# Creating awareness about “travelling data” and data privacy-issues through student-centred problem-based project-work.

*By Claus Witfelt, 2023*

## Introduction

The European SPADATAS-project seeks to create awareness about ‘travelling data’, information security and privacy issues in schools throughout Europe. In this paper we will look at how this can be done in an active learning, qualitative way with engages the students and enriches the education at Oerestad High School.

## Informatics, Travelling data, information security and privacy

Informatics is a subject in Danish high schools and there is also discussion about introducing a subject in the compulsory school, very much like informatics.

Informatics in the Danish high school is a very broad subject, including a huge variety of topics and themes, traditional as well as more : programming, system engineering, databases, game design, web-, app- and application development, innovation, cybersecurity, AI and the relationship between society and technology.

This includes for instance personal protection, virus, hoaxes, trojan horses, fake news, types of it-criminals, cryptography, backup-strategies, legal issues as well as information security for companies and states, cybersecurity regarding databases, crypto-currency and IOT – internet of things.

IT-security, privacy and travelling data are of vital importance, but difficult to teach high school students, due to these topics build-in complexity.

## Teaching and learning in Informatics

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Figure 2: Frontpage from the interactive ibook: "Informatik for alle"/"Informatics for all" by Claus Witfelt, 2022

Educational principles of IT-instruction, used in “Informatik for alle”

* Computational thinking
* Use-modify-create
* Worked examples
* Stepwise improvement
* Faded guidance
* 98/2 – active learning with media technologies
* Taking a point of departure in students everyday experiences and media use
* Portfolio evaluation

Computational think is here understood as a general scientific theory of informatics based on pattern recognition, algorithms, iteration, stepwise improvement and abstraction.

Use-modify-create means that the students starts with using existing solutions, then tries to modify and at last create their own solutions. Stepwise improvement denotes the relentless loop where a programmer develops some code, tries it, evaluates it and is success then takes the nex small step towards a final solution.

Worked examples means, that the teacher must have a number of worked examples, that the students can investigate and work with (for instance podcasts) and the teacher starts with providing a lot of support and later on less support and more freedom to the students, the idea of *faded guidance*. In informatics, we rely heavily of screen casting as worked examples.

For more about stepwise improvement, worked examples and faded guidance, see Michael Caspersens extensive work on these topics (Caspersen XXXX).

The 98/2 principle is about teachers should use 2% introducing and students should use 98% of the time on being creative, working on problems with the computer in relation to informatics. There problems must take a point of departure in the students own life, in order to motivate and make the subject understandable and relevant. Interface design, sound, media, video, design.

Et billede, der indeholder indendørs, person, gulv

Automatisk genereret beskrivelse

Figure 4 We also visited Aalborg University Copenhagen, Institute of mediology in order to learn more about the Internet of Things, Makerspaces and many other media technologies to come.

# A student-centeret, projectbased, problemoriented, ICT and media-supported approach

We have tried to motivate students in informatics via an action-learning- and problembased approach (described many places, for instance Holm Larsen, 1998), and ict- and media-supported learning (for instance described in (Witfelt 2003) ”TakePartToo…”). In this project the participants used blogs, wikies and fora as well as team-based project-oriented problem-based ways of studying and learning, inspired by CSCL/webbased learning here understood as a way of learning, where lots of different methods and modalities are used in order to meet different students preferred approaches to learning: creative, technical, pragmatic and lots of others.

Also, we tried to motivate students by exploiting external resources, museums, ngo’s, commercial and public institutions.

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Figure 1 In the current case, we also tried to engage the students and making the learning authentic by including a visit to the Danish National Council for Health Cyber Security

The ideas of student-centred self-paced project-work is by no means new. I recent years it has got a revival as innovation. In informatics we use the basic model for innovation (Witfelt 2022), inspired by the model developed in the DesigntoImproveLifeEducation-project (DTILE 2009)

Et billede, der indeholder diagram

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Figure 1. The lemniscate is know from many other contexts and can mean a lot of different things, but here, we understand it in this way: Instead looking at the past development (the circle in the left) and consequences, we look at the future and which actions is needed, in order to get to the future, we want (right side of the model).

To go through all aspects of innovation, the BASIC model for innovation, relevant theories of motivation is by far beyond the scope of this paper. Instead we will describe how we worked with authentic learning, protect work and innovation to motivate the students to engage actively relation to travelling data, privacy and GDPR. Inspired by the futurist, Herman Koenings: “Not just studying the past, but changing the world, by inventing and creating the future.

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## Sketching and prototyping

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| Et billede, der indeholder tekst, person, indendørs, gruppe  Automatisk genereret beskrivelse  Figure 3. Picture from a workshop with Emanuella Marchetti and Andrea Valente. The picture is not from the actual workshop, but a similar on Ørestad Gymnasium. |  | Et billede, der indeholder tekst, person, indendørs  Automatisk genereret beskrivelse  Figure 2: Student sketching a low-fidelity model of an app. |

Included in the work with the SPADATAS prototypical apps were also workshops with visualization of data in JavaScript and sketching as a tool for prototyping. Prototyping (a.k.a. throw-away prototyping or rapid prototyping) and creating mockups is a key competence in informatics.

Prototyping here understood as creating very fast sketches on paper of ideas for user interfaces.

## The assignment

We used the question “How can we engage the students, management, teachers and administrators in privacy issues” as a point of the students exam. Students were give 16 lesions of 90 min in groups of 3 to make a report, conduct in-depth interviews with relevant target groups and make a prototype of a social media platform, where there issues could be discussed. They were given an IDE for doing these things, the code.org-environment, where apps can be made in an JavaScript dialect with databases etc.

## Students products and results

We initiated a very project-oriented , problem based approach to working with privacy in schools. A class of 3rd year informatics B students were selected to work with the case. The students were given the task to produce digital materials to create awareness amongst their peers about privacy.

They had access to a JavaScript-based IDE, (Code.org) where they could develop apps. It was mandatory to also include in-depth interviews with either headmasters, teachers, students or administrators and data protection officers or questionnaires.

We could ask students questions, weather their awareness increased or the opposite, but maybe this would not be the best way to evaluate. Instead we provide some screenshots from students products.

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*Screenshots from example of student product, an app with media, word-clouds, quizzes, fun facts and chat forum, where target group can discuss and ask questions.*

## Discussion / Conclusions

Project like the Spadatas is important in order to raise awareness about travelling data.

In this paper, we have shown, how it is possible to engage students in even complex topics like GDPR and privacy, using a qualitative and project-oriented project-based approach combined with the current principles of IT-education, innovation, sketching and using external resources. More results will follow.

## Literature

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