probability calculus, logical thinking and simple programming. John decides to use KODU and Minecraft as tools to construct narratives and games in his Norwegian-language class, and collaborates with Marianne's class on the mathematical aspects of games programming.

## Key concepts

- Game-based learning
- Peer-based learning
- There is a huge need for knowledge of coding and programming in the labour market, but this is not reflected in school subjects and curricula

## Environment

- Initially after school club (ongoing) – but then incorporated into lessons (maths and Norwegian lessons), over the course of a school term

## People & roles

- Students as experts and producers, constructivism, The Maker movement
- External experts as tutors

## Resources & technologies

- Subjects: Flexible e.g. mathematics, languages, science
- The scenario may require installation of software on school computers, which in some cases could be difficult. KODU runs on Windows. Scratch does not require local installation, and can be used in the web browser. Students could also bring their own devices.
- KODU/Scratch/ComputerCraft
- Games (eg Minecraft, DragonBox)

*The Future Classroom Scenarios have been developed as part of the EC-funded iTEC project (FP7; 2010-2014). The Find more Future Classroom Scenarios in the Future Classroom Lab website (<http://fcl.eun.org/directory>) and learn how to create your own scenarios by using **the Future Classroom Toolkit** (<http://fcl.eun.org/toolkit>)*

