



Iris Vis

Educational logistics for personalised learning in secondary education

The shift to personalised learning in schools in secondary education requires a paradigm shift in educational logistics to link learning demands of students to educational activities. The focus on flexible planning of educational activities is a new and highly interesting research theme with great potential within the field of Industrial Engineering and Operations Research. In 2011, Iris Vis started to work on this topic based on a question from practice. She and her colleagues recently received an acceleration grant from FEB's Research Institute to further work with schools in secondary education to create tools that support flexibility in planning and real-time decision making for personalised learning.

Your project is about educational logistics for personalised learning and includes a study on planning elective hours, what is the importance?

"Schools are now at a tipping point of embracing the system innovation of personalised learning. A paradigm shift is required in the organization of

logistics operations to transition to real-time decision making based on individual learning needs. In a personalised learning system, each pupil gets the right type of education and instruction at the right time. Traditionally, long term planning of activities, teacher-class allocations and fixed timetables are leading. With personalised learning, all decision making with regard to the individual learning needs of

pupils will be made in the workplace in an interaction between the teacher and the pupil. Professionals in secondary education recognise that this amount of flexibility will result in a 'logistical nightmare'. From a theoretical perspective, our focus on the organisation of personalised learning is quite unique. Schools have a wide range of different ways of implementing flexibility for students. With our research, we help schools navigate these various options by analysing how personalised learning can be facilitated through creating flexibility in planning learning activities, composing groups, assigning teachers and choosing working methods. In one of our projects, we're focusing on the planning of elective classes. In these classes, students can regularly select a set of group-based learning activities for the upcoming period that are related to various courses offered by the school."

Why did you decide to work on this research topic?

"In 2011, I started with the research project *educational logistics for personalised learning in secondary education*. This project was prompted by a question from Wim Kokx, back then chair of the Zo.Leer.Ik! Network, a network of Dutch schools in secondary education which work on implementing

personalised learning. He asked me whether knowledge from the world of logistics could help to solve the logistical challenges posed by personalised learning. From that moment on, we worked together on this topic. Currently, I work with Wim Kokx, my colleagues dr. Ilke Bakir, dr. Nicky van Foreest and dr. Jose Lopez Alvarez, student assistants, students and representatives from schools in secondary education on this topic. Specifically, we started a collaboration with Quadraam, a network of 14 schools in Gelderland."

Can you describe the project on planning elective hours?

"During elective hours, students can select a set of group-based learning activities based on their needs. These activities are related to the various courses that are offered. Our tools are designed to help schools to determine which courses should be offered together so that most students can take their first-choice course. For example, should French, Dutch and English be offered at the same time, or is it better to opt for a combination of French, Mathematics and History. An important first step in this is to determine how to track student preferences."



What will the process look like?

“We will follow a design-science approach, using feedback loops to continuously match research and operations in practice. In the first phase of the project, we carry out interviews in schools, analyse data and organise workshops with stakeholders to create awareness of educational logistics. In the second phase, we focus on the development of new tools. In the third phase of the study, we test the developed tools in schools and based on the outcomes we refine our tools. In the last phase, we will perform studies to show that the tools designed can be used at different types of schools, under different circumstances.”

What do you hope to achieve with your project?

“Important elements of my research projects are co-design and co-creation with societal partners with the aim of making joint contributions to solving societal challenges. Schools have now initiated a transition to personalised learning to better prepare students for the future and improve learning results by increasing student motivation. To do this successfully, new knowledge in logistics is needed. With the chosen design-science approach, we can work in co-creation with stakeholders from the secondary education practice to realise societal impact and enrich academic research at the same time. Insights from the projects can be implemented immediately by the schools involved. In addition, we work, for example, via workshops, YouTube playlists and professional publications to reach many more schools that can use the knowledge.”

“Within the “Sterk Techniek Onderwijs” (STO) project of Quadraam and other schools for secondary education in the region, the faculty of Economics and Business will participate by specifically focusing on developing tools and providing support to several schools that are making a transition to more personalised education to enable more options for engineering education.”

Would you like to know more about [Iris Vis](#)?

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Iris Vis is Professor of Industrial Engineering at FEB's Department of Operations. She is also Captain of Science of the Topsector Logistics. In 2024 Vis was appointed fellow of the Netherlands Academy of Engineering. From 2016-2021, she was Dean of Industry Relations at the University of Groningen, with university-wide responsibility for initiating, building and maintaining long-term collaborations with external partners. Before joining the University of Groningen, she was an associate professor at the VU University Amsterdam. She was a visiting researcher at CIRRELT, Canada (2013), Virginia Tech, USA (2007) and Georgia Tech, USA (1999). She holds an MSc. in Mathematics from the University of Leiden, and a PhD from the Erasmus University Rotterdam.

Her research focuses on the development of new planning and control concepts to design and improve processes by combining quantitative and qualitative research methods. The projects are characterized by the development of practically relevant concepts within a variety of themes at the crossover of logistics with other sectors such as energy, health and education. She has performed numerous projects in cooperation with industry, resulting in a blend of rigorous academic work with practical applicability.

More information on the overarching research project

<https://www.rug.nl/cope/projecten/onderwijslogistiek?lang=en>

YouTube serie '[Workshops onderwijslogistiek](#)' (in Dutch)