

# RESEARCH ATLAS

Design Based Research in Perspective



university of  
applied sciences



Service Economy

Vital Regions

Smart Sustainable  
Industries

Design Based Education  
& Research

## Colofon

### Title

Research Atlas

Design Based Research in Perspective

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Sciences

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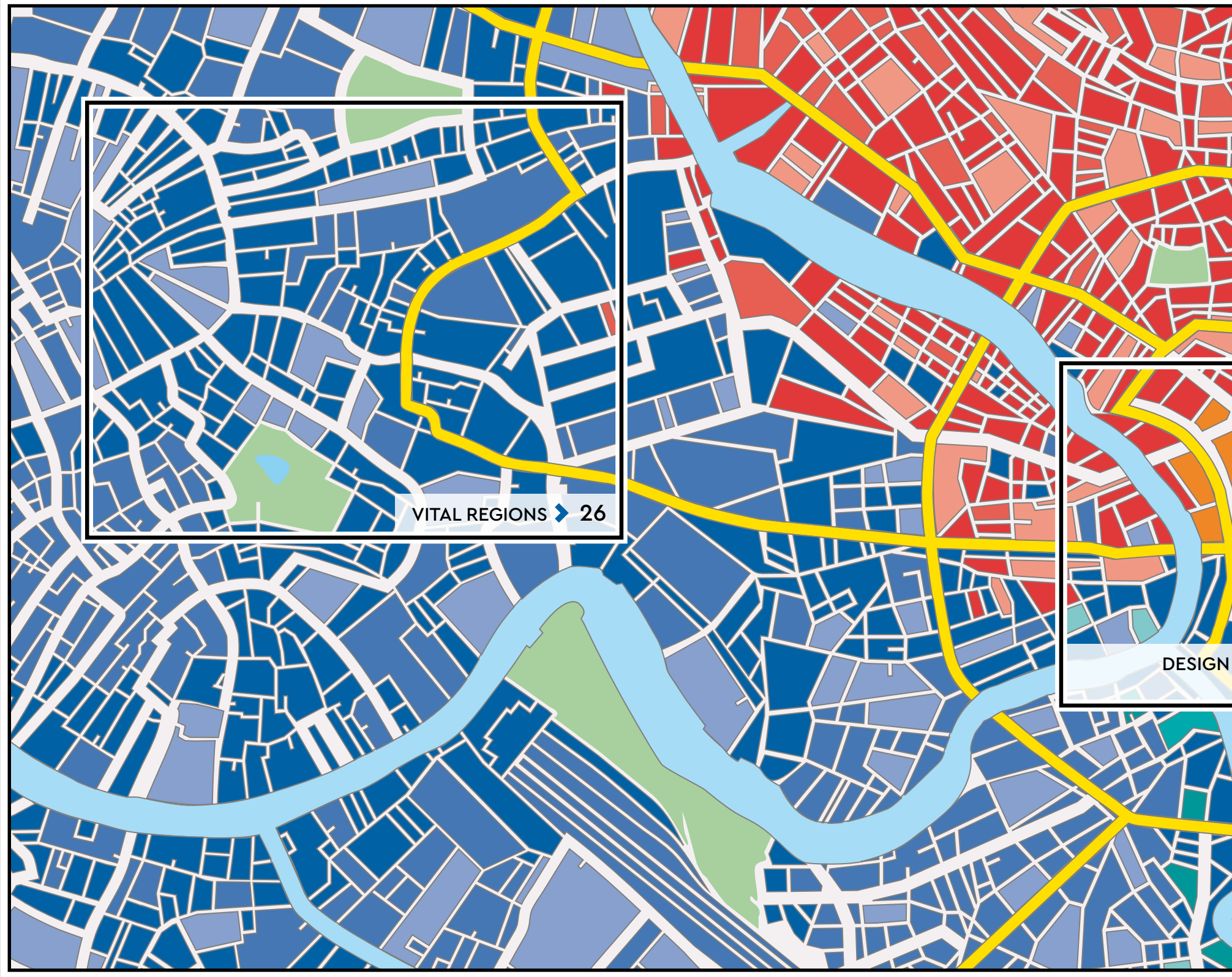
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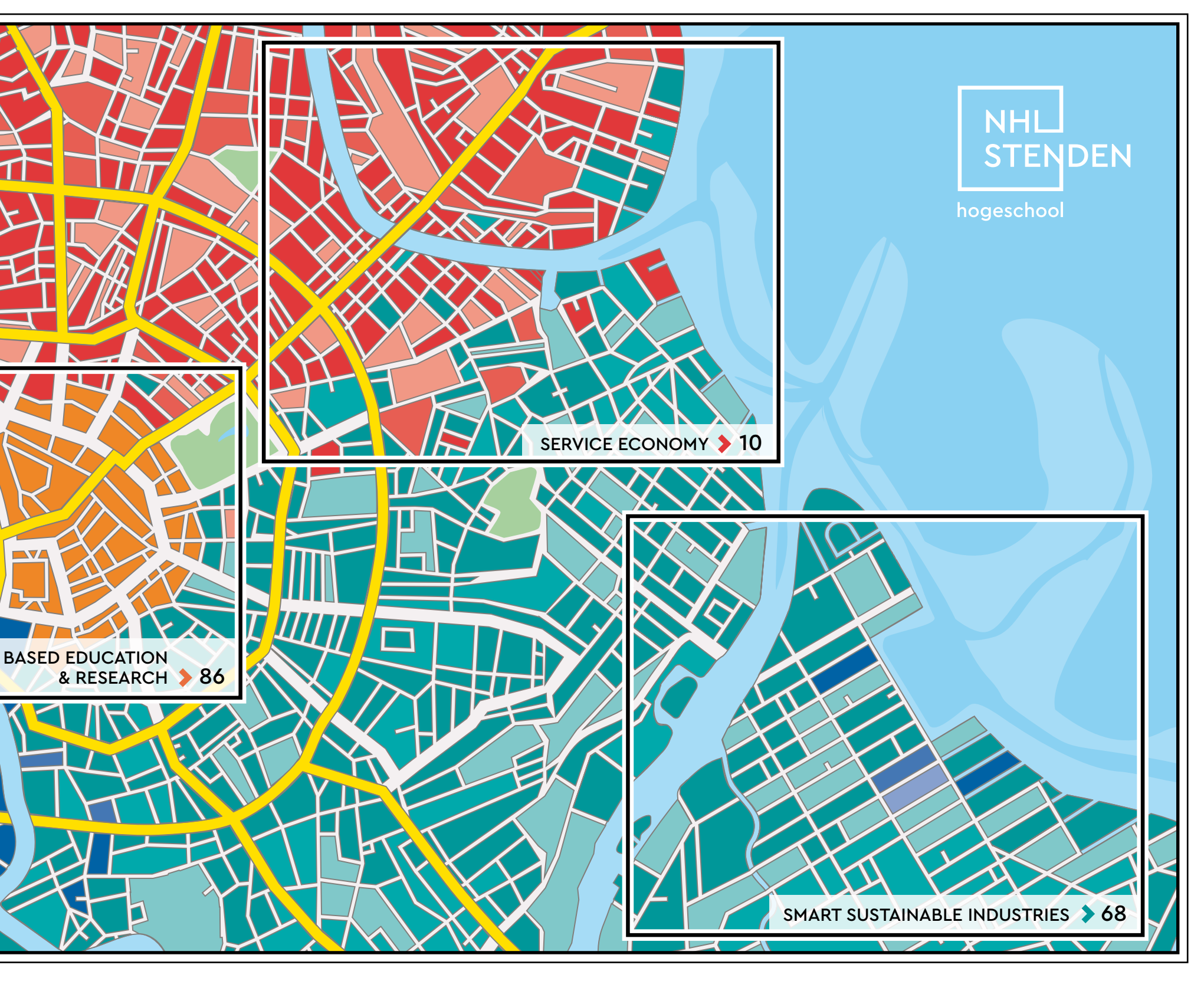
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DESIGN





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# 1. All men are designers

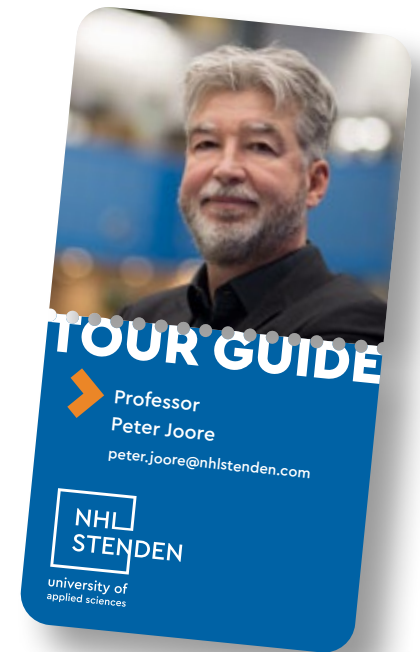
Peter Joore, professor Open Innovation

*"All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity. The planning and patterning of any act towards a desired, foreseeable end constitutes the design process. Any attempt to separate design, to make it a thing-by-itself, works counter to the fact that design is the primary underlying matrix of life. Design is composing an epic poem, executing a mural, painting a masterpiece, writing a concerto. But design is also cleaning and reorganizing a desk drawer, pulling an impacted tooth, baking an apple, choosing sides for a backlot baseball game, and educating a child" (Victor Papanek, Design for the Real World, 1971).*

One of the first things I grasped when I started studying Industrial Design Engineering at Delft University of Technology in the mid 1980s, was that everything had been designed by someone. The tables and chairs around me, all the products in the shops, the cars and trains I travelled by, the clothes I wore, everything had been devised by someone! I was especially interested in record players and hifi systems and new models were introduced every year. There were snazzy stereo sets with lots of flashing lights, and sleek stereo sets with no knobs or dials that were said to have the best sound quality. Up until then, I honestly thought that the continuous flow of new products was simply a natural phenomenon. Just like the ebb and flow of the seasons, I thought that those new stereo sets appeared spontaneously and then disappeared of their own accord. Many years have passed since then and I have been involved as an industrial designer in the development of many different products, ranging from aircraft interiors to electric vehicles. I now know that new products do not appear out of thin air, but that they are created through a complex development process comprising hundreds of steps and a continuous stream of complex decisions.

Delft engineers are not the only professional designers in the world, of course. In 1969, Nobel laureate Herbert Simon stated that anyone who tries to change an existing situation into a new, desired situation can actually be considered a designer. In his book *The Science of the Artificial*, he explains that the process of developing a material artifact is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare for a state. Design, so construed, is the core of all professional training: it is the principal mark that distinguishes the professions from the sciences. In other words, every (future) professional is actually a kind of designer.

So I am extremely pleased that NHL Stenden has opted for an educational concept based on the design process. The choice for a corresponding research concept completes the strategic choice. The combination of Design Based Education (DBE) and Design Based Research (DBR) provides NHL Stenden with a unique and distinguishing education and research profile. At the same time, as a university of applied sciences, we have to consider carefully what we actually mean by this. After all, text taken from strategic policy documents can all too quickly degenerate into concepts without substance. It is essential that we actually give the very promising DBE and DBR concept content. Otherwise, we risk being enthusiastic about something without really knowing why - just like what happened in Hans Christian Andersen's fairy tale about the Emperor's new clothes that only very intelligent people were able to see. But who wants to go through life





stupid or ignorant? The risk, just like in the fairy tale, is that at some crucial point in time the new clothes turn out to be nonexistent and the emperor goes through life naked. In short, it is essential that we think through our ideas about DBE and DBR.

This publication focuses mainly on the concept of Design Based Research, seen from the perspective of the close on 40 professors at our university. Their joint sphere of activity covers virtually all sectors of society, ranging from technology to economy, from healthcare and welfare to education, from the maritime sector to the leisure and hospitality domain.

The professors conduct research that is just as diverse, ranging from technical to social research, from qualitative to quantitative research and from exploratory to empirical research. Their greatest common denominator is that they always conduct applied research, the research question is dictated by professional practice, and the ensuing knowledge contributes directly to professional practice or society as a whole. All universities of applied sciences in the Netherlands focus on applied research. NHL Stenden adds another dimension to its research activities, namely Design Based Research.

Although 'design' and 'research' are strongly related, they are certainly not the same. So it is important to define what we mean by 'research' and what we mean by 'design'. When professor Johannes Eekels (1987), professor of design methodology, described the difference between the two, his starting point was that people live in two worlds, namely a material world of tangible things and perceptible facts, and a spiritual world of thoughts, opinions and ideas. Where exactly the boundary lies between these two worlds is the subject of philosophical discussion, but the basic principle is that these two worlds exist and constantly interact with each other. This interaction can be described with two processes. Firstly, an outside-in process (from the material world to the domain of the mind). We can look upon this as the field of research, of knowledge acquisition and

of scientific practice. The essence of the mind's domain is understanding and interpreting the world. Secondly, an inside-out process (from the domain of the mind to the material world) aimed at influencing and changing the world in a desired direction. Eekels calls this the field of action, design or technology.

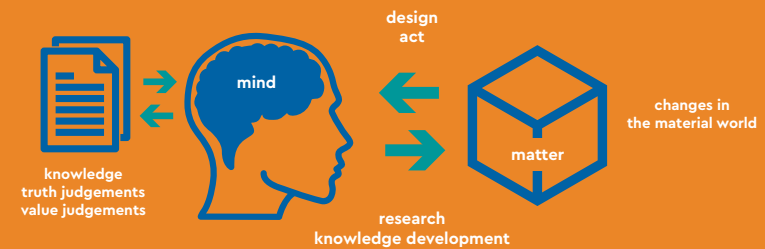


Illustration: Relationship between human mind and material world, based on Eekels (1987)

Besides the interaction between mind and matter, there is an internal mental process in which thinking and reasoning take place. On the one hand it is about the search for truth and the question of how the world really works. This is the field of 'truth judgements'. But it is also about assessing this truth and what we actually think of a certain situation. This is the field of 'value judgements'. The field of truth judgements relates to scientific research. The field of value judgements can lead to people wanting to change a certain situation which brings us to the field of design. The two processes are not unrelated, of course. After all, as soon as people act with the aim of changing a certain desired situation (= value judgement), the question is whether this action is actually effective (= truth judgement).

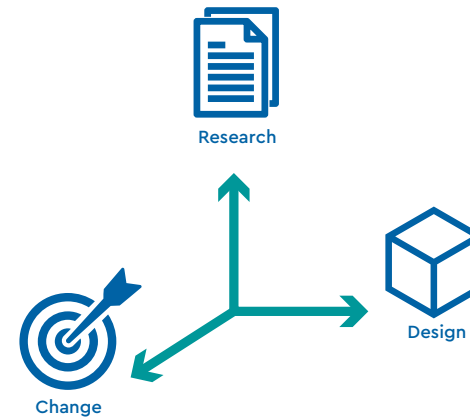
Obviously, this is a highly simplified representation of reality, if only because the 'outside world' consists not only of matter but also of other people.

All those people make their own choices and considerations and are much less 'makeable' than the material reality of the technical engineer. So designing is not so much a matter of creating a physical solution for an identified problem, but much more of changing an existing situation into a new desired situation. So you could say that the pure scientist is focused on 'understanding the world' and the successful designer is focused on 'changing the world'.

The relationship between these two processes could be regarded as a kind of coordinate system. The degree of knowledge development sits on one axis. The primary goal here is to have a better understanding of the world without that understanding necessarily leading to innovation or change. Fundamental research is, in principle, situated on this axis, since it is purely aimed at developing new knowledge, without yet considering possible uses. The publication of scientific papers could also be placed on this axis if this would be considered as a goal in itself.

The other axis can be regarded as the degree of innovation. Valuable innovations that can be developed without requiring much knowledge can be found on this axis. But this axis also holds all the devices whose unnecessary new designs are churned out in a never-ending cycle. New cars, new clothes, new posters, new TV programmes, and so on and so forth. They might seem novel, but actually, they are more of the same.

Victor Papanek's quote contains yet another important aspect, namely the achievement of the underlying goal that is to be reached. What do we actually want to achieve with all that new knowledge, or with all those new creations? More publications or more new products are (hopefully) not an end in themselves. Therefore, we could add a third axis that indicates the extent to which a development helps to realise a certain change. The question then is: what is the intended new situation, and to what extent does the new knowledge or the new design contribute to that change?



**Illustration: Relationship between research, design and change**

Back to the question of what NHL Stenden means by the term Design Based Research. In order to move forward in our collective thought process, the aim of this publication is to discover what research is currently being conducted within NHL Stenden, and to determine how our professors are already giving substance to the DBR concept. For this purpose, we interviewed all professors, asking them how they work, how their professorship contributes to solving issues related to professional practice and society, and how they interpret DBR. Each interview has been transcribed into a short, six hundred to seven hundred word text. That, of course, is far too short to do justice to the wealth of activities conducted by the NHL Stenden professorships. In that sense, this publication can indeed be regarded as an atlas or a travel guide that only gives a taste of the actual situation. To truly experience reality, the reader must actually go on tour and get to know the professorships themselves.

The metaphor of 'travelling' and 'mapping' is also reflected in the visual form of this publication. The institution's field of activity is presented as a map containing all of the institution's research activities. For clarity's sake, the field has been divided into the institution's focus areas and underlying themes. During the interviews, we asked each professor which focus area and which sub-theme they are working on. The chapters in this document are based on the answers to this question and are in no way related to any



organisational configuration. This publication centres on the content of the research and not on management structures.

All in all, this overview can be regarded as an atlas or travel guide with which the reader can follow a route along the various professorships. Chapter 2 centres on the professorships that are active in the field of Service Economy. Chapter 3 is dedicated to the professorships that are focussed on the field of Vital Region. Chapter 4 describes the professorships operating in the field of Smart Sustainable Industries. Chapter 5 deals with the professorships that are active in the field of the institution-wide themes of Design Based Education and Design Based Research. Lastly, in Chapter 6 we make an attempt to discover one or more connecting themes or procedures in the approach of the various professorships. This publication is not intended to give a definitive answer to the question as to what exactly NHL Stenden means by the concept

of Design Based Research. The aim of this publication is to get an idea of everything that is happening in the NHL Stenden professorships and to pique one's curiosity to find out more. Like any regular travel guide, it is not mandatory to travel the described route in one specific order. Feel free to leaf through the pages. It doesn't matter if you go astray. Let the journey begin!

### Sources:

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## 2. Service Economy



Sustainable Development and Management



Host-Guest Relationship



Value Creation

How can catering companies waste less food and work in the most circular manner possible? What laws and regulations are required for newcomers to the services sector? How can we prevent over-tourism in certain destinations? The Service Economy focus area seeks answers with respect to leisure, tourism, hospitality, retail, meaningful communication and media. In that regard, we focus on the right balance between people, planet, profit & purpose.

### Sustainable Development and Management

In this theme, we address value creation from a sustainability perspective, focusing on safety, impact and climate.

### Host-Guest Relationship

Within this theme, we look for an eventful customer journey and efficiency in service, viewing the host-guest relationship from three perspectives: personal, commercial, social.

### Value Creation

How can you ensure innovation and interdependency within your product range? What is the situation around ownership and supply in the hospitality sector? Within which frameworks and infrastructure can you create value as an entrepreneur? In this theme we seek answers to these questions.



# "One thing is certain: the future is uncertain"

## 2.1 Scenario Planning - Albert Postma

Agile, adaptive, resilience or strategic foresight. The jargon we use today to describe future-proofing is growing by the day. But how do you translate all that jargon into practice? Professor Albert Postma aims to answer this key question within the Scenario Planning professorship.

"Looking ahead and anticipating possible scenarios are the core activities of our professorship. We focus on issues relating to future-proofing the tourism sector in the broadest sense of the word. Our professorship is affiliated with ETFI, the European Tourism Futures Institute of NHL Stenden University of Applied Sciences. Together we have built up a good reputation in the field of scenario planning. We work on a vast diversity of projects and are highly regarded, both in the Netherlands and abroad. We are a global leader in the study of overtourism and also attract national and international attention with our scenario studies for tourism.

"Changes in the world necessitate that organisations and entrepreneurs change as well. Because they have to respond quickly to those changes,

many tourism entrepreneurs want ready-made answers. That's only human. People want some sort of security, even when it comes to the future, whereas we assert that 'one thing is certain: the future is uncertain'. So what should you keep in mind? Scenario planning enables you to identify as many uncertainties as possible and strategic foresight enables you to anticipate them.

"The solutions we develop are as wide ranging as the issues we work on. We conduct research to come up with futuristic views and scenarios. What should one do if this is what the world will turn out to be? We translate that into concrete concepts, strategies and business models. But I want to do more than just that; I also want to teach clients to do their own scenario planning and for that we need to provide more courses and training.

"Our job is to teach entrepreneurs and organisations to understand and deal with trends and social changes. I have noticed that millennials are rather good at that. I have spoken with millennial entrepreneurs who have the ability to unerringly connect developments in society. They represent a completely different type of entrepreneur; they are proactive instead of reactive. And that is exactly what you want to be as a future-proof entrepreneur. Don't wait and see, but take your own initiative. Lead the way; don't tag along. Because leading the way is much more satisfying and gratifying."



# Carnival in Notting Hill

"Notting Hill Carnival is the largest street event in the world. London's Notting Hill district is known for its narrow streets where menace lurks. The carnival event was increasingly plagued by race riots and juvenile delinquency. Six years ago the administrators in London threatened to pull the plug if no improvement was in sight for the future. Our professorship was approached to outline a number of scenarios.

"We invited all parties involved, from the Caribbean Music Association to the British Association of Steelbands, to provide their input. I applied appreciative inquiry principles, so instead of scrutinising the threats, we focused on the opportunities. I had those involved write down what they had been most proud of. I matched those results with what visitors find important and the possibilities the city has to offer.

"Based on the outcome of the workshops, we came up with a number of scenarios in which the carnival area is expanded. The first scenario was to also include Hyde Park in the carnival event. Another scenario was to hire the Arsenal Stadium. A third scenario was to involve the entire city of London, not just Notting Hill. Given the complexity of the problem, I am immensely proud of the part we played in finding a solution."



Scenario Planning

HOTEL

## TOUR GUIDE



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# Society of Humanitarianism

"The Maatschappij van Weldadigheid (Society of Humanitarianism) was the first care network in the Netherlands. It was set up in 1818 to provide education, jobs and a future for poor people, who were housed in special communities in Veenhuizen and Frederiksoord. This foundation has been nominated for UNESCO status. Although an enviable status, it does require that you determine what purpose it will fulfil in the future. That is why our professorship has been asked to consider what the glorious history of the Society of Humanitarianism can still bring us today.

"In this project and proceeding from the anticipated UNESCO status, we unearth issues in order to strengthen the regional connection by establishing a Community Network: a learning network of committed entrepreneurs in and around Frederiksoord and Veenhuizen. We examine the three themes - care, living and leisure - together with various disciplines, ranging from construction company to catering entrepreneur. The intention is for them to contribute to sustainability in the region by means of these surprising combinations and for them to help secure the potential UNESCO status.

"The initiative lies with the people in the region itself. What will they run up against and what help could they use? In addition, we work on specific regional issues that are of interest to the entire community. The combination of UNESCO nomination and learning networks in the region is unique. And more importantly, the combination is proving to be extremely fruitful."

**Sustainable Innovation  
in the Regional  
Knowledge Economy**



## TOUR GUIDE

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**NHL  
STENDEN**

university of  
applied sciences

# "Sustainable partnerships between MBO, HBO and companies are the success factor for innovation"

## 2.2 Sustainable Innovation in the Regional Knowledge Economy - Ineke Delies

As an educational institution providing senior secondary vocational education (MBO) or higher professional education (HBO), how can you and the business community together, train and deploy professionals for whom there is an urgent need in the region if you do not know exactly what issues are at play? You can't, says professor Ineke Delies. Her Sustainable Innovation in the Regional Knowledge Economy professorship forms the link between vocational education and the business community. This link enables innovations with respect to new combinations between care, living and leisure in the professional field.

"Our professorship was established in 2009 and was among the first MBO-HBO dual professorships. I am affiliated as a professor with both Alfa College and NHL Stenden University of Applied Sciences and have been tasked to investigate how we can strengthen sustainable innovations in the regional knowledge economy by way of collaboration between professional education and the business community. As an HBO and MBO institution, we want to form strategic alliances with the business community.

"Over the years we have become an expert in developing, starting up and maintaining partnerships. Our goal is to join forces in helping each other to become aware of sustainable partnerships and the parts we all play in a learning network. The common thread all those years is the same collaboration formula as we came up with in 2009. We want to establish links with partners in the region who are interested not only in themselves, but also in others, not just for today, but for the future as well. We purposely select our partners on the basis of trust and regional commitment. We learn from each other by experience, combined with logic and action, both internally and externally.

"It is through our professorship that MBO and HBO have become better acquainted. It turns out we have more in common than we thought. Our common goal is to ensure that people continue to work, live and learn in the region after completing their MBO or HBO education. To that end, we develop training programmes, conduct research and jointly implement innovation projects, and we develop solutions and evaluate them together with our partners. We constantly refine our knowledge. We do this within our three research programmes: Crossovers care, living and leisure, Learning in the innovative workplace and Leadership in learning networks.

"I am allergic to advisory reports that are laid aside and ignored. I want to create something that will benefit both business and education for a long time to come. That is why we develop concrete solutions to practical problems. These solutions are not only in the form of advice and products; we also support processes, provide services and training, contribute to new insights into combinations of transcending disciplines and we implement knowledge from other regions. In short, we are the indispensable link between advice and implementation."



# "Don't take your cue from formal leaders, but from birds of paradise"

## 2.3 Leadership and Change Management - Gabriël Anthonio

Whether it's turning the organisation into a smoke-free environment or introducing new work practices, directors and managers are still inclined to take a top-down approach to announcing and implementing changes, whereas the trick is to manage horizontally, not vertically. Professor Gabriel Anthonio always keeps an eye out for the informal leaders, or the birds of paradise as he likes to call them.

"During the course of my professional career I have lived through five deep crisis situations in organisations where I had recently taken up a new position as director or governor. Some people call that bad luck; I call it good luck, because you can learn so much from those experiences. Along the way, I have noticed that management makes far too many top-down decisions in emergency situations. At the same time, I increasingly see just the opposite in that management tries to get things done from the bottom up. But they are still managing along the same vertical axis. The trick is to switch your influencing strategy from vertical to horizontal. Within our professorship, we research and develop ideas regarding horizontal leadership."

"Horizontal leadership is the key to success. One of the many things we notice in our research is that although most employees are willing to

change, they don't want to be changed. In order to change you need to be able to identify with something or someone. And let's be honest: you can rarely identify with your boss, who is often far beyond reach. But it's different when a direct colleague encourages you to change. You should not take your cue from the formal leaders, but from the birds of paradise, i.e., people who have a lot of informal influence. Listen to them, even if they seem a bit intractable and difficult at first. My advice is to embrace these natural leaders and experts by experience."

"To support organisations in this respect we develop tools, education and training programmes, but more importantly, as a university of applied sciences, we train tomorrow's leaders. We need to equip them with the necessary knowledge to enable them to actually make a difference. Notably, in professional practice, professionals are no longer simply implementers, but increasingly take on a leadership role and pro-actively contribute to product development and improved services. My basic proposition therefore is: don't wait for your boss, but use your own initiative."

"The interesting thing here is that we collaborate within the university of applied sciences with students, lecturers and researchers from more than sixty different cultures and they all have very different definitions of leadership. The Chinese and the Americans, for instance, differ hugely in their definitions. Discussing leadership brings you quickly to the core of a person's cultural background. What one culture might consider to be a dictator, another culture might label as the country's saviour. We encourage each student to look at leadership from different perspectives. And the big question is of course: What kind of leader are you?"

# Go up in smoke

"Our professorship conducts research into turning healthcare institutions into smoke-free environments. Strangely enough, addiction institutions were our first 'subjects'. Our efforts there quickly became such a success that we established an alliance called Nederland Rookvrij, (Netherlands Smoke-free). Some 200 umbrella organisations have signed up, ranging from sports clubs to large retail chains and from hotels to hospitals and healthcare institutions."

"We have developed an instrument derived from an international standard to measure that change. This instrument enables us to conduct research and to drive change. Research, therefore, includes staging an intervention. Organisations are rewarded with medals (bronze, silver and gold) based on their achievements. In addition to banning smoking from your own organisation, we measure whether you have agreed with your suppliers that their workers refrain from smoking, so that the cleaners, for instance, do not reek of cigarettes when they show up."

"The most important element in this research is that the doctors, practitioners and caregivers take the lead, not the board of a healthcare institution. The board facilitates and offers support. And that pays off in practice. This horizontal leadership style is successful here as well and is the way forward for making healthcare institutions throughout the Netherlands smoke-free, for which we lobbied up to coalition agreement level. In fact, the coalition agreement now states in black and white: 'We are on our way to a smoke-free generation.' We are changing society's views on smoking. The professorship and the research group are contributing towards a healthy generation and a vibrant society."



CINEMA



Leadership and  
Change Management



  
CINEMAMarine  
Wetland Studies

# The taste of the Wadden Sea

"The Wadden Sea boasts an abundance of food and not just fish, but many other foods as well, many of which we don't even know exist. A number of initiatives are emerging to make more use of this abundance of food. Entrepreneurs on the islands set off with visitors to collect oysters, clams and mussels, which the visitors then prepare themselves. More and more restaurants on the islands include Wadden Sea products on their menus.

However, they do not provide any information about the origin of these products, whereas it is precisely that kind of information that can make the visitors more aware of how unique the Wadden Sea Region is. The hospitality and catering industry can literally and figuratively 'serve' this knowledge to its visitors. Take, for example, products grown on brackish soil, such as briny potato varieties, tomatoes and strawberries. Information provided right there at the table enhances the experience and enriches the taste of the Wadden Sea.

In conjunction with VisitWadden we strive to set up a programme with various other parties to exchange and increase one's knowledge of this product and region, but also to bring together entrepreneurs to set up new hospitality packages together. This will establish a link between good food, the World Heritage values and the joy of nature: all ingredients that contribute to the sustainable development of the Wadden Sea Region.

**TOUR GUIDE**

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**NHL  
STENDEN**  
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# "We offer students the largest open-air laboratory in the world"

## 2.4 Marine Wetland Studies - Hans Revier

The Wadden Sea Region has many active users, ranging from tourists and holiday-makers to hospitality entrepreneurs, fishermen and the shipping trade, not to mention the unique flora and fauna of the area, which are the original main users. How can one find the right balance between these assorted users? Under the leadership of Hans Revier, the Marine Wetland Studies professorship examines the various tension areas.

"The Wadden Sea Region was awarded the status of UNESCO World Heritage site in 2009. The region's highlight is its fairly dominant natural world, despite it also being where people have lived, worked and enjoyed recreational activities for countless years. That creates tension areas. The professorship aims to find answers within a number of tension areas, i.e., answers to questions concerning the day-to-day situation in the Wadden Sea Region that can also be translated to other, similar nature reserves in the world.

"We are looking into responsible ways for people to deal with such a unique nature reserve. Furthermore, we actively acquaint visitors with specific values of the Wadden Sea Region, hoping to not only create

appreciation and interest, but a sense of protection as well. We focus on the feeling that the Wadden Sea Region belongs to us all. And that's working, witness the fact that masses of people took to cleaning up the polluted beaches after the January 2019 container catastrophe.

"We continuously try to translate our knowledge gained through research into practical advice for organisations, entrepreneurs, foundations, institutions and users. A good example here is the OILS project in which we developed a computer model in collaboration with the Directorate-General for Public Works and Water Management. This computer model accurately maps the consequences of an oil spill on the Wadden Sea. Oil spills have an impact on the flora and fauna in the area, of course, but we mustn't forget the economic impact. OILS provides governments with practical tools for in case a similar disaster should ever occur.

"When I was appointed professor, people in the Wadden Sea Region took a critical view of research, saying it was irrelevant. 'Researchers just want to conduct research,' was the prevailing view, whereas our applied research can actually help to solve problems. That must be our core business. We train young professionals who know better than anyone how to deal with the prevailing tension areas. We offer students the largest open air laboratory in the world: the Wadden Sea Region. I hope that both national and international students will discover how we manage and treat our nature reserve in the Netherlands and that they will learn how to view the Wadden Sea from a sustainable development perspective and then apply this knowledge to other, similar nature reserves."

# "It pays to be hospitable"

## 2.5 Hospitality Studies - Erwin Losekoot

The lobby door held open for you as a hotel guest, a freshly made bed upon returning to your room or clean towels in the bathroom. These are often the first things that come to mind when hearing the word hospitality. But hospitality is much more than that, argues professor Erwin Losekoot. In his Hospitality Studies professorship, he seeks the basic essence of hospitality.

"There is a big difference in the hospitality sector between hospitality management and hospitality. We focus on hospitality: how can you create hospitality, how does it feel, what does it look like? This is often confused with the hard skills. Interesting research was conducted recently, in which first-year hotel school students were asked to give their understanding of hospitality. They were able to explain in detail how to make a bed, but when asked what hospitality feels like or how to create it, they were at a loss. This research therefore goes to the heart of the problem. It is not about students who know how to change bed linen, but about game changers, global citizens, who make a difference with new forms of hospitality.

"Contrary to popular belief, hospitality doesn't necessarily run in your blood. You can learn to be hospitable. Fast food chain McDonald's is very good at that. McDonald's has a kind of learning system in which it takes only ten minutes to learn something new about hospitality. We do that too. We teach our students the hard skills, but also the soft skills, the main question being: how can you add value to something? For this purpose we have developed the minor Hostmanship in conjunction with the Stenden Hotel Management School. We focus on hospitality in the broadest sense of the word.

"Hospitality is more important than ever in today's digital society. Whether a stay at a hotel, a purchase from a company or a dinner in a restaurant, everyone posts their experiences on social media and not only their positive, but their negative experiences as well. Those who read these reviews consider them to be highly credible and reliable. Even more so than what your company's website states.

"In many cases, visitors have no idea what hospitality involves behind the scenes. All they know is how they feel. That is essential for deciding whether or not to return and whether you as a company get new customers by word of mouth and 'word of mouse' advertising. Hospitality therefore has economic value. It pays to be hospitable."

# A basket full of hospitality

"For Natuurmuseum Fryslân (natural history museum) we have created a toolbox with a whole series of activities and checklists for hosts and hostesses. Many of them are volunteers, who put their hearts and souls into letting as many people as possible enjoy 'their' museum. But how can you convey that passion? How can you, as a museum, ensure that your hosts and hostesses are as hospitable as can be? That's what this research project was all about.

"We organised four workshops in which we put the volunteers to work. For example, we had them walk through the museum and take pictures of what they felt was hospitable and what not. That's how we discovered that many 'do not touch' signs are posted throughout the museum. For instance, visitors may not touch the venomous snakes in the venom exhibit, as the 'do not touch' sign warns. One volunteer wondered: Why not post a sign portraying a startled snake? Then it's no longer prohibited, but recommended. That's much more hospitable.

"This exercise produced a list of improvements for the museum to address. We are also working on a toolbox containing tips, tricks and assignments for the hosts and hostesses themselves. A basketful of hospitality."



Hospitality  
Studies







## TOUR GUIDE



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university of  
applied sciences



## Thorough research

"The Groene Ster nature reserve is the stunning, verdant backdrop for the annual Welcome to the Village festival. Even so, this festival has a negative impact on the natural environment. People tend to drink and smoke a lot during festivals. How can you ensure that people refrain from tossing their cigarette butts on the ground? That was the question we tackled in a project that was supported by CELTH, among other partners.

"During the three-day festival, we were assigned a section of the festival grounds to conduct our research. We used the first day as a baseline measurement to see how many cigarette butts we could

find lying on the ground. Then we started cleaning up.

After removing all the rubbish we started on our first experiment. We investigated whether people in a very clean environment are more inclined to throw their cigarette butts in the waste bin, rather than tossing them on the ground.

"During the second experiment, we gave all smokers a mini ashtray, the size of a lighter, in which to store their cigarette butts. Lastly, we experimented with a work of art on which people could affix their cigarettes. In the end, the mini ashtray worked best, as it was the easiest to use. Welcome to the Village will continue to use the ashtray as a gadget during subsequent festivals."



Sustainability in  
Hospitality and  
Tourism



# "We like stoking up the sustainability fire just that little bit more"

## 2.6 Sustainability in Hospitality and Tourism - Elena Cavagnaro

The call for sustainability in the hotel industry and the tourism sector is growing. At the same time, hospitality entrepreneurs have plenty of questions regarding the practical interpretation of sustainability and its compatibility with hospitality. These two core values can easily go hand in hand, as Elena Cavagnaro's Sustainability in Hospitality and Tourism professorship shows.

"I sometimes joke: 'I can triple your profit, provided we're talking sustainability.' We help companies give shape to their contribution to society. We focus on the host-guest relationship. How can you make things as pleasant and comfortable as possible for your guests, without having a negative impact on your environment? Many entrepreneurs, especially in the hospitality sector, believe that sustainability is at odds with hospitality. But it doesn't have to be. As a professorship, we show that hospitality and sustainability can go hand in hand, without having to compromise on good service and luxuriance.

"You will surely be able to identify with the following. When you have friends over for dinner, you automatically tend to prepare more food than

usual. You also open two bottles of wine instead of one and you prepare a special dessert. At the end of the evening you have a lot of leftovers, which you eventually throw out. That's okay if it's just the odd time, but when you multiply all that leftover food by three hundred rooms, that's a whole lot of food waste. Combating food waste is consequently one of our focus areas.

"We already know quite well how to encourage guests to do the right thing. We just have to put that knowledge into practice. Fortunately, more and more companies are turning to us for help in taking that step towards sustainability. Our goal is to stoke up that sustainability fire even more by providing them with knowledge, tips, tricks and advice that have already been devised and scientifically tested, so that companies are more likely to succeed in their sustainability endeavours. We are more than happy to visit companies on site to provide support. Our huge commitment is our showpiece.

"As a professorship, we are experts when it comes to changing human behaviour. And the irony is that this often involves small solutions to major issues. Virtually all studies show that most people are a good lot and are willing to participate in sustainability initiatives. In fact, it is greatly appreciated. Yet many companies still focus on the 5 percent that do not cooperate. The trick is to just let go. How can you and your employees act as hosts and entice your guests to do the same?"

# "Social media is not a one-trick pony"

## 2.7 Organisations & Social Media - Deike Schulz

Facebook, Instagram, Twitter and YouTube: every company will have to deal with social media sooner or later.

Organisations mostly use these channels to post a video clip or photo, announce a special offer or communicate business hours. But how can you make communication meaningful?

Associate professor Deike Schulz focuses on this key question within the Organisations & Social Media professorship.

"We focus on how organisations communicate via social media. We also study the effect their communication has on the public at large. We do this in order to advise organisations on how to improve their processes. For this purpose we use the Meaningful Communication model, which zooms in on the interplay between offline and online communication. The model focuses on three components, namely content, dialogue and commitment. The latter factor in particular is quite difficult for companies and organisations: how can you get the recipient's commitment?"

"Our professorship also focuses on media literacy. Although we look upon that as an important topic for both young people and senior citizens, media literacy is also a hot topic for companies. How can you make

communication meaningful? If you know what people expect of you and how you can get people to be committed, you can consider yourself media literate. We help companies to interpret this content. It is not a one-trick pony. Having a good understanding of one platform does not mean that you understand another platform equally well. You have to ask yourself each and every time: how should I approach that? In some instances, online dialogue on its own does not suffice, and you have to communicate offline as well.

"In November, we set up the Mediawijsheid Friesland (Friesland Media Literacy) platform together with partners in the region. The purpose of this platform is to support each other with regard to media literacy in the Northern Netherlands. We want to come together and learn from each other with small initiatives. We involve students in these projects and together we develop live events, for instance, to create meaningful encounters. We would also like to conduct research together with these partners to collect questions and to find out how we can support them in their meaningful communication efforts.

"As a professorship, we contribute to the improvement and streamlining of online research and social media research in order to better identify the kind of role that content, dialogue and commitment can play. We share this knowledge with our students by providing regular guest lectures and workshops. From dealing with ethical guidelines to processing social media data, we have built up an excellent track record and a wealth of expertise in the field of social media research and interpretation over the years."



# Parents of YouTube

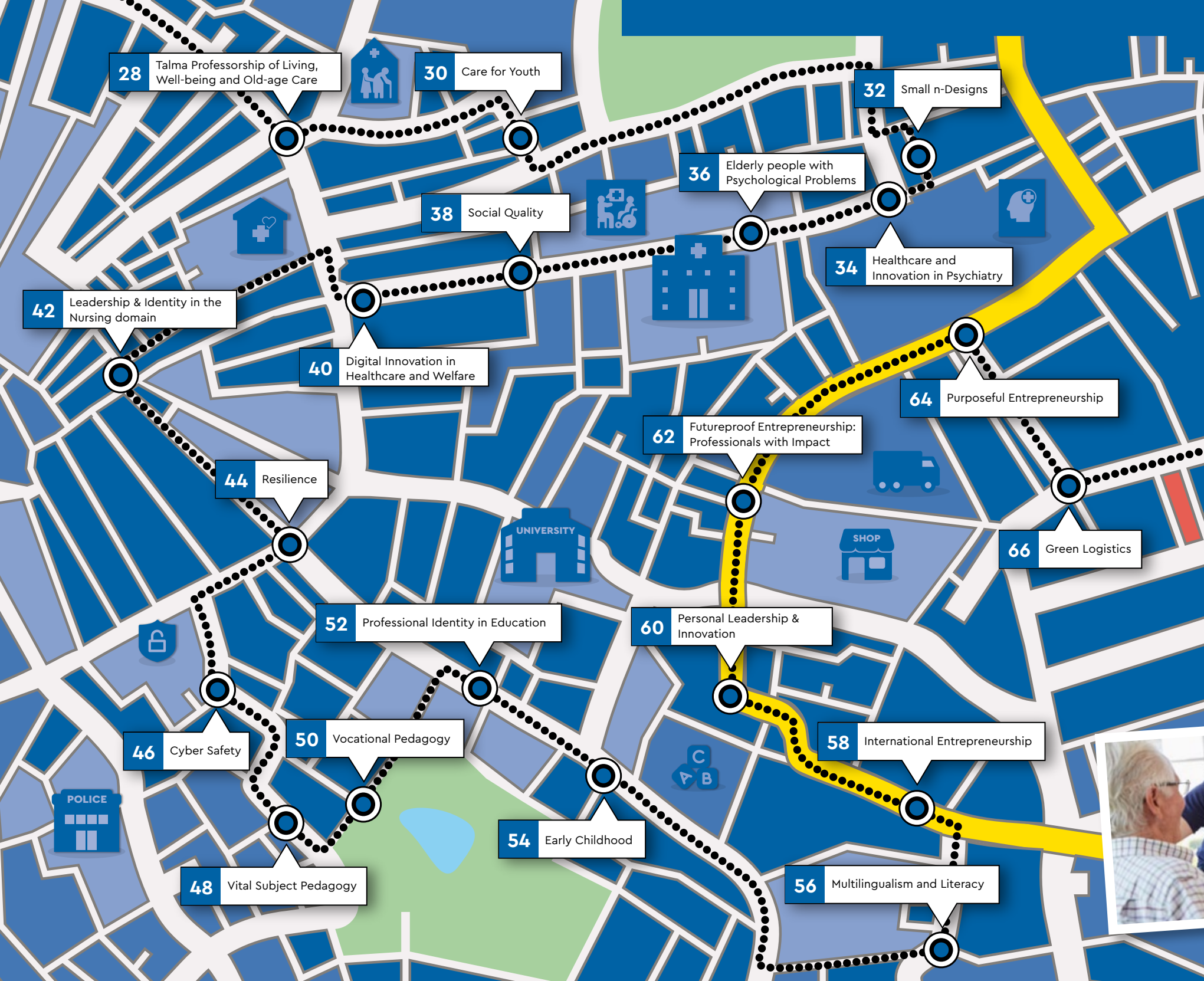
"Working together with students on the Indycaster project, we analysed various YouTube channels and developed a codebook. To analyse a YouTube platform, you need codes with associated definitions for such things as coarse language or criticism regarding the content via comments. We asked students to see whether those codes work across the board or whether other codes are needed. This has resulted in a codebook that we continuously improve and update.

"This project will be followed up by another project called 'Parents of YouTube', the YouTube viewing guide that we are developing for parents and their children. In this follow-up project, we will put together an editorial team and implement a research team. They will develop this information guide together. We have noticed that media literacy is not only relevant to primary school children between 8 and 12 years old, but to their parents as well. It is precisely the former target group that regularly logs onto YouTube, whereas many parents are oblivious as to what their children are watching and what effect it has on them.

"We aim to develop a viewing guide that gives parents an insight into the channels and helps them strike up a conversation with their children. We are even considering a podcast for parents and their children to listen to together. It is a challenge to create something that appeals to both parents and children so that they can feel comfortable talking about media literacy."



Organisations & Social Media





## 3. Vital Regions



Vital People and Society



Vital Education



Vital Economy

What impact does the closure of a village's last remaining school have on that village? How can we get started on the energy transition in actual practice? Despite the decreasing number of professionals and the growing demand for healthcare, how can we continue to provide excellent care? Within the Vital Regions focus area, we focus on increasing the liveability and resilience of regions. We view the world around us from an economic, social and educational perspective.

### Vital People and Society

The theme People & Society revolves around the inclusiveness of vulnerable people, interdisciplinary professionalism and digital innovation in healthcare and welfare. We also focus on the challenges posed by an ageing population and a lower birth rate in the region.

### Vital Education

How do you deal with multilingualism and (low) literacy? Which didactic innovation is required for this and what about identity building in education? These are questions to which we provide answers within the Vital Education theme.

### Vital Economy

Meaningful and international business is central to the Vital Economy theme. We focus on cyber safety and innovative and sustainable business operations. Our objective is to train value-driven and innovative professionals.





**Talma Professorship  
of Living, Well-being  
and Old-age Care**



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## TOUR GUIDE

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# FAITH Academy

"Within the FAITH Consortium, we conduct research into frailty, or vulnerability. The number of vulnerable people is increasing, and not just among the elderly. Take, for instance, social vulnerability or vulnerable target groups such as people with an intellectual disability. How can we ensure that vulnerable people can remain in control and maintain a high quality of life for as long as they possibly can? And what part can healthcare professionals play in this respect? These are key questions that are central to the FAITH Consortium."

"We conduct different kinds of research into these questions, varying from the role of senior professional education level nurses to individualised care (dementia care mapping) for people with intellectual disabilities and dementia. We also look beyond the Netherlands, such as in the collaborative project with German, Polish, Austrian and Turkish researchers focusing on the concept of care dependence. I strongly believe in long-term collaboration. It creates lasting relations and enables one to develop thematic knowledge on an ongoing basis and thereby to cooperate as closely as possible based on mutual trust. Together we examine current issues that are of interest and importance to us as researchers and educators, as well as to the organisation and (future) professionals."

"Besides our research activities aimed at knowledge development, we create solutions that help to maintain the quality of life of vulnerable people, we develop and implement tools for professionals, we share newly acquired knowledge and we provide education and training for professionals. By equipping them with the right knowledge and competencies, we contribute to the vitality of the elderly as well as the professionals. After all, we need them more than ever before."

[www.faithresearch.nl](http://www.faithresearch.nl)

# "We need vibrant health and well-being professionals more than ever before"

## 3.1 Talma Professorship of Living, Well-being and Old-age Care - Evelyn Finnema and Geke Dijkstra

The life expectancy in the Netherlands is rising, but not all senior citizens are enjoying good health in their old age. Furthermore, we are experiencing a growing number of elderly people with complex care needs, just when the number of healthcare professionals is declining. Evelyn Finnema and Geke Dijkstra are delving into these combined issues together with researchers within the Talma Professorship of Living, Well-being and Old-age Care.

"The progressing ageing of the population is a driving force within our professorship for issues related to living, well-being and old-age care. We focus on two target groups, one being the elderly (and their loved ones) who increasingly suffer from chronic conditions and therefore are fairly dependent on healthcare professionals. The second target group are the healthcare professionals. The main question we aim to answer for both target groups is: How can we provide the best possible evidence-based support?"

"The Talma professorship centres mainly on developing and sharing knowledge, competencies and skills. We work together with virtually all elderly-care organisations in the province of Friesland, as well as with the Frisian hospitals and municipalities, the provincial government, Community Health Services (GGD) in the northern Netherlands, health insurers, regional education centres (ROCs) and advocates. But the most essential are the elderly themselves, whom we actively involve in our research from start to finish."

"Because caring for the elderly is such a topical issue, we are a connecting factor between all parties involved. The topic is not limited to Friesland or the Netherlands; it is a global phenomenon. Relatively speaking, the global population is ageing. The demographic changes and their consequences raise many challenging questions, which we are researching both here in the Netherlands and abroad. That is our *raison d'être* as a research group. We conduct many of our projects in a local context, but we publish the research results nationally and internationally and participate in international projects. This enables us to disseminate our knowledge to interested parties, be they local, regional, national or international."

"We thought for a long time that students would not find the elderly a very interesting target group, but we can see that that is changing. More and more students are wanting to work on our research projects. With the positions we have to offer, we can inspire them and introduce them to topical issues. Virtually every health and well-being professional, no matter their particular field, is involved in one way or another with the elderly and their loved ones."

# "The cross-fertilisation we unleash is unprecedented"

## 3.2 Care for Youth - Janneke Metselaar

The social domain, and specifically youth care, is under enormous pressure. Many youth care organisations are currently in survival mode, says professor Janneke Metselaar. With her Care for Youth professorship, she conducts research into effective work practices and into improving the profession of youth workers. The professorship aims to support psychosocial health in children and families.

"We focus on quality and efficacy questions in youth care, mostly for demonstrating whether an organisation's efforts are of any use. We are also frequently asked to 'share our thoughts', in which case we engage in discussions, occasionally resulting in concrete projects. Youth care is in a state of flux. No sooner have you turned your back than things have changed again. That is why, as a researcher, you should not stick too rigidly to an assignment, but adjust along with circumstances. I have noticed that we are considered a valued discussion partner.

"We work together with several organisations, among which Humanitas, Jeugdhulp (Youth Aid) Friesland, youth health care, Community Health Service (GGD), primary education, local authorities and senior secondary vocational education institutions. We offer these organisations process

guidance and advice, and we provide methodologies, draw up interim reports and organise focus groups. In short, we act as a mirror for the client. Our added value is our neutral position. No municipality or healthcare institution has a stake in our professorship. Furthermore, we sometimes become aware of developments elsewhere in the country a bit sooner than others. We bring this knowledge and information to the attention of our youth care partners.

"We always strive to have students participate in our research for cross-fertilisation purposes. If any interesting conclusions can be drawn from our research or if our research produces interesting results, we will include them in our education. For example, I give regular guest lectures to students of the Healthcare and Social Studies academies. During those guest lectures, I can communicate the knowledge we gain through our projects in the primary process of education. We also participate in workshops, which enables us to spread our knowledge even further.

"We said from the outset that our professorship is not interested solely in the short-term effect of a research project, but in continued development. What has proven to be very fruitful in this respect is the collaboration between our professorship and the client which is often seen as the driving force in the client's quest. Our strength lies in the short lines, the pleasant transfer and the intensive exchange of knowledge. We send our students out into the field to investigate issues for organisations. This leads to welcome cross-fertilisation, such as in the Regional Youth Knowledge Workshop, in which we collaborate with a range of organisations."



# School as a Workshop

"The dropout rate in senior secondary vocational education is relatively high. Friesland College wanted to turn the tide by lending a listening ear to students who had questions and dilemmas, so as to identify problems at an early stage and prevent school dropouts. A group of care providers from various organisations constitutes the support team within Friesland College. These organisations include debt counselling, Community Health Service GGD, Jeugdhulp Friesland, Reik and FIER. This team is aptly named the SAW team: School as a Workshop.

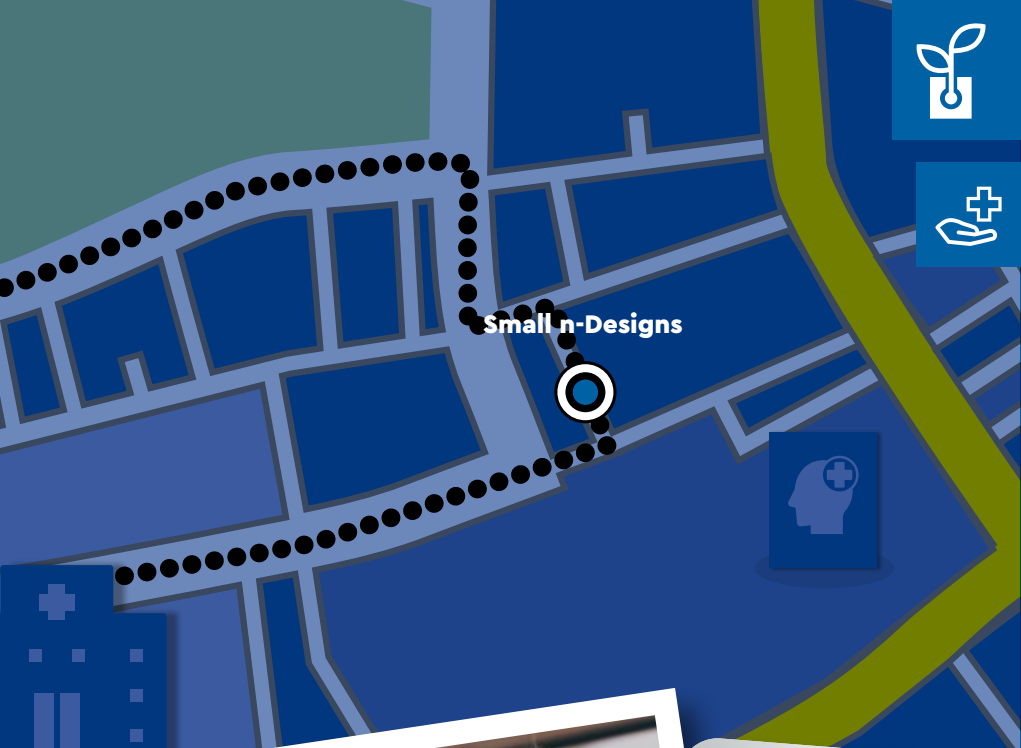
"The aim of the SAW team is not so much about being able to immediately solve people's problems but the trick is to make students so resilient that they can finish their education. As a professorship, we were asked to take over the development of this project, which resulted in the Peer School Support Project (PSSP) funded by ZonMw. With a view to further developing SAW, we started interviewing students to see what they need. We took a closer look at the support provided by the SAW team to identify any aspects that needed to be improved.

"Proceeding from these exploratory talks, we organised students, lecturers and SAW team members into groups who were then tasked to pioneer a specific theme. This resulted in concrete suggestions for improvements and ultimately resulted in a discussion guide and a route planner. We also created a package for lecturers and SAW members to help boost their collaboration."



Care for Youth





Small n-Designs



**TOUR GUIDE**

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## Behind closed doors

"Healthcare has traditionally been very centred on healing. This also applies to dementia. We turn to pills to keep the disease under control. But we do not conduct enough research into what happens behind closed doors once someone returns home after being diagnosed with dementia. Very little is known about people with dementia who live at home, whereas eighty percent continue to live there until the day of their death. As part of our Social Trials research, we look behind closed doors.

"In the Social Trials project, we evaluate Prof. Anne-Mei The's *Sociale Benadering Dementie* (SBD, Social Approach to Dementia) by means of the n=1 approach. In our research project, a person who is diagnosed with dementia receives help from an SBD team. This team lends a listening ear, discusses the meaning of life together with the client and their family and carefully distributes the care tasks among the client's network so as to lighten the individual burden of those who provide informal care. We monitor this new approach among hundreds of people in Amsterdam, Rotterdam, Den Bosch and Amstelveen.

"We use the systemic n=1 approach to identify the generally effective components of the SBD approach. We want to share this knowledge in order to sway the one-sided medical view on dementia. We must stop taking over from patients; it makes them lose control of their lives, not to mention their self-esteem. Patients with early dementia inadvertently become socially disabled, as it were. We favour inclusion, not exclusion."

# "There is no such thing as an average patient"

## 3.3 Small n-Designs - Marinus Spreen

The healthcare and welfare sector has always been the domain of people who zealously roll up their sleeves.

However, with the rising cost of our healthcare system, there is an increasing need to investigate the efficacy of treatments.

Within the Small n-Designs professorship, professor Marinus Spreen and his research group conduct research into the usefulness of low-threshold and easily conducted small-scale studies, the so-called n=1 studies, for the purpose of demonstrating the effectiveness of a treatment or method.

"The primary question in healthcare is: does the treatment that a patient receives actually have the assumed effect? In order to answer that question, you first need to answer another question: how can you prove that a patient's treatment has had any effect? Our professorship centres on this latter question. We develop methods for healthcare and welfare professionals who want to know whether the treatments they prescribe have the desired effect or whether they need to change their approach.

"That need for proof is expressed from various quarters, such as health insurers, local authorities and provincial governments, but also patient

associations. Even higher professional education wants proof so as to turn out well-prepared future professionals. The tricky thing about healthcare and welfare is that the evidence is always based on averages. "On average, this treatment is effective in 75% of cases." What this actually comes down to is that you as a professional do not know whether the patient you are treating is among the 75% success stories or the 25% bad luck stories. That's no wonder, really. After all, we all differ as human beings and we all respond differently to treatment.

"To collect this evidence, we have developed the systemic n=1 approach. With this approach you decide what treatment a patient needs and then take qualitative and quantitative measurements during the course of the treatment, using the patient's network to gauge whether the patient is making sufficient progress. By applying the n=1 approach, you learn to work in a questioning manner as a treating physician or bachelor student, continuously asking yourself whether the result you achieved was due to the treatment you prescribed or whether a different treatment would have had the same effect.

"Fortunately, the recognition committees are more and more inclined to allow n=1 approaches as valid evidence for assessing treatments. And yet we have noticed that the 'one size fits all' notion is quickly starting to creep back in. It's only common sense that you should consider someone's personal history and relate your treatment to that history in order to make progress. So what our professorship is aiming for is tailored healthcare and welfare treatments by training professionals who are curious to know how effective their procedures are by applying n=1 methods in their daily practice."

# "We consider the person behind the patient"

## 3.4 Healthcare and Innovation in Psychiatry - Nynke Boonstra

Psychiatry is traditionally centred on treating complaints.

However, it is essential to consider who the person is behind the patient, how that relates to the patient's functioning and what happened to cause the complaints, says professor Nynke Boonstra. Her professorship helps professionals to come up with innovative solutions and to seek the person behind the patient.

"Within the Care and Innovation in Psychiatry professorship, we consider the person behind the patient and investigate how we can improve that person's functioning. Based on this insight, people are better able to exercise more control over their lives and then have a say in possible treatment and support. We not only consider complaints, but people's strengths as well. What do you excel at and how can you keep these complaints from recurring in the future?"

"I believe that senior professional education level professionals are the key to this transition within psychiatric care. As part of their professional profile, senior professional education level nurses focus on improving performance.

Our professorship is fully committed to this. Together with the professional practice, we research how we can give professionals more tools to give people a greater say in their treatment process based on the connection between symptoms and functioning. That way, patients can have more control over their treatment.

"We do not specifically look at the content of protocolled interventions, but focus on active ingredients in healthcare and on how we can assist professionals better in this respect. We conduct research, develop tools, provide training and education and help partners in the professional field to set up a learning network, in which expertise by experience is very important. Professionals are very used to constantly thinking along the same lines based on their own expertise. That expertise is important, but if you zoom out wide and brainstorm together, you can find completely different solutions.

"Epidemiological research shows that 75 percent of mental illnesses arise around the age of 20. At that age you are susceptible to mental problems and you can use some extra help. That is why we have also set up a number of prevention projects within our own university of applied sciences. A good example here is the Young Experts by Experience Friesland (JEF) help desk, which is part of the Study Success and Student Welfare workshop. JEF is a workshop where young people can tell their peers about what they have experienced. Appropriate, accessible solutions are devised here. As a professorship, we support this help desk in any way we can."

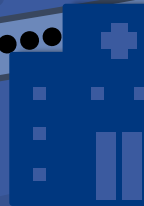


# Getting a grip on misunderstood behaviour

"Our professorship works on 25 different topics. A major topic is people with misunderstood behaviour, popularly referred to as confused people. Professionals are still very hesitant when it comes to treating people with misunderstood behaviour. We are all people of goodwill, but it remains difficult to provide proper care, especially when people do not ask for help themselves or are not able to turn to the correct service point with their call for help.

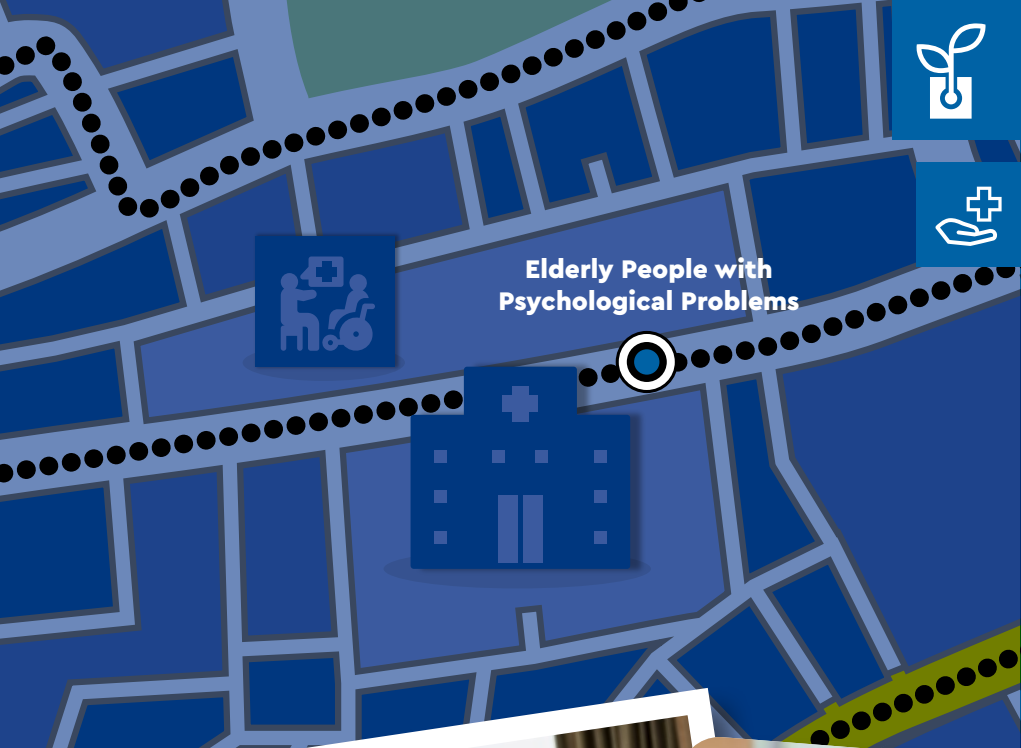
"To look into this issue, we started with a post-graduate course and a learning network, in which professionals from various disciplines, from social workers and the housing corporation to community police officers and regional teams, work together. Naturally, we have also involved GGZ (mental health) Friesland experts and experts by experience in this project. By discussing casuistry taken from practice, we come up with unique solutions.

"As an example, a woman introduced the case of the housing corporation where she works not noticing until very late that someone is in trouble. Ultimately, the solution was devised to have vulnerable tenants sign a contract, so that - if things are not well - the housing corporation and GGZ are allowed to consult each other. Furthermore, there should also be a financial safety net for those who are unable to pay their rent for a while due to psychological problems. A good prototype, in which you break away from current practice."



Healthcare and  
Innovation  
in Psychiatry





Elderly People with  
Psychological Problems



## Guided by the Guide

"Home care, mental healthcare (GGZ), the district team and the general practitioner: these are just a few of the many healthcare disciplines that attend to the elderly with mental health problems. Try keeping a clear overview as an older person - or as a social worker for that matter. The various primary care organisations regularly have to deal with bottlenecks in their mutual communication. They make too little use of each other's knowledge and often work at cross purposes.

"In order to get a good idea of who is involved in a client's care, we have developed a Guide in the research project 'Working together for the elderly with psychological problems'. This guide is a booklet in which every care provider enters their contact details and duties, thus providing an overview for both the client and all other care providers involved. The informal carers can also enter their details. As a consequence, the guide connects informal carers and professionals.

"As part of this project we are also developing a social map of the entire vicinity so that involved parties can look up other organisations and find out what services they provide. People immediately think that this kind of guide should be a digital guide. But we want it to be a printed guide, so that every elderly person with mental health problems can keep it next to their phone. That is what we are aiming for."

# "Research should not be looked upon as being outside the scope of healthcare professionals"

## 3.5 Elderly People with Psychological Problems - Gea van Dijk

The number of elderly people with mental health problems is growing. This can partly be explained by the growing elderly population, but the occurrence of mental health problems is increasing as well. Associate professor Gea van Dijk is committed to putting this often forgotten target group on the maps of both current care providers and of students who are just starting out in their career.

"Our research theme 'Elderly people with psychological problems' falls under the Care & Innovation in Psychiatry professorship. The research questions within this research theme relate specifically to senior citizens with mental health problems. We also maintain close contact with the Noorderbreedte healthcare group, which funds my associate professorship. This research theme centres on three topics. Firstly, the clients: from the disorder to increasing self-reliance. Secondly, the family and informal carers: how can you position them properly? And thirdly, the employees: how can employees deal with the (problem) behaviour of these elderly people? In our research we strive to continuously consider the triangle comprising client, family and employees.

"Elderly people with mental health problems are a growing and increasingly important target group, but ask first-year nursing students in which sector they want to work and hardly anyone mentions elderly care. Elderly care is not very popular and psychological problems in the elderly even less so. I consider it as my mission to introduce students to this fascinating target group, by involving them in my research. I also want to embed research to a larger extent in professional practice. Elderly care is in its infancy when it comes to research. There is still plenty of work to be done.

"The research that has been conducted into elderly people with mental health problems is mostly medical scientific research. I would like to see research being done at all levels within the organisation, and then not only by researchers in universities and universities of applied sciences, but also by employees who conduct their own research. I try to make healthcare professionals aware of the significance of research. I do this by linking our students to employees. As a result, research is no longer outside their scope. In my position as associate professor, I have access to the scientific field and provide the necessary support.

"The solutions we work on are found in as many instances as possible in conjunction with and by the healthcare staff. Examples of these solutions are increased knowledge, a new insight or a new working method, but also the development of a new tool. Research is very important for improving quality in healthcare. If you do not ask yourself why you are doing what you are doing, you are acting on autopilot. We must continue to spark that curiosity. That is my contribution to professional practice: inquisitive healthcare professionals."

# "Much can be achieved through small initiatives"

## 3.6 Social Quality - Jolanda Tuinstra

People are social creatures. Socialising is good for our health, makes us feel that we matter, reassures us and makes us happy. Furthermore, there is constant reciprocity between people and their social surroundings. Within the Social Quality professorship, Jolanda Tuinstra researches the extent to which people can participate in society in a way that suits them and that does them good.

"The key question within the professorship is as follows: how can we - at all levels - learn together, study together and work together on social quality? Social quality is defined as the extent to which people are able to participate in social relationships in a way that does them good and that suits them. It is the interaction between the quality of life of the individual and their social relationships. Four conditions apply here, namely social economic security, social cohesion, social inclusion and social empowerment. When any one of these conditions is at issue, problems such as social exclusion, loneliness, poverty or homelessness arise.

"Within our Social Quality professorship, we work together with municipalities, welfare organisations, healthcare organisations, volunteer organisations, residents and, of course, with students, lecturers and researchers. All these partners come together in various collaboration structures, such as our Social Domain workshops. Workshops are a meeting place for students and teachers from various disciplines who work together with representatives of municipalities and welfare organisations on ideas and solutions for local practical issues.

"Our research projects are based on local practical issues regarding social quality. We often opt for participatory research, in which we actively involve the target group on which the research is centred. Co-creation is paramount within our professorship. Take, for example, the 'Crossing the threshold' project in Leeuwarden, in which culture creators are committed to stimulating encounters in the neighbourhood. Residents actively participate in accumulating experiences and stories. This is how we create co-researchers in the neighbourhood.

"Student commitment is indispensable in these kinds of projects. They work on sub-questions within a research project. As an example, they can acquaint themselves with applied research, from the perspective of different disciplines, the result of which is tested and used directly in the professional field. That is why I became a professor. I want to make links between research, practice and education. I have been working on that all my working life. We need each other to deal with the various complex social issues we face as a society. Nobody has a ready-made answer, but I truly believe that much can be achieved through small initiatives."



# Social quality during the corona crisis

"Keen home cooks who prepare meals for their neighbours, students who offer free childcare, and professional football players who telephone lonely football fans. It's amazing how many people take steps to do something for others during the coronavirus pandemic.

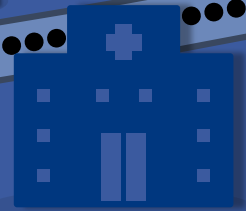
The big question is: will these kinds of initiatives continue after the corona crisis dies down? Proceeding from the Social Work study programme, Social Domain Friesland workplace and the Social Quality professorship, we conduct research into the impact of the corona crisis. Collecting and sharing these initiatives in our network is the core of one of our projects.

"We have set up a platform in which we collect fine examples of initiatives having to do with social quality. These are initiatives that our students or colleagues have developed, as well as projects that we see happening around us, in our neighbourhood, our city or region. By collecting these initiatives and sharing them with a large network, we aim to learn from each other how to improve social quality. Not only are these kinds of activities extremely valuable during a crisis, we can also benefit from them in the future.

"We also conduct research among all students and staff of the Social Studies and Healthcare academies, exploring the impact of the coronavirus (COVID-19) on their own daily lives. We also explore experiences and insights on issues in their social surroundings. In any case, if there is one thing that the corona crisis has taught us, it's that people demonstrate high levels of social resilience."



Social Quality



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## Digital Innovation in Healthcare and Welfare

# Natalie gives dementia a voice

"Dementia is still a big taboo subject. People who are diagnosed with dementia prefer not to talk about it and have to cross a threshold to even mention the word. As a result, communication between all those involved is challenging. Incidents are not reported because it embarrasses them, thus standing in the way of proper care. How can involved parties engage and keep engaging in dialogue, making it easier to mention uncomfortable matters and ensuring that the provided care remains in tune? The Natalie project (Need Articulation Through Autonomy Loss In Elderly) centres mainly on this matter.

"Together with De Zorgspecialist (The Care Specialist), software supplier Lable, Alzheimer Nederland, Dementia Network Friesland, the University of Groningen and Hanze University Groningen, we are working on a digital environment aimed at improving communication between all parties concerned. In this environment, parties can pose questions and report incidents. This digital environment is not an all-encompassing solution, but it does provide tools for giving patients as much independence as possible.

"Current practice is to ask dementia patients what they want. As an example, a patient might answer that they would like to have yogurt and cereal for breakfast. That wish is duly noted and henceforth that patient is served only yoghurt and cereal for breakfast. That's how people become two-dimensional. The big question is: how can you help them to keep making their own decisions and remain as independent as possible? Our Natalie project gives dementia patients a voice again."



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# "The best way to predict the future is to design it yourself"

## 3.7 Digital Innovation in Healthcare and Welfare - Job van 't Veer

The number of care recipients is growing, whereas the number of care providers is falling. That phenomenon calls for new solutions. Professor Job van 't Veer is utterly convinced that we cannot maintain the quality of healthcare and welfare without digital innovation - especially in shrinking regions. He works together with researchers and the professional field to identify successful applications of digital innovation in healthcare and welfare.

"Our professorship is engaged in digital innovation in healthcare and welfare. Although that might sound like a technical issue, it is mainly a matter of change management. How can you bring about behavioural change? How relevant is the app, game or robot to the customer, organisation or patient? And are our professionals sufficiently skilled and motivated? In other words, how can you ensure that healthcare professionals are digiskilled?

"As a professorship, we occasionally initiate our own projects and design actual digital products. But we also conduct research into the implementation of existing technological applications in new practical

contexts or focus on validating research: does an application have the intended impact? Examples of current projects are an educational Virtual Reality game for children with autism, a social robot for people with dementia, an exercise game for the elderly and the use of VR glasses in rehabilitation care.

"Healthcare and welfare professionals should not only be trained in the use of digital innovations, but should also be able to provide input and participate in decision-making. I sometimes compare implementing digital innovation with making music. It involves more than just purchasing a piano; you need music lessons and sheet music to make sense of it. There is often far too little support, if any, during the implementation of new applications, with the result that employees cannot mould a digital product to their own liking, and therefore cannot make it a logical part of their work. Innovations are usually more sustainable if people have enough say in them.

"For me as a professor, it's not about getting the most high-tech innovations. The more important question is: what fits in our region? What are the latest developments that we can use here and are we able to change along with them? I also focus on our students, who, as future professionals, will be dealing increasingly with technological developments in their healthcare and welfare practice, and who will be in control of how to deal with those developments in a creative, yet responsible manner. The best way to predict the future is to design it yourself. That's what we train our students for."

# "Using knowledge in nursing practice improves care"

## 3.8 Leadership & Identity in the Nursing domain - Margreet van der Cingel

Attending seminars or reading articles - it is a golden standard for medical practitioners to keep up to date. It is less common in the nursing profession, however, to invest time in acquiring scientific knowledge. It is not yet an evident part of the job, whereas it is much needed, argues professor Margreet van der Cingel. Her professorship aims to encourage nursing leadership and to empower professional nurses.

"Nurse shortages have been increasing for several years now, in hospitals as well as in healthcare in general, including care for older people and people with disabilities and home care. These shortages are related to the ageing society, but unfortunately, too many nurses and nursing students are dropping out as well, whereas there is interest enough of young people for the nursing profession. So, what is going on? We are looking into this problem by doing research, in close cooperation with our partners: the regional healthcare organisations. We perform studies into leadership and why nurses leave the profession. We already know it is a so-called 'wicked' problem, a complex problem with multiple causes that needs

several solutions. Causes are f.e. workload, bureaucracy, hierarchy and a lack of autonomy.

"Another issue we are looking into is the application of scientific knowledge in the nursing profession. Nursing is often seen as a profession that requires no scientific knowledge. Historically, the idea is that everyone can provide care, especially women. It is an image that troubles us still. Especially bachelor-educated nurses are not yet being challenged to their full potential when it comes to translating scientific knowledge into practice. Nursing should preferably be considered a profession that calls for practical as well as theoretical knowledge. Nursing leadership might be helpful in facilitating this.

"Our research is aimed at contributing directly and indirectly to solutions to the nursing shortages in the Northern Netherlands, and ultimately aims for achieving good quality of person-centred care. We develop both knowledge and tools for practice. In our research studies we gather data which reveals examples of good leadership and use these as role models for nurses to draw on. We also provide modules and workshops for our nursing schools as well as for follow-up and refresher courses for professionals.

"We involve nurses in every study and whenever we develop and design a tool. After all, they are the ones to use them. I firmly believe that change can only succeed if people feel they are in charge of that change themselves."



# LeerSaam Noord

"The LeerSaam Noord (Learning Together) project is a study into learning communities of nurses with a focus on mutuality and cooperative learning. Learning communities consist of nurses and nurse assistants with various educational backgrounds. They all work and learn together, each of them having their own value and making a specific contribution to the teams. We are specifically looking into issues concerning the integration of scientific knowledge, professional expertise and patient experiences in daily practice.

"In order to study this, we have established five learning communities in several healthcare organisations. These learning communities organise case meetings in which they discuss patient-cases. We support and monitor these meetings with a research learning community in which patients themselves are partners. They take part in the discussion regarding good quality of care. The aim is to take better account of what is of importance for patients, since much still is subject for improvement, especially with respect to patient participation.

"I have noticed that all parties enjoy debating with each other on good quality of person-centred care. Nurses who facilitate the learning communities in daily practice are found to apply knowledge and share their experiences from their own locations. They gradually develop a working culture in which mutual learning is pivotal and in which knowledge is made available and put into practice."



Leadership & Identity in  
the Nursing domain





Resilience



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## On the police radar

"What must you take into account when dealing with people with MID? This is a very familiar question to many employers, and especially within the police force. It is for that reason that we have produced a knowledge guide for the police force, containing information on this target group and tips and tricks for when policing the streets. Many police officers do not know how to deal with people with MID, which can cause situations to escalate. The knowledge guide should help prevent this.

Society is becoming more and more complicated, making it increasingly difficult for people with MID to continue to participate. Giving a police officer lip when being called to account about a violation, a violent outburst while being arrested, or a tirade after being issued a warning are just a few examples of escalations that can occur. The tricky thing here is that it is not immediately obvious that someone has MID. In fact, these are very verbally skilled people, besides which they are adept at concealing their disability.

"We created this knowledge guide in collaboration with a sounding board comprising police officers and people with MID who have already come into contact with the police. We had both parties engage with each other to help them gain mutual respect and understanding. This enabled us to produce a knowledge guide that everyone can identify with. We would be thrilled to have this guide on every police officer's desk."

# "I have seen too many disappointed people with mild intellectual disabilities"

## 3.9 Resilience - Piet Geert Nicolay

Labour force participation became a hot topic in 2015 when agreements were made regarding participation jobs. Municipalities were required to create jobs for people with disabilities, with the aim of taking a major step forward towards an inclusive society that allows everyone to participate. The big question is, however: does this approach work? Professor Piet Geert Nicolay has devoted years of study to this issue.

"No less than 16 percent of the Dutch population has a mild intellectual disability (MID). That's about three million people. In order to become an inclusive society, you have to take this group of people, who have trouble finding a job, into account. I would like to help gain a better understanding of this population. I have seen too many disappointed people with MID who were very happy thinking they had a new job, only to find themselves very quickly back home out of work.

"There are many employers out there who would like to offer someone with MID a job, but unfortunately, in too many instances problems slowly but surely start to arise. Still, I think it is wholly unjustified that labour force participation is made out to be a fiasco only five years after its implementation. It is very worthwhile to offer someone a participation job, only the trick is to provide both parties with correct information to ensure realistic expectations on both sides. I make employers aware of which preconditions are essential and show people with MID what their options are. Our job coaches also inform both parties of the opportunities and possibilities.

"A good example of a concrete product that we have developed for this is the labour interest test (LIT) for people with intellectual disabilities. Our first product was a virtual reality application to show people with MID what work they would be doing in a supermarket, for instance. We also take the social aspect of these jobs into account. Virtual reality is a very factual way to demonstrate the kind of tasks that are to be performed, but also to highlight the social aspects of a particular job.

"We have compiled a top 10 list of the most common jobs that people with mild intellectual disabilities do, from working on a care farm to cleaning duties and replenishing shelves. We started with an initial prototype of the VR glasses, in which we detailed a job in a supermarket. We hope to do something similar with the other nine jobs as well. If our labour interest test leads to a 10 percent reduction in the number of people who quit their jobs, I will be a very happy man."

# "Digitisation is not only a matter for specialists; it affects the work of all of the police force"

## 3.10 Cyber Safety - Wouter Stol

Bicycle theft topped the list of most common criminal activity for years, but now hacking and online fraud rank the highest. Organised crime is rapidly digitising, whilst people are online 24/7. The police play a key role in the fight against cybercrime, but are not yet sufficiently responsive to this particular digitisation phenomenon. Under the leadership of Wouter Stol, the Cybersafety professorship focuses on police work in a digital environment.

"Cybercrime has increased immensely in recent years. Today, countless kinds of cybercrime, ranging from hacking to fraud, are rampant around the world. Our professorship focuses on police work in relation to digitisation. Combating cybercrime is a primary task, followed hard on its heels by the use of digital evidence in classic criminal activities, such as assault, and the use of digital information during police street work. We do not so much develop products, but rather practical advice. The Police Academy and the Open University are our main partners in this respect. In 2016, we set up the Cyber Science Center to formalise our partnership.

"The main police strategy is that the police have a lot of experience in all areas of society, resulting not only in information, but in a social network and support for police action as well. Now that society is digitising, it is important for the police to be familiar with the digital environments of society as well. Take, for instance, discussion forums on the internet to know what concerns people have and who the key people are in this digital environment. So-called 'digital community police officers' should help the police take that step. The Cybersafety professorship conducts research into everyday police street work, paying special attention to the use of digital information, in order to provide the police with feedback and assistance in this respect as well.

"The police are gradually becoming more familiar with the digital world, but developments are progressing so quickly that they are constantly faced with new issues. Hacking and e-fraud are crimes that every police officer should be able to handle, but apparently can't at this point in time. Meanwhile, new issues are rapidly emerging. How can we tackle dark web crimes? Could cooperation between the police and digital specialists in the business community be a solution? Will we have to deal with sexual offenses against avatars? Time and again the unthinkable turns out to be true. The police must actively respond to these developments and conduct and initiate these discussions. We want to contribute to this by means of our research.

"We are currently researching the impact of cybercrime on victims and how it affects the role of the police. We are also researching the use of digital information during police street work. One thing is certain: digitisation is not only a matter for specialists; it affects the work of all members of the police force."



# Light on the dark web

"Things happen on the dark web that cannot stand the light of day. Until recently, this was an unpoliced area, an area with no police presence. Societies cannot afford to have any areas with no government involvement. In collaboration with researchers from England, Sweden and Norway, we have set up a project to gain a better understanding of the fight against criminal activities on the dark web: how successful is it and is there room for improvement?"

"The Darkweb research team is not only an international team; it also consists of people from different backgrounds, ranging from lawyers, criminologists and computer scientists to diehard forensic techies. As a professorship, we study police tactics: what strategies do police officers use to fight crime on the dark web? Forensic technicians, for example, investigate how evidence can be properly secured from a technological perspective and the lawyers study what is legally possible and where to draw the line.

"Collecting evidence on the dark web must be technically sound and comply with our principles of the law. Not everything that is technologically possible is sanctioned. Tracing rules apply to the dark web as well. We aim to show the police how crime can be fought under digital circumstances."

[www.cybersciencecenter.nl](http://www.cybersciencecenter.nl)



Cyber Safety

POLICE



## Japanese maths class

"I attended a maths class in Japan. There, children are given a challenging assignment at the beginning of the class. They can work on this assignment individually or in groups in their own way. All possible solutions are then put up on the board and are connected to each other, so that students develop a conceptual understanding of mathematics. We are now experimenting with this Japanese concept of mathematics education in the northern Netherlands."

"The big advantage of this teaching method is that students no longer have to learn 'tricks' by heart, but rather develop insight for which they can use a certain formula in actual practice. This also helps students develop higher thinking skills, which are important for them to function well in society later in life."

"International research shows that Dutch students score very low in terms of motivation. This is partly because in the Netherlands we focus mainly on that 'average' student. What I want as a professor is for schools to actively work on equal opportunities through personalised learning by improving the teaching skills of teachers. My dream is for our professorship to initiate and support a regional movement, with teachers providing increasingly better personalised education through collaboration and research."



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Vital Subject  
Pedagogy

# "Rather than giving them a fish, give them a rod"

## 3.11 Vital Subject Pedagogy - Siebrich de Vries

No two children are the same, no two students are the same.

The call for customised education is becoming louder. But how can teachers realise that? Professor Siebrich de Vries helps teachers and (training) schools in the region to transform their traditional classroom into a personalised learning environment centred around the subject pedagogy. Teachers who conduct research in their own classes are the key to success.

The research line of subject pedagogy is part of the professorship Vital Subject Pedagogy. Where my colleague Marco Mazereeuw focuses on profession-oriented pedagogy, I focus on subject pedagogy in secondary education. "Teachers often still use textbooks that are aimed at 'the average student'. But there is no such thing as an average student. When teaching, they should take into account how a student learns, but also how easy or difficult the teaching material is for that student. This is called personalised learning. In other words: what is the best way for a particular student to master a particular topic? To answer this question, we focus on teachers and then mainly on teacher training programmes and training schools. After all, that's where the teachers of the future are trained.

How do we turn out subject pedagogically competent teachers? Well, by not giving them a fish, but by giving them a rod."

"We have noticed that it takes years of teaching experience for teachers to properly explain the material in their field to their students, and that some teachers often still fail. To stimulate that learning process among teachers, we use the Lesson Study professionalisation approach. Lesson Study has its origins in Japanese education, but can be applied to all types of education. The goal is for a team of teachers to work together to cyclically design and give a lesson and then examine their own students' learning."

"Take the sine during math lessons as an example. In practice, the sine turns out to be a very complicated subject and many students quickly switch off. With Lesson Study, a group of teachers design and give a lesson. Then, instead of studying how the teacher gives the lesson, they examine the reactions of the students. They collect data by studying the students as to what they did well and what went wrong."

"I have noticed that this new role and attitude takes many teachers some getting used to. They should learn from their students, rather than that their students learn only from them. Besides the transformation to personalised learning, it is also a huge transformation in education: learning together with each other to become increasingly competent teachers and to give all students the same opportunities."





## Different view

"The research project 'Room for Agile Craftsmanship' is a collaborative project with many partners, in which we develop ways for providing tailored guiding to individual senior secondary vocational education students working in hybrid learning environments. To support supervisors, we have created a model to provide an insight into the learning processes of agile craftsmanship among students. We have also developed a model for guiding students in this process.

"When creating this model, we asked students about their reflection moments at work. We discovered that learning often starts while they work in a working and learning environment. Learning processes for agile craftsmanship arise when students look for or help to find solutions in their work. If they are willing to help search and see opportunities to do so, they are not learning a handy trick in the classroom, but they are looking for the knowledge they need in actual practice at that point in time. How this process can be reinforced is one of the vocational pedagogies that our professorship is seeking.

"We offer supervisors a different lens on how their students learn but also a lens to critically examine how they guide students so they are motivated to become agile in their guiding themselves. Because no matter how you look at it, agile craftsmanship is important for everyone."



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Vocational  
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# "Contributing to the quality of vocational education in the Northern Netherlands is what drives us"

## 3.12 Vocational Pedagogy - Marco Mazereeuw

Lifelong Learning: Since its introduction, the term has undergone a number of transformations. Nowadays, senior secondary vocational education uses 'Lifelong Development' on the same footing: how can we ensure that professionals can continue to learn and develop? Associate professor Marco Mazereeuw supports vocational education in this respect by means of the research theme Vocational Pedagogy.

"The Vocational Pedagogy research theme is part of the Vital Subject Pedagogy professorship. My colleague Siebrich de Vries focuses on subject pedagogy within secondary education; I focus on pedagogy within vocational education. There are currently two important movements in vocational education. Firstly, work is becoming increasingly more dynamic. Nowadays, professionals are not only expected to be able to do their jobs, but to also have the will and ability to learn while working. We refer to that as agile craftsmanship."

"Furthermore, the labour market is changing rapidly. People are increasingly expected to scrutinise their careers and to develop on their own initiative. Vital regions benefit from people who have the will and ability to make informed career choices, thereby ensuring a sustainable career for themselves.

Vocational education is involved in both movements. Vocational education is more than just listing what requirements a metal worker or care provider must meet and then working towards meeting those requirements. It challenges students to become agile professionals who are willing and able to look beyond the context of their own profession.

"In order to train these agile professionals, vocational training seeks collaboration with companies. More and more hybrid working and learning environments are emerging, in which the work and learning of students are linked or even merged. A hybrid working and learning environment has the characteristics of both a work environment and of a learning environment. A big question in vocational education is how to best supervise students in a hybrid working and learning environment. How can teachers and work supervisors shape the interaction between non-formal and formal learning? How can we support students in this respect?

"To support vocational training in this transition, we jointly design and research curricula, working and learning environments and coaching practices. This is our contribution to the quality of vocational education in the Northern Netherlands. That is what drives us; that's our *raison d'être*. Just like senior secondary vocational education, we are keen to enter into strategic partnerships, in which we position ourselves as a discussion and development partner. The way in which our research methodology is structured enables us to take action and learn together. Ideally, I would have all senior secondary vocational education institutions in the Northern Netherlands work together as one large research centre for agile craftsmanship."

# "Distrustful types should not become head teachers"

## 3.13 Professional Identity in Education - Albert Weishaupt

For twenty years now, the Netherlands has been doing its utmost to improve secondary education. Nevertheless, studies show that the quality of our secondary education has remained unchanged over the past two decades. Professor Albert Weishaupt wonders why. He seeks answers together with education professionals in the workplace and has found that an important task is reserved for the intrepid head teacher.

"We have been working on quality improvement in education for many years and have come up with innovative plans. These ideas are undoubtedly well intentioned, but going by what scientists have to say in their report 'De staat van het onderwijs 2020' (The state of education in 2020), we have apparently not been able to actually improve our education in the past twenty years. Innovative ideas alone are not enough; those ideas also need to be implemented. As a professorship, we make that connection between theory and practice.

"Education in the Netherlands is traditionally very focused on content, but we fail to implement. Innovation requires not only brainpower to formulate an idea, but also brainpower to subsequently execute the plan. One-to-one

agency is an integral part of innovation. By agency of teachers I mean 'teachers who focus their professional actions on realising innovation'. The professional identity of the teacher is the driving force behind this action. That is the philosophy of our professorship. How can you ensure that teachers have more control over their work? How can you ensure that they indeed take control?

"The school culture and the attitude of the head teacher play an essential role in this respect. If, as a principle, you say: 'This is good for all of you, go off and do it', you're asking for trouble despite all your good intentions. Instead, give teachers themselves a chance to find ways to enhance education. Position them as the experts in their field. I believe there is much to be improved in that respect in Dutch education. Teachers are often heard to complain that they don't have time to consult with each other. That's wrong. A professional who cannot consult is not a professional. If you as a head teacher do not facilitate consultation time, you do not take your staff seriously.

"We strive to coach schools from the sidelines to give teachers control. Our professorship does not develop the educational content; that is up to the education professionals themselves. We guide the process in that direction. What we are actually doing is designing the future together with the school. In some instances we are an advisor and provide input, but we also try to make tools available to (secondary) education institutions with which they can advance their organisation in order to improve the teaching they provide. In short, we are the link between plan and implementation."

# Who's the boss?

"We carried out a project for several schools called 'Letting lecturers regain control of their field'. They realised that educational development had stagnated in their schools. They made the brave decision to let teachers themselves be the boss of this development. As a result, they encouraged teachers to resume their role as experts.

"This change in thinking calls for an intrepid head teacher. As a principle you care about your school; you feel responsible. That's fine. But you have to realise that you can only fulfil that responsibility if your staff do their jobs properly. Allow teachers to take that responsibility. They may do things slightly differently than you would, but have faith. You will see that teachers take control of their field again. In any case, distrustful types should not become head teachers.

"We noticed that this change empowered teachers. Head teachers also started to professionalise the school environment. Saying that your teachers are professionals should immediately beg the question: what does that mean for your organisation? How do you give these professionals more freedom? How do you interact with each other in a school environment? There is no recipe for that, but as a professorship we like to find ingredients for success in joint collaboration with schools."



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Professional Identity  
in Education



## Mastering language

"Every child learns to read. They learn step by step. Budding literacy occurs roughly between the ages of 0 and 7. This development also occurs in phases, leaps and bounds. Eighty percent of children can relate shapes to sounds they hear, but twenty percent cannot. Those children cannot make the connection between sound and shape. That twenty percent get stuck. They have literacy problems, which then continue throughout their entire school career. We refer to this target group as fundamental dropouts.

"We are now applying a new method in primary schools in Zaandam, which has been developed by the Stichting Platform Dyslexie Nederland (Netherlands Dyslexia Platform). This method is called Alpha bedding. The aim is for the 20 percent who are unable to connect shape and sound to first get to know letters by touch. Our research shows that once they have felt the letters, they are very good at recognising them. They don't learn by phonology, but on the basis of an image they have in their heads.

"With Alfa bedding, we therefore develop word image based on touch and image, instead of on hearing. You notice it when children discover: hey, I can do it! And instead of dropping out, they join in. They regain a sense of autonomy, self-confidence and pleasure, which increases their motivation for language. Mastering language, that's our ultimate goal."



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Early Childhood



# "Give teachers back their sense of authority to act"

## 3.14 Early Childhood - Ineke Oenema

The goal in the Netherlands is for children to advance from group 1 to group 8 as smoothly as possible. However, according to professor Ineke Oenema, this does not take into sufficient account that young children develop in leaps and bounds. Their development seems to stop at times, followed by a sudden, huge jump in their progress. The Early Childhood professorship works on innovations for the development and learning of young children.

"Our education system expects every child to develop along an average line of progression, but actual practice shows that that just isn't the case. You can see in 2.5 to 8 year-old children that they develop in leaps and bounds. Whereas one child might speak intelligibly at 26 months, it might take another child 60 months to achieve the same. Immediately giving the latter target group speech therapy can be inexpedient. Those children are apparently not yet ready in terms of development. Nevertheless, that approach is frequently taken. Teachers are required to draw up complete action plans and keep assessments should a child score poorly. Besides it being a lot of extra work, it also creates a feeling of incompetence among teachers.

"Our professorship focuses on strengthening the position of primary school teachers. Based on our research, we want teachers to be more sure of themselves by providing them with tools for substantiating why they are opting for a different learning trajectory for a certain group of pupils than for others in the group. If they as teachers can substantiate their decision from a scientific perspective, they will get back their sense of authority to act.

"With a Teacher Education for Primary Schools (PABO) diploma teachers may teach groups 1 to 8, which is daft when you think about it because they are entirely different target groups. The professional field is increasingly calling for the PABO to be split again into lower and upper school specialisations. The Education Council too has advised to focus more on two target groups, namely the 0 to 8 years old target group and the 10 to 14 years old target group.

"People are gradually realising that young children are indeed a specific target group, for which a special age cluster should be developed. The Ministry of Education is currently investigating how to shape that kind of cluster. Our professorship is pleased to participate in this research. In fact, that was the explicit task at the start of our professorship: get this discussion going. It is a lengthy process, but I am convinced that this issue would not have been on the national political agenda if we had not initiated this crusade."

# "My dream is a society in which every language matters"

## 3.15 Multilingualism and Literacy - Joana Duarte

We cannot imagine a world without languages. Approximately seven thousand different languages are spoken worldwide, with about forty thousand dialects besides. Professor Joana Duarte speaks eight languages and is committed to holistic language education, with plenty of room for minority, regional and neighbouring languages in the classroom. Language as the key to participating in society.

"The Netherlands traditionally separates students into as many groups as possible: everything and everyone has to be categorised and compartmentalised. We have special schools for public education, Christian education and also specific schools for newcomers. Research has shown, however, that newcomers learn the Dutch language just as well in an 'ordinary' primary school, where different languages are spoken, as in separate language classes or in international transition classes where the students often speak the language of their home country during breaks and already know that it won't be long before they have to change schools. We want our professorship to be seen as an expert in language education for newcomers."

"In that respect, we develop specific training for teachers, as well as for groups that are closely involved in education, such as internal coaches,

teaching assistants and ambulatory coaches. We are also considering school administrators. We focus not only on education, but also on civil servants for language and education policy within the provincial government and on municipalities and organisations such as Keunstwurk and Tryater. We have teamed up with virtually all stakeholders involved in education to jointly provide training, organise reflection days and workshops and provide digital information."

"The most concrete products we develop are our toolboxes for multilingual education for schools. More and more of our products are digital products. As an example, we have developed an augmented reality game for primary school children. In this game, a figure called Babel has had an accident. He fell and consequently has forgotten all the languages he was able to speak. The children have to help Babel to find parts of his language memory in different worlds. In that context, they are given assignments in the various languages that are represented in the classroom. As a teacher you can select the languages that occur in your class and encourage the children who speak those languages to participate. Every student is needed to help Babel. This adds value to multilingualism."

"We intentionally decided on a holistic approach, avoiding having to compartmentalise every student. For example, students are not characterised as newcomers who do not yet have a good command of the Dutch language, but as children who have a very good command of another language. Our positive approach ensures a more positive view of multilingualism. My dream is a society in which every language matters."



# Through different lenses

"In collaboration with Information Technology students from Emmen, we have developed an app to promote receptive multilingualism in border regions, in which the users wear VR goggles, which helps them to overcome the barrier to speak a foreign language. Many students in secondary education, and especially in intermediate professional education, suffer from foreign language anxiety. They don't speak a language well enough to dare to use it. Those languages are often German and French. Students learn these languages at school, but only really use them at work, for example in the catering industry or in the tourism sector. There is a big gap between these two environments: practising your sentences in the classroom or actively using them at work."

"With the app and the VR goggles you can practice very realistic situations. Someone comes in and speaks to you in a foreign language. You can practice in a safe environment until you have developed the confidence to actually speak the language in actual practice. This app with the VR goggles still focuses on French and German, but you could also use it for receptive multilingualism and foreign language anxiety among newcomers, by having them practice the Dutch language."

"Together with the Friesland College, the Serious Gaming professorship and the Information Technology programme, we are considering whether we can seriously develop the app to include more languages. We also want to include pronunciation. That is a huge innovation for Google Translate, because when it comes to recognising different pronunciations, there is still so much more that can be achieved in the world of languages."





## The strength of a soft landing

"In collaboration with Maastricht University, we seek answers to the question as to how companies can attract and retain highly educated foreigners for a prolonged period of time. We see that highly educated foreign employees are very willing to come to Drenthe and Limburg, but after a while prefer to switch to a company in the Randstad, the urban agglomeration of the Western Netherlands. As a result, companies in Limburg and Drenthe not only lose those employees, but also the knowledge, time and energy they invested in them.

"The question we are researching is: how can a company ensure that it can keep these international employees for a longer period of time? For this research, I am working with about twenty students from Emmen and Maastricht to monitor a number of companies in both regions with foreign employees in their workforce. Based on interviews, we discover how these companies attract highly skilled foreign workers and help them to integrate.

"The aim of this project is to develop tools for companies to retain international staff for longer periods of time. Examples include a manual containing practical tips, such as help to build a personal network in the region together with the employee. Proper integration of the employee's family and things like suitable housing must not be left wanting either. The research has not been completed yet, but a soft landing already seems to be crucial for a successful and long-term working relationship."



International  
Entrepreneurship





# "We do not conduct research only to be mothballed"

## 3.16 International Entrepreneurship - Mariska van der Giessen

Down to earth, modest and proud of their native soil; that is the image people have of northerners. What they often forget to mention is the fact that entrepreneurs in the Northern Netherlands are very good at doing international business and are not afraid to push their limits. Professor Mariska van der Giessen and entrepreneurs together seek new international opportunities.

"Our International Entrepreneurship professorship conducts research into four theme lines: entrepreneurship, import and export, international skills and knowledge, and international cooperation. People, companies and regions: all research projects that we undertake must meet at least two of these three pillars. I view regional issues from an international perspective. My aim is to ensure that this professorship conducts research projects that will benefit the region and, ideally, the rest of the Netherlands. We do not carry out projects only to be mothballed, but only research that is truly needed.

"At the request of municipalities, provincial governments, sector organisations and business clusters we assist with practical advice, suggestions and tips. Take, for instance, a programme for improving

entrepreneurial activities in a province, a quick scan for a city centre with respect to circular entrepreneurship or improved tools for international entrepreneurship. Furthermore, I am constantly alert to the fact that such issues should not be tackled for one party only. We do not conduct research for a specific company, but for an industry, sector or group. Consequently, our advice always applies to and can be used by several parties.

"Our research must have impact in the region. That is why, as a professor, I strive to be as visible as possible to the outside world so as to hear of issues and concerns that affect companies. Actually, our professorships that work with stakeholders and companies in the region need a kind of 'front desk' within the university of applied sciences, so that companies can always turn to us. This desk should know exactly which professorship can tackle a particular research issue. We know from experience that in order to generate regionally relevant research topics you first need to build an external network. But as a cooperation partner in the region I have to create that visibility and trust myself.

"I see myself as a connector working on research from the outside in. For example, I regularly sit down with provincial policy makers, thus fulfilling the role of go-between for both the government and the companies and networks in the region. Entrepreneurs consider me a kind of link between them and the government in bundling and communicating their wishes and obstacles, because in many instances there are no direct lines between government and entrepreneurs. This is an important role and opportunity for many professorships, but also for universities of applied sciences in general."

# "I have the peculiar habit of always viewing society from a people perspective"

## 3.17 Personal Leadership & Innovation - Jelle Dijkstra

The days when employees were able to solve problems on their own are now a thing of the past. In this increasingly complex world, we must be able to view issues from various angles. Multidisciplinary collaboration is a new and ubiquitous key phrase. Professor Jelle Dijkstra's mission is to find out which competencies professionals need to develop in order to collaborate effectively with professionals from other disciplines.

"People are naturally inclined to solve problems as quickly as possible, preferably by themselves. The transition to co-creation, in which multiple disciplines develop and test a prototype from different angles before proceeding to the final solution of the problem, requires that employees have different skills. Our mission within the professorship is to develop a competency model, which describes what you need as a professional to work in multidisciplinary settings.

"In order to discover which competencies are required, we look for lessons learned from case histories. Take the Chemie-Pack fire that blazed in Moerdijk on 5 January 2011, during which large quantities of chemicals were emitted into the air. All sorts of things went wrong between the various

disciplines while combating the fire. We conducted an in-depth evaluation on this case, which we published in the journal *Bestuurswetenschappen* (Public Administration Sciences), for instance, and in the Handbook of Integral Safety, which we use in our safety training courses. We also develop practical tools ourselves for conducting research into the competencies that are needed for working in a multidisciplinary fashion.

"A good example here is the escape room that we use to see how groups behave under time pressure. We investigate which competencies are conducive to working well together and which competencies actually have an adverse effect. As a result, we discover various decision-making and leadership strategies, all of which can be successful under certain conditions. We share this information with our partners. Organisations want employees to take more responsibility, but the question is whether every employee is suitable for that. In other words, which competencies do you need in a self-managing team? The business community as well as governments have shown a lot of interest for support in this transformation process.

"I have the peculiar habit of always viewing society from a people perspective. But we are living in an increasingly economy-driven society. And so I wonder how we can give the people factor more weight. I believe this is a necessary shift in thinking. Our professorship connects all those involved in this transition in one way or another. I firmly believe that this is a very important role for our professorship. More focus should be laid on people, rather than money."

# The escape room unravelled

"In the escape room project, we study the actual behaviour that participants demonstrate as compared to how people describe their own behaviour. They complete a questionnaire containing about sixty questions in advance, from which we can deduce their level of leadership, as well as other competencies, such as communication skills and their ability to deal with power relations.

"One thing we have learned is that if there is one leader in the group, you have about a fifty percent chance of successfully getting out of the escape room. If there are two leaders in the group, the chance is more than eighty percent. But beware: the leaders must have complementary talents; they must be complementary to each other. If they have the same talents, the chance of a successful escape is reduced to almost zero percent.

"Another very interesting aspect in this study is 'dormant leadership'. Someone demonstrates no leadership behaviour at all in a normal situation, but in one particular assignment that person suddenly takes control. Based on what you normally perceive in practice, you would never appoint that person for a leadership position, but that person turns out to be the best leader in a certain context, such as in a crisis situation. These are all results that partners in the professional field can benefit from."



Personal Leadership  
& Innovation



## Jobs of the future

"How can you, as a company, prepare for jobs of the future? That is the key question within the Change Gear project that we conduct for various companies in the logistics sector. At first glance, logistics may seem to be an unchanging sector, but nothing could be further from the truth. Especially in this industry there are plenty of innovations to deal with. The trick is to involve employees in these new work and organisational practices.

"Especially when changes are made to people's job content, you have to collaborate and give them time to deal with those changes. This requires employees with a learning attitude. Employees who

like to do their job and strive to do it well, but also who are willing to learn new things. At the same time, this requires that management makes a suitable offer in return, such as in the form of courses or further training.

"More and more entrepreneurs are discovering they can no longer act like a lone wolf, but that they must seek (knowledge) partners and even start taking a cross-company approach. That is why we set up learning communities in this project with transport companies. It enables them to share knowledge and adopt each other's good practices. Together we are advancing toward the jobs of the future."



**Futureproof Entrepreneurship:  
Professionals with Impact**



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# "Our professorship aims to give people in the workplace a voice"

## 3.18 Futureproof Entrepreneurship: Professionals with Impact - Jacqueline Rietveld

City farmers, influencers or data architects; these kinds of jobs simply didn't exist a decade ago, but today plenty of improvement managers and disruptors work in well-established companies. Our jobs are changing. How can management anticipate these changes and how can you ensure that your employees will go along with them? That is the central issue that professor Jacqueline Rietveld is tackling.

"How can we train people for the future? Where can we find new employees? How can we ensure that we don't lose knowledge in the workplace when employees retire? We help companies in the region to address such HR issues. Our students immerse themselves in these companies for several months, tailoring their research and design process to that of the company. Students drive along in a lorry or stand behind the counter. Because they are there on normal working days, a process starts up with everyone actively providing input.

"We focus on small businesses in the region that don't have an HR department. These SMEs face the same major changes as large multinationals, but have less capacity to deal with them. Not involving people in the workplace in these transition issues is a major pitfall for organisations and companies. Changes and improvements are often conceived in a staff department and then communicated top down, short-changing people in the workplace. It is precisely those employees who have an enormous amount of practical knowledge and see opportunities that others can't. Our professorship aims to give people in the workplace a voice.

"Participation is the common thread throughout our professorship. The people in the workplace - our respondents - are active stakeholders of our research based designs. Most are not used to being allowed to provide input on their own future of jobs. We want to bring the knowledge of the workplace to light and communicate this knowledge to management in well-worded terms. Our mission dovetails perfectly with the democratisation process that is currently going on and with the pursuit of an inclusive society. Involving your employees in your change process is hugely beneficial.

"Our goal is to interconnect small entrepreneurs and knowledge institutes, so that learning communities can start up. In fact, there are even cross-sectoral collaborations. It's the way to go. As a director, don't wield power from your ivory tower, assuming you know how things work. Only together can you take on the future."

# "This applies not only to top companies, but above all to the followers"

## 3.19 Purposeful Entrepreneurship - Aleid Brouwer

Our society is increasing its focus on sustainability, circularity, and on involving those people in society who are at risk of exclusion. These are major themes that should be addressed by entrepreneurs as well. Professor Aleid Brouwer helps companies in taking their first step towards Purposeful Entrepreneurship, which includes sustainability, inclusiveness and transparency as key elements.

"We want SMEs in the Northern Netherlands to be more future-proof. Future-proofing encompasses many themes. One example is employees who also act as informal caregivers: how should you deal with them? Another example I can mention is working with people who have some kind of baggage. But also, how can you turn your business processes into circular processes? We also focus on digitisation: how can you ensure that your company is easy for customers to find online? In a nutshell, we focus on all issues surrounding themes pertaining to ecosystems, sustainability, inclusivity and digitization.

"Many small entrepreneurs find it difficult to change course and prefer to stick to the same old same old. They run the risk of missing the boat. By responding to emerging trends and requirements, you can ensure that you become future-proof. But that requires taking a different approach, handling profit differently or viewing business models from a different perspective. Some companies have no trouble in those respects, but others still struggle. We assist them with tools, advice and workshops.

"I maintain close contact with regional entrepreneurs to know what is going on in the region. All kinds of research questions emerge as a result. For example, I conduct research into co-working spaces in Leeuwarden. How pleased are people with the 'new work practices'? And does your company still have any team spirit left with everyone working externally? I also examine the effect of these co-working spaces on their immediate surroundings. Do lunchrooms or restaurants get any extra patronage from all those people who work externally and want to have lunch? The trick is to scrutinise these matters from all angles.

"I involve students as much as I can in our research projects. Our goal is to turn out discerning students who do not proceed from threats, but from opportunities. Value-oriented professionals who do not immediately think in terms of money when it comes to value. We strive to train people who see possibilities to maintain the learnability of SMEs in the Northern Netherlands and keep those SMEs viable by actively responding to questions that arise in the workplace. This applies not only to large top companies, but above all to the smaller followers. Small followers are the backbone of our economy."

# Digitisation of Drenthe as a tourist centre

"Whether booking a holiday or searching for a weekend getaway, everything is done online nowadays. Most tourism entrepreneurs have a website, but we have noticed that that's all they have. They are hesitant to take the next step towards doing digital business. Our 'Digitisation of the tourism sector in Drenthe' project helps them get started. How can you use your website to collect interesting data and how can you apply that data to your day-to-day business and future plans?"

"We started by taking an inventory and then noticed three different things. Larger tourism companies often outsource digital matters, mainly because they lack time and knowledge. Smaller companies, however, simply do not have enough manpower to free up time for digitisation efforts. And lastly, some companies still believe that digitisation is unnecessary: 'I can't be bothered'. This group might be dwindling, but they're still out there."

"With this information in hand, we started organising workshops tailored to the extent to which the company has digitised. We give SMEs tips and tricks in these workshops, but also get straight down to digitising. This is typical professionally oriented higher education research, i.e., while researching something, you also provide immediate assistance. Rolling up their sleeves is exactly what this target group loves doing."



Purposeful  
Entrepreneurship



Green Logistics

## Less is more

"We humans consume too many raw materials and too much energy to maintain our standard of living. In the Netherlands alone, we use the equivalent of 3.5 planet Earth. This has major consequences for our planet and our future. The government has consequently conceived the ambitious plan to be a circular economy by 2050. But the government stipulates what we as companies should achieve, not *how*, so that's a big challenge.

That's where our knowledge and guidance come in.

"Together with these companies, we look for ways to optimise their production chain. We have developed a performance measurement system for this, which gives companies an insight into the amount of wasted materials and energy. We provide real-time data regarding opportunities and energy and materials wastage. What causes this wastage and can it be prevented? We can then roll out this knowledge to similar companies in the industry.

"A good example is a steel company that requested our help. An energy-guzzling machine in the production hall stood idle for an hour every day during the operators' lunch break, but still consumed gas even when not in use. We ultimately managed to get the operators involved in this improvement process, and now they no longer take breaks at the same time. This means that the machine can be turned off earlier on Friday afternoon and both energy and money are saved."



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# "Why are we so obsessed with possessions if they don't make us happier?"

## 3.20 Green Logistics - Matthias Olthaar

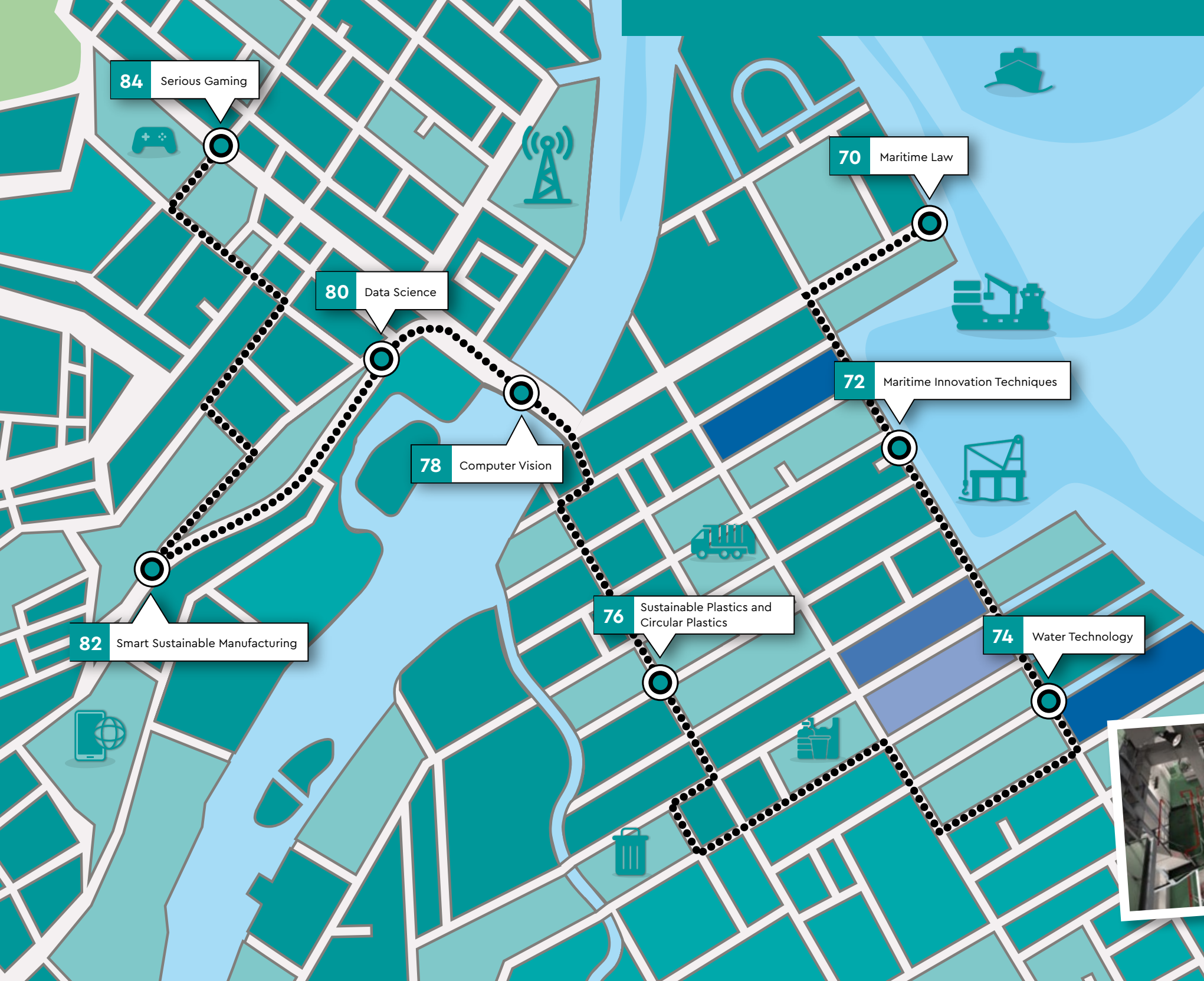
Errors in the production process causing the destruction of brand new goods; excess stock that spoils; short life cycle products that cannot be repaired. These are all examples of waste that the Green Logistics professorship aims to combat. Working together with companies, Professor Matthias Olthaar aims to seek other forms of efficiency, bearing cost savings as well as waste prevention with respect to materials and energy in mind. The modern form of less is more.

"We focus on sustainability in logistics, i.e., the optimal management of goods, information and money flows. Our mission is to ensure that every action in the production chain ideally contributes to value creation for the end user and value retention of materials. It sounds complicated, but actually it's quite simple. Many things cost money, but do not necessarily contribute to value creation. So you waste materials, time, money or talent, without improving your product. We aim to prevent this kind of waste by optimising processes.

"In order to optimise processes, logistics people must adopt an attitude of continuous improvement. Furthermore, production processes can be organised in such a way as to make products that last longer. This goes against current 'planned obsolescence' practice. Many manufacturers deliberately manufacture products that last several years and then have to be replaced. No longer providing software updates is an example of planned obsolescence. Many manufacturers take that approach, wasting unnecessary amounts of materials.

"After optimisation and extending the life of products, the next step is to take a critical look at what we really need. A big house, a good income and a new car are all status symbols in our Western, materialistic society. They are all things by which we measure our happiness. However, science shows that once we reach a certain income level, our happiness no longer increases. The key factor for happiness is not how much you earn or how big your car is, but maintaining good relationships with others.

"We can organise the economy better by consuming less, but the key to success is asking ourselves what really makes us happy and what actually contributes to our quality of life. We need to start wondering why we are so obsessed with possessions if they don't make us happier. This means that we must first take a critical look at what we need in terms of goods and services for achieving a good quality of life. Then we have to organise the production processes in such a way that we make smart use of materials and energy so as to prevent wastage. And lastly, we must ensure that renewable sources are used to produce the materials and energy."



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## 4. Smart Sustainable Industries



Water



Circular Economy



Smart Technology



Creative Industry

What technologies do we use to provide the growing world population with water? Which smart applications can we use to recycle plastics? What is the added value of robotics for people and society? Within the Smart Sustainable Industries focus area, we focus not only on the development and uses of smart technological solutions, but also on the associated social and economic aspects.

### Water

The water theme centres on water technology and maritime issues, such as the question as to how we can provide the world with clean water, or the question as to the impact of autonomous sailing on international laws and regulations.

### Circular Economy

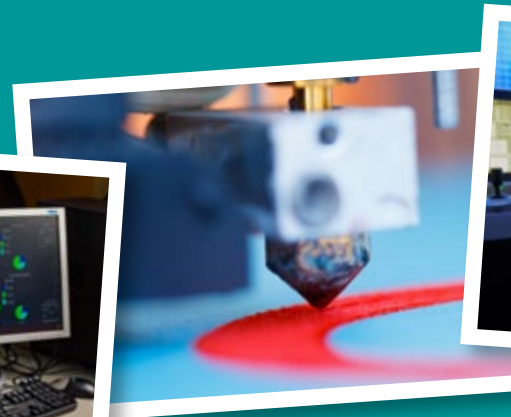
The Circular Economy theme focuses on the transition to a sustainable and circular economy. We focus on reducing harmful emissions, energy consumption and harmful materials.

### Smart Technology

Within Smart Technology we work to improve enabling technologies for all top sectors, so that the use of cameras in combination with artificial intelligence can improve the quality control of products and services.

### Creative Industry

The Creative Industry theme centres on creative business. Our focus includes Media Literacy, meaningful communication by citizens and organisations via social media, smart and ethical use of social media and 21st century skills.







# North Sea Wrecks

"You may not realise when walking on the beach or taking a dip in the ocean that there are still plenty of wrecks with ammunition on board at the bottom of the North Sea and they pose a real explosion hazard. Furthermore, ammunition starts leaking after a few decades, with the risk of harmful substances seeping into the seawater. On behalf of OSPAR - an international cooperation committee that aims to protect the maritime environment in the northeastern Atlantic Ocean, including the North Sea - I am working on an analysis model to identify the risks of all these wrecks.

We first collected data on the wrecks in the North Sea with our training ship Octans. We also conducted historical research in various archives and unravelled the story of each wreck. How long has the wreck lain there? How many torpedoes did it fire? How many tons of diesel are still in the ship? We performed a risk analysis for each wreck, using colours. Red for 'clean up immediately', orange for 'monitor' and green for 'safe'."

"In this North Sea Wrecks project, we are drafting a new international policy for countries to manage the risks of wrecks and ammunition in the North Sea. As far as risks are concerned, it is irrelevant which nationality a wreck belongs to; the cargo is what's important. I expect to be able to present our proposal in the autumn of 2021."





# "I want to lift the fog in the legal landscape to enable maritime innovation to proceed"

## 4.1 Maritime Law - Welmoed van der Velde

The maritime sector has long been one of the most international sectors in the world. The same applies to maritime laws and regulations. Professor Welmoed van der Velde willingly immerses herself in the complex subject of Maritime Law, with the aim of clearing the way for new maritime innovations. It's donkey work that constantly requires finding the middle ground between law and technology.

"I conduct applied research at the interface of maritime law and technology. Take, for example, the innovation of navigating a ship with fewer people on board. The first matter I am investigating is whether this is allowed under current laws and regulations and if not, how the law can be changed. I mainly investigate what is laid down by national, European and international laws and regulations. Where can you find these rules and how can you change them?

"The sustainability issue is a hot topic in the shipping sector. Shipping must be safer, cleaner and more efficient, but how will we manage to do that?

For example, I conduct research together with students into the stricter fuel requirements that have been in place since 2020. How can you meet those requirements with a different kind of fuel? Or you can literally and figuratively carry a press of canvas, such as a folding sail in a container, which you can place anywhere on deck.

"Herbert Koelman's Maritime Innovative Technology professorship and my professorship together make up the Maritime research group. This combination of technology and law is unique and works very well. Most times, you are bound by laws and regulations when introducing maritime innovations. You have to ask yourself with every invention whether it is allowed. Innovations often grind to a halt because laws and regulations do not yet provide for them. As a professor, I try to lift the fog in the legal landscape to enable technological innovation to proceed. The legal side should not be an obstacle, but should be facilitating. I aim to show how that can be done.

"We collaborate with students in all our research projects, totalling about a hundred a year. I don't conduct any research without involving students. That would be very boring. Maritime students work together with law students and bachelor students collaborate with master students. That is our strength: we are a very multidisciplinary professorship. That's inevitable actually, because maritime issues are by definition international issues and require cross-border solutions and laws and regulations."

# "We make sure that the Dutch shipbuilding sector does not miss the boat"

## 4.2 Maritime Innovation Techniques - Herbert Koelman

The Netherlands and water go hand in hand. It's for good reason that our ship and yacht builders are highly regarded around the world. Despite our age-long excellent track record, it is especially important nowadays to stay on board when it comes to new developments in the shipping sector.

Herbert Koelman and his Maritime Innovation Techniques professorship is making sure that the Dutch shipping sector does not miss the boat.

"More economical navigation, lower emissions and as little impact on the environment as possible: these are the challenges that the shipping sector faces today. We have joined forces with partners from the professional field to examine new maritime technology in everything related to sailing and navigating, from ship design to computer simulation. Our strength lies in our close relationship with professional organisations, such as shipyards, shipping companies and the navy. We know what the problems are, recognise the issues and seek solutions together with the professional field.

"The overriding issue in the shipping sector pertains to the question: how can we sail better and more economically? We also examine the impact of ships on the environment, which in some cases is quite surprising. Nowadays, everyone is aware of the ill-effects of soot and CO2 emissions and the damage caused by containers after being swept overboard. However, it has recently been discovered that the noise ships make is a source of disturbance to marine life. Our ultimate goal is for the shipping sector to leave not a trace of its presence behind.

"Together with our partners from the professional field we develop design methods that can be used for designing new ships. A simulator is a good example here, as are calculation formulas, design models and computer programs. The aim is for the professional field to immediately start using our products to improve their ships. We therefore provide useful building blocks that the sector is keen to use. This applies to our products, but certainly also to our students.

"We train young people who have knowledge of today's maritime technology. Companies benefit directly from this. The Dutch maritime sector has a huge demand for students who are familiar with innovative products as they enable Dutch companies to compete on the international stage. The maritime world is by definition international and to remain in the race you have to stay ahead. Our Dutch sea legs come in handy here."

# Flow of information

"Water depth, fuel consumption, engine power, air pressure: virtually everything on board ship is measured with sensors. Only the question is: what do you do with all that data? What do you want to use it for? In the Transferring Operational Data into Design Information for Ships (TODDIS) project, we aim to use this information to continuously improve new ships."

"The temperature on board gas tanker ships, for instance, is measured in many places. At the moment, this practice is primarily intended as a safety measure, but you can also make other use of this data. For example, gas must be kept at a certain temperature while being transported over water and so it is cooled along the way. The temperature is often kept lower than required, which is a shame because it is an unnecessary waste of energy. By studying the temperature data, you can determine the perfect temperature."

"This kind of on board data can be used for many other purposes. Take, for instance, the deformation of the ship's hull due to high waves. By measuring the distortion, the resulting data can be linked to a so-called lifespan model. Consequently, the shipping company will know exactly when a ship is due for maintenance. Within this project we develop calculation programmes, formulas, computer programs and simulators to help designers design even better ships."



## TOUR GUIDE

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Maritime Innovation  
Techniques





# The importance of water in Plastic Recycling processes

"Plastics reduction and recycling is a worldwide concern.

Washing is an essential step of the recycling processes because it influences directly the quality of the final product. During the washing process, miniscule particles of all kinds of waste materials are released into the water. Those particles can be filtered out again to allow a reuse of the water. But even more interesting is the question as to whether we can reuse those particles as well for a new product, for example.

"Wageningen University & Research, our Circular Plastics professorship, various companies and waste processor Omrin have joined forces to investigate the quality of the waste water in plastics recycling systems. The characteristics of the water after washing differs per type of plastic. Foils have more organic in it, whilst PET bottles, for instance, present more sugars. To understand this relation is very important to know how can we make the whole process more circular.

"In most cases, however, all kinds of plastics are washed together, this is not ideal. Therefore, a pre-selection of plastics, to allow individualized washing is necessary. That calls for the knowledge of our Computer Vision professorship. With their hyperspectral camera they can identify the types of plastic, resulting in better waste separation, better plastics recycling, better washing step and better water purification. Optimised recycling."



## TOUR GUIDE

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Water Technology





# "Our mission is to support, share and create water technology expertise"

## 4.3 Water Technology - Luewton Agostinho

Leeuwarden can proudly call itself the Capital of Water Technology.

Besides plenty of water, our province also boasts plenty of water

knowledge provided by the Water Campus Leeuwarden. The Water

Technology professorship is the bridge between knowledge and

actual practice. Under the expert guidance of professor Luewton

L. F. Agostinho, researchers delve into issues related to physics-

driven water processes and water technologies.

"How can we ensure that we don't needlessly waste our water? And how can we use sophisticated techniques to provide the growing world population with water? Our professorship is delving into these questions. Our expertise lies in the field of drinking water and wastewater treatment systems, the relationship between water and electricity (High Voltage) and the production and detection of nano-microparticles in water. In this respect we use physics-driven water processes and water technologies based on physics principles such as thermodynamics, ultrasound and electro-hydrodynamics.

"We strive to link our research questions to the region in which we live and work on. The current European strategy demands mainly the implementation of climate and energy-neutral water systems: systems that emit fewer greenhouse gases. And this is a strong focus of our group.

Another matter we focus on is the circular economy and the role water plays in that economy. An example here is water that is used to clean plastics during recycling. How can we improve the washing cycle, can we recycle the wastewater as well as the plastics? We are looking into such questions in collaboration with several universities and companies.

"The Netherlands has huge amounts of water, unlike many other countries. That is why we are committed to developing new technologies for countries where water is scarce. In collaboration with a local authority in Brazil, we have initiated a project to create water sources in remote areas that lack water due to natural conditions or desiccation. People consequently move out of those areas. One of the ideas that has now emerged is to use a so-called Air to Water System, with which water can be extracted from the night air. Although not in large quantities, it could be an option for small communities.

"Because we collaborate with Wetsus, the European Centre of Excellence for Sustainable Water Technology, we have one joint high voltage laboratory in which we focus specifically on new innovative water technologies, for which companies specifically come to us. As an example, we have developed a system which can improve the efficiency of liquid-liquid extraction systems for metal recovery. This is very interesting for metal companies that use water during their production processes; this system enables them to selectively remove metals from waste water in a very sustainable way. Because no matter what water is used for, it must ultimately be treated as a valuable resource, a human right and as an immense opportunity for science and business. This is the principle which drives our group."

# "We are always up for new things"

## 4.4 Sustainable Plastics and Circular Plastics - Jan Jager and Rudy Folkersma

Plastic is a hot item nowadays. The term plastic increasingly has negative connotations, whereas plastic is a fantastic material to work with, argue professors Jan Jager and Rudy Folkersma. In fact, a life without plastic is unimaginable in this day and age. The two professors are jointly committed to a circular economy with sustainable plastics.

"In 2011, we implemented the Sustainable Plastics professorship, which centres on developing and researching biodegradable and bio-based plastics. So we were already zeroing in on social developments. Looking back over the past few years, you can see that interest in recycling has boomed. Recycling is in the spotlight, partly due to the central government's aim to be 100% circular by 2050. That is why in 2016 we implemented the Circular Plastics professorship, centred specifically on the recycling of plastics.

"Within the Sustainable Plastics professorship we focus on applying new bio-based plastics. How does nature break down plastic and how can we control that disintegration process? If we can manage to control it, then surely we can consider the use of a certain type of plastic and what properties it must have. Take biodegradable plant pots, for instance, or

biodegradable plastics for agricultural applications. We are also developing biocomposites with impressive results. As an example, together with companies and other knowledge institutions we have built a biocomposite bicycle bridge in Ritsumasyt and the Tiny House in Emmen.

"The Circular Plastics professorship is mainly concerned with mechanical recycling, i.e., recycling plastic waste products into a suitable raw material for a new product. We do this in close collaboration with the Computer Vision professorship and companies in the region, such as waste processing companies Omrin and Attero. Together we are perfecting the separation of different types of plastic, ultimately resulting in a pure waste stream that can be used as raw material for a new product. If mechanical recycling no longer suffices because the waste is too polluted, we prefer chemical recycling. We also consider the next step: what can you do with these recycled plastics?

"As a university of applied sciences, we have become an expert in the field of plastic recycling and sustainable plastics in recent years. We should expand that role so as to become the centre of expertise in the Netherlands. Our main goal is to share our knowledge. Fortunately, we can see a growing interest among young people. We ourselves are too old to solve the current plastic problems, but we can inspire young people in our lecture hall to take on the challenge. We want to use our knowledge to inform the decision-makers of the future, so that they can choose the right course of action when it comes to plastics."

# Bridge to the future

"By order of the province of Fryslân and the municipality of Leeuwarden and in collaboration with companies and other knowledge institutes, we produced a biocomposite bicycle bridge in Ritsumasy. Biocomposite is pressed sheet material that we make from natural raw materials such as reed, flax, hemp and resin. We had previously built a biocomposite solar boat and a drawbridge for the zoo in Emmen. But making such a large object from biocomposite was a challenge for us. Fortunately, we are always up for new things.

"We did not build the actual bicycle bridge, but carried out all the required research behind the scenes. To test how the material will hold up in the coming years, the bridge is equipped with all kinds of sensors that generate data. We use this data to improve biocomposite and to test new applications. So the bicycle bridge is just the first of many more applications to come.

"The construction sector is fairly conservative when it comes to their choice of materials. To inspire and motivate builders to opt for other materials, we recently built a Tiny House in Emmen entirely from sustainable materials to demonstrate what is possible. But it will take time. With the bicycle bridge and our Tiny House, we hope to have built a bridge to the future."



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**Sustainable Plastics and  
Circular Plastics**







## Computer Vision

# Gut feeling

"The medical world has traditionally often used images to make diagnoses and draw up treatment plans. Cameras are increasingly used during surgery to translate images on the spot into usable knowledge. Interpreting the images remains the responsibility of the surgeon or medical specialist. We are working on a camera that gives the surgeon advice based on images during abdominal surgery.

"Together with LIMIS Development B.V. and Medical Centre Leeuwarden, we have developed a camera and a software prototype, which provide surgeons with real-time advice during surgery. This camera measures the blood flow of the tissue during abdominal surgery. Based on this data, the surgeon can determine the quality of the tissue adhesion. The main aim is to prevent complications.

"Our professorship acts as advisor for the further development of the product. Colleague Klaas Dijkstra has been involved in this innovative approach to surgery right from the start. That is the strength of our professorship. We are at the forefront and that's essential in our field. Innovations occur in such rapid succession that you can't wait for knowledge to be published in a book."



## TOUR GUIDE

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# "You can't wait for new knowledge to be published in a book"

## 4.5 Computer Vision - Jaap van de Loosdrecht

Many decisions made today are based on images. Take the medical world, for instance, where doctors study x-rays to diagnose a tumour. Cameras are also widely used in the industrial sector. And of course, the careful viewing and interpretation of camera images is essential in security. Professor Jaap van de Loosdrecht and his Computer Vision professorship focus on the entire spectrum.

"The core business of the Computer Vision professorship is to automate visual testing. Good examples are conveyor belt images of products that need to be inspected, or images for giving real-time advice to a surgeon during surgery. We have been using artificial intelligence right from when the professorship was established in 1996. We work closely with the Data Science professorship in the field of deep learning. Furthermore, we are the proud joint owners of the Deep Frisian, a computer with unprecedented computing power.

"Our research centre has a huge arsenal of smart cameras, ranging from hyperspectral cameras to thermographic cameras and cameras that can precisely measure distances. We specialise in hyperspectral imaging.

Hyperspectral cameras analyse a wide spectrum of light and can therefore recognise a greater range of colour nuances. Ordinary cameras take pictures in the three primary colours, namely red, green and blue. We have cameras that have no fewer than 224 colours instead of three, and can also take pictures in invisible light.

"The medical world, industry, chemistry, logistics; artificial intelligence is used in all top sectors in the Netherlands to extract information from images. As a professorship, we develop solutions that can be applied by all these top sectors. We call this Enabling technology. The government has launched the NL AI coalition programme to stimulate artificial intelligence in business. We are honoured to be part of this programme in which we focus specifically on imaging data. After all, that is what we specialise in.

"Besides the top sectors, increasingly more organisations and institutions are using artificial intelligence. Together with natural history museum Naturalis in Leiden and several universities, we are developing an app that recognises flowers, plants and animals. By taking a photo of a plant, for instance, the app will tell you what the plant is. If the app cannot pinpoint the plant, it will ask you to take another photo, for instance of the underside of the plant. The app uses explainable artificial intelligence. We can apply this technology in the medical world as well. When you develop an image data system that helps a doctor to detect cancer, you want the system to continuously monitor itself and also provide an explanation on the basis of which the doctor can make a decision. You certainly don't want to make any mistakes in healthcare."

Data Science



## A closer look at plastics

"PET, PP or PE: These three different types of plastic - also called polymer types - cannot be distinguished from one another with the naked eye, whereas sorting is an essential part of the recycling process. The purer the waste stream, the better the end product. Working together with colleagues from the Circular Plastics professorship, we have developed two sophisticated camera systems that can identify types of plastic, namely a visible light system and an infrared system.

"It takes both cameras only a split second to differentiate the types of plastic based on different wavelengths in the infrared spectrum. By placing the plastic packaging material under the camera it immediately identifies the polymer type involved. It is as simple as scanning a product at the checkout counter. The system takes things a step further, in that it is self-learning. This creates an enormous database of knowledge, which we use to produce the purest possible recycle.

"Both cameras are housed in the Mechanical Recycle Lab. Here, students, lecturers and researchers lay the foundations for the most refined recycling of plastic packaging material. Combining our knowledge with other professorships creates interesting crossovers that benefit the professional field."

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# "I believe that future generations will study data science at school"

## 4.6 Data Science - Ioannis Katramados

We live in a time of Big Data; retrieving and using information from large amounts of data. Photographs, but also images and satellite pictures, for instance, abound. It is impossible to check all these images manually. Ioannis Katramados, professor of Data Science, conducts research into the use of artificial intelligence. How can we make this huge amount of data work for us?

"Data Science is all about analysing big and small data. We focus on developing state-of-the-art technologies and innovative solutions for processing this data into useful information. We centre our attention on image data. That is why we work closely with the Computer Vision professorship. Together we constitute the Computer Vision and Data Science research centre, focusing on deep learning and hyperspectral imaging.

"Our professorship specialises in deep learning, an automated, learning method modelled on the human brain. You teach the computer to recognise things by entering innumerable examples. Whereas we used to

take a conventional, statistical approach to image analysis, we are now increasingly switching to deep learning, for which we use our Deep Frisian supercomputer. This computer has more computing power than a hundred standard PCs combined.

"As a research centre we were among the first experts along with Computer Vision to transition from ordinary conventional pattern recognition to deep learning. Our research into the inspection of potato fields is a good example here. Our hyperspectral cameras can detect diseased potato plants. We use a drone to photograph every millimetre of the potato field. The drone's camera can immediately recognise whether a spot on the leaf of a potato plant is evidence of the fungal infection *Alternaria*. This information is passed on to the arable farmer, who can then take appropriate action.

"Deep learning applications like this are growing by the day. We are moving towards an increasingly data-driven society. Data science is becoming an essential part of life. That is why we provide companies in the region with advice to make data work for them. Many of our innovations originate from a company in the region and are subsequently rolled out on a large scale, making them suitable for colleagues and other sectors. It is our duty as a professorship and university of applied sciences to train professionals who know what to do with this data. In fact, I believe that future generations will study data science at school, just like they do math and languages."

# "In the future, we will not readily accept that our products are made in China"

## 4.7 Smart Sustainable Manufacturing - Wilbert van den Eijnde

Digitisation and automation are indispensable in the manufacturing industry. Exploiting the opportunities that these new work practices provide and capitalising on all available data arising from these opportunities, creates a completely new playing field for businesses and researchers. Associate professor Wilbert van den Eijnde and the business community are discovering the possibilities and challenges that this fourth industrial revolution has to offer.

"We help companies make their production processes more sustainable, focusing on the use of smart technology, minimising environmental impact, saving and recycling raw materials and on how to provide workers with safe and meaningful work. That triad is reflected in our research pillars: smart production technology, tailored education and reduction of waste.

"Based on our first, technology-driven pillar, we help companies make their production process smarter. As an example, we equip robots with sensors and analyse the collected data so as to make them smarter.

Working smarter also applies to employees, who have to adapt in synch with this continuous change process. In fact, experts say that in ten years' time, seventy percent of all current jobs will no longer exist. Based on our second pillar, tailored education, we focus mainly on the question as to how to retrain and upskill the professional field. Based on our third research pillar, we seek solutions for improving the sustainability of production processes.

"The term automation has long had a negative connotation. People lost their jobs because manual processes were gradually taken over by robots. But realistically speaking, automation is indispensable. Especially in the northern countries we are dealing with substantial lower employment figures. I also predict that sustainability will play such an important role in the years to come that we as consumers will not readily accept that our products are made in China. Consequently, we ourselves need to buckle down.

"The shift to local production requires that regions employ people who have the knowledge and skills to actually produce those kinds of products themselves. We must therefore do our utmost to keep enough people, including students, interested in technology. Our professorship plays a crucial role in this respect. We help companies find solutions for producing these products in a smarter way and for retaining knowledgeable employees. Tailored education is essential in this respect."





# Plastic welds

"Welding is traditionally done by people.. However, the shortage of skilled workers means that we should look for other solutions. In collaboration with Wavin, a Hardenberg company that produces plastic drains and pipes, among other things, and together with partner companies Stevens Engineering from Emmen and HB3D from Haarlem in the German-Dutch ID3AS INTERREG project, we have developed a robot that is able to make plastic welds.

"As part of this Smart Polymer Welding project, we installed a welding application on an existing robot. We then investigated which parameters influence the welding quality. Temperature appears to be an important factor here, so we opted for an infrared sensor on the robot. We are now at the stage that we can also make 3D welds, bringing 3D printing on an industrial scale ever closer.

"3D printing on an industrial scale is very interesting, because it allows you to quickly make custom-made products on the condition that the product and the process are reproducible and repeatable. That is a second research project that emerged from this first one. For example, we are considering 3D printing of biodegradable coffins. Various worlds converge here, namely smart production, new technologies and waste reduction. Our professorship in a nutshell."



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Smart Sustainable  
Manufacturing



## Serious Gaming



## YOUR GUIDE

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# An invaluable game

"We are developing a serious game together with the municipality of Groningen to tackle debt problems. It is not a topic that you would immediately link to serious gaming, but gaming proves to be an excellent way to make people aware of their behaviour when it comes to debt prevention.

"Based on conversations with debt counsellors and people who have overcome financial problems themselves, we have opted for a serious game in which we apply role switching. The person asking for help is assigned the role of a debt counsellor and may help an imaginary person asking for help to stay out of debt. The player then makes choices on behalf of someone else, thus breaking down a barrier. After all, the situation is not about players themselves, making the game anything but confrontational.

"Afterwards, of course, you discuss the choices that players made during the game. Based on those choices, players reflect on their own behaviour. Would they make those choices in their own situation? The serious game turns out to be an excellent tool for starting that conversation. During this conversation you can point out the difference in choices that the player has made in real life as opposed to in the game, and then link assignments or exercises to those choices. That is the power of every serious game: reflection, transfer and action."

# "Playing a serious game is the most successful way to learn"

## 4.8 Serious Gaming - Ivo Wenzler

Fighting chronic pain by means of a VR game, learning to work together effectively during a simulated emergency situation or effortlessly gaining insight into the challenges of energy transition: serious gaming is rapidly on the rise in companies and social organisations to create sustainable impact. Professor Ivo Wenzler shows that serious gaming is serious business.

"Everything you perceive as a person, you perceive based on an image you have in your mind. You take new information on board by comparing your observations to the models you already know. Sometimes we want to make these models dynamic, as a better way to explain and understand something new. When you add the possibility of acting yourself from within this dynamic model, you are talking about serious games. A serious game is a simplification of reality. It's a superb laboratory for exploring and learning.

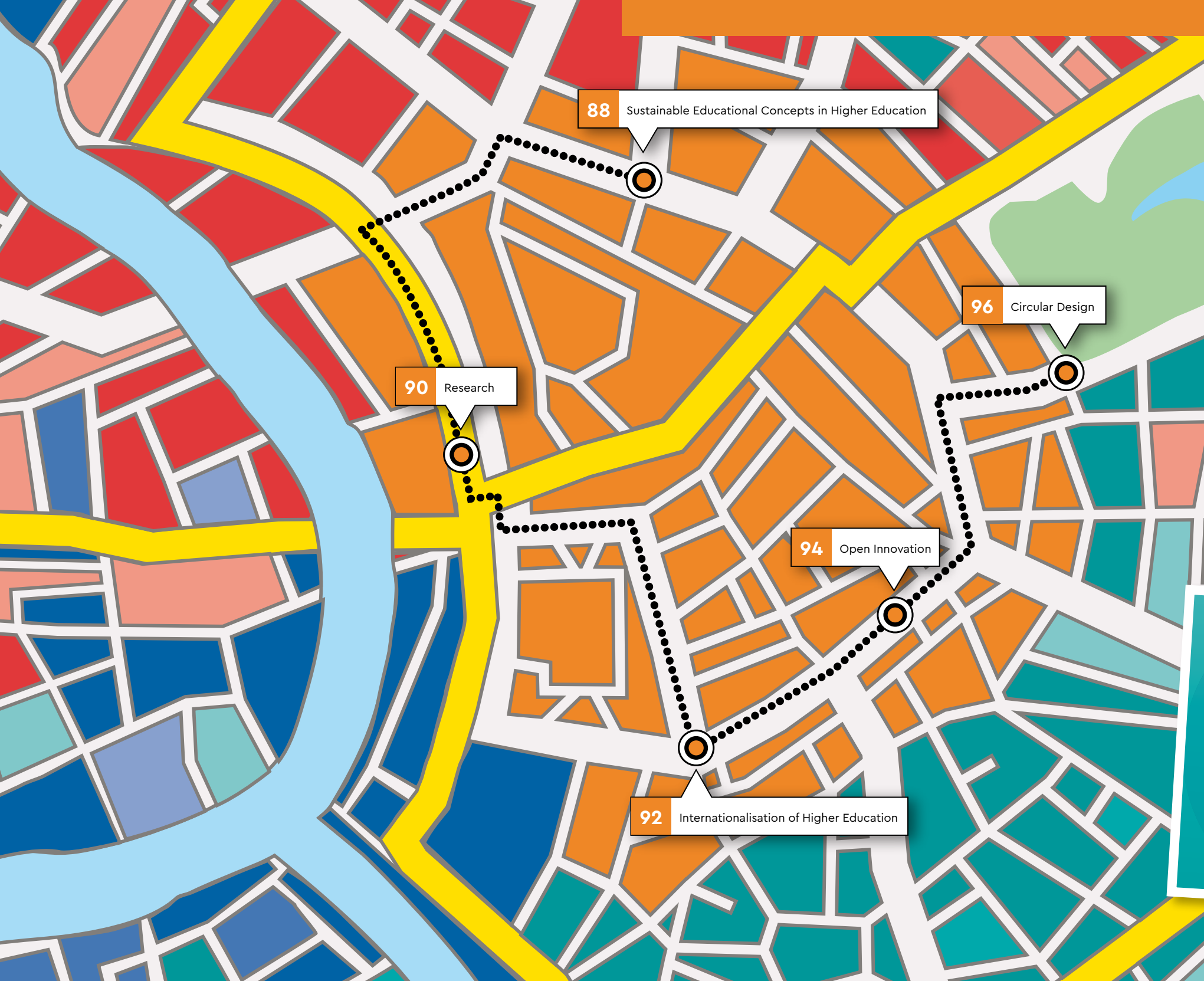
"We develop serious games together with our partners in the professional field. These serious games have two basic objectives. Firstly, we want to create new knowledge; in other words, we use the game as a research

tool. Secondly, the game serves to build capabilities. So, it's all about knowledge, skills and behaviour: I know, I can, I will. A serious game should always contribute to these three elements. Playing a game in itself is of no value. It is only when you formulate a goal and a follow-up process during which you create a link back to reality that you can make the desired mental transfer. What will you do to ensure that actual changes take place based on the insights gained from the game?

"It does not matter where and in what context our serious games are applied. That is what makes serious gaming interesting for every company and every social organisation. I firmly believe that gaming is the most effective way to learn. Still, serious gaming is not recognised as a fully-fledged scientific discipline. By combining education and research, our professorship aims to create knowledge and evidence and prove that gaming is not a gimmick, but a serious scientific discipline. Our aim is, among other things, enabling educational programs within NHL Stenden to use games in half of their courses.

"Even more ambitious, our serious games can contribute to reaching the United Nations sustainable development goals. Take poverty alleviation or the promotion of security, for which serious gaming lends itself perfectly. As a professor, I accept the challenge of putting serious gaming seriously on the map."





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94 Open Innovation

92 Internationalisation of Higher Education



# 5. Design Based Education & Research

-  Education processes
-  Research processes
-  Innovation processes
-  Internationalisation processes

What does the introduction of Design Based Education and Design Based Research involve? To what extent should DBE and DBR be adapted to the various sectors in which the university of applied sciences operates? What do the workshops in which the students work together with lecturer-researchers, professors and professional practice, look like? How can we effectively involve external parties in our DBE projects? To what extent do DBE and DBR dovetail with the various campuses where the university of applied sciences is established? We have a number of institution-wide professorships to

answer these questions. These professorships are not centred on one specific sector, but on developments in the university of applied sciences itself. These professorships aim to jointly develop knowledge that contributes to the education, research, innovation and internationalisation processes that are part of DBE and DBR. Our ambition is for these processes to be structured in a way that they contribute to the proper training of innovative professionals, as well as to the goals of professional practice and society.





# Taking a critical look at feedback

"Feedback is a gift. You are probably familiar with this quote. Although we keep knowing more and more about giving feedback, both lecturers and students still have plenty to learn in actual practice. People still assume that students will learn a lot if lecturers give a lot of feedback. However, we now know that that's not true. Students clam up, become insecure and consequently demonstrate the exact opposite behaviour.

"This research shows that students should have a more active role in getting effective and sustainable feedback. Asking questions is essential here. Ask a student who you will be assessing for three points that you as a lecturer should pay attention to. That way you turn the tables. You are at your student's service, as it were, thus turning the negative association of criticism into positive, supportive feedback.

"This requires a different approach in terms of thinking and functioning, for both students and lecturers. What we now see is that lecturers give extensive feedback, after which students process those points for improvement in a fragmentary manner. In other words, you are very busy as a lecturer, without achieving the intended result. Changing the way in which you give feedback, will save you a lot of time and energy."



## TOUR GUIDE



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# "Our students' development does not cease once they receive their diploma"

## 5.1 Sustainable Educational Concepts in Higher Education - Gerry Geitz

The administrative merger between NHL University of Applied Sciences and Stenden University of Applied Sciences on 1 January 2018 kicked off the implementation of a joint educational concept: Design Based Education (DBE). The aim is to train flexible, future-proof young professionals who make a difference in actual practice. But do we make good on that promise as a university of applied sciences? Professor Gerry Geitz seeks answers to the question: 'How effective is the education we provide?'

"Our professorship is the odd one out among all the others because we focus exclusively on our own university of applied sciences. When Stenden and NHL merged, it was a good time to take a baseline measurement. We are currently investigating whether we as a university of applied sciences are actually achieving what we set out to achieve, namely to enable students to embark on their careers in a certain sector or field with the best possible basic knowledge. Do we give our students the opportunity to develop into a brilliant accountant, an inspiring teacher or an enthusiastic healthcare professional?

"By means of DBE, we want to ensure that our students continue developing their knowledge and skills after receiving their diploma. Asking good

questions, seeking information, making connections, viewing things with a critical eye and metacognitive skills are essential qualities. The way in which we have developed and implemented the DBE educational concept includes all these elements. Our professorship is investigating whether it is truly effective in practice.

"We focus on the learning behaviour of students, with explicit attention to assessment and feedback. We know that learning behaviour is influenced by how the assessment is designed. If students know in advance what kind of questions they will get, they will centre their learning behaviour on that specific type of test. When students are given assignments and assessments that encourage them to implement a project together with the professional field and in which they have to search for the required knowledge themselves, they will demonstrate a different type of behaviour.

"Indirectly, by improving our educational concept, we also improve professional practice. We produce graduate students who enter the domestic as well as international labour markets. Our ambition should be that our DBE alumni distinguish themselves from those of other universities of applied sciences. I believe we should set the bar high for ourselves. Our professorship provides the underpinning as well as the onus of proof that our educational concept actually does achieve this. There is already an enormous amount of knowledge regarding education and educational concepts, but as an educationalist I want to add something to that knowledge. I want to strengthen and deepen our insight in cooperation with colleagues."

# "Customisation in design-oriented research"

## 5.2 Research - Herman Blom

How can you improve the research ability and the design ability of students and lecturers? The Research professorship aims to answer this key question. Professor Herman Blom helps study programmes in designing their research tasks and Design Based Research (DBR) and provides all academies within NHL Stenden University of Applied Sciences with the necessary footing and insight by means of targeted feedback.

"Together with research group member Martin Struik, I look into research carried out by lecturers and students at NHL Stenden University of Applied Sciences for the purpose of determining their research ability. Our aim is to boost their ability. We are also interested in the design ability of students. So our research centres on the question: how do we conduct research, how do we design and how can we improve?

"To answer this question, we evaluate graduation projects to see whether these final products demonstrate sufficient research and design ability. We thus hold up a mirror to the relevant programme committees and provide feedback on the opportunities for improvement. We are keen to

provide input for establishing a line for research ability for planned new study programmes. We are also involved in Design Based Research practices in research conducted by the professorships: how do they design DBR and what can they learn from each other?

"Sometimes the direct reason for this kind of inventory project is a visit by an accreditation committee. That is the perfect time to review your performance as a study programme. We support colleagues in this respect by drawing up a report in which we record the quality of the research ability and the design practice. For this we use a list of criteria, which differs per education level. For each level, we consider the level of research and design ability a student should reach at the end of the programme.

"Besides reports, analyses and recommendations, we also provide courses intended for teams to improve, per study programme, the research ability of students and their design practice. You can then enter into discussions with each other, but you can also draw up concrete improvement plans. Our aim as a professorship is to remain involved in these improvement plans for as long as possible. Together with a team, we want to translate our recommendations into action items which we subsequently evaluate. There is no uniform formula for that. The research ability required in one study programme does not apply to another study programme. As a professorship, we strive to develop concepts that provide clarity. That requires guidelines, concepts and ideas to be able to see the wood for the trees. As a professorship, we are keen to guide this process."



# Insight into research

"I work closely with colleagues from other universities of applied sciences to design research within higher professional education. We focus our attention on the research discussions within higher professional education. How can you improve the research ability within each domain and differentiate per field? After all, each domain varies in intensity and frequency. Although we have succeeded in drawing up specific criteria for bachelor and master programmes for determining the level of a student's research ability, this effort is still in its infancy for the Associate Degrees."

"We are developing criteria lists for our AD courses together with colleagues. What can be expected of an AD student in terms of research ability at the end of the study programme? Together with other universities of applied sciences, we are working to make research ability within AD programmes more concrete. This is important for the AD courses to become self-sufficient."

"The book *Strategisch ontwerpen Ontwerpprocessen situationeel inrichten* (Strategic design. Situational organisation of design processes), which I wrote together with a colleague from HAN University of Applied Sciences, will be published in 2020. With this book, we hope to give study programmes and universities of applied sciences a better hold on design-oriented research. Because just like research, there is no one-size-fits-all solution for design."



Research





## Start at the basis

"According to research, students who attend Teacher Education for Primary Schools (PABO) are less interested than other students in internships abroad, whereas foreign study experience has a lasting effect on the behaviour of teachers. It is particularly important for future teachers to gain international experience. One of the Centre's first projects is therefore researching how to motivate Pabo students to venture abroad.

"Researcher Grada Okken conducts research into the importance of teachers gaining experience abroad and the influence of this experience on their career. This is also called 'diversity responsive teacher behaviour'. We focus on the internationalisation of education in its entirety, starting at the basis. The attitude of young children is the easiest to improve. You have the best chance of influencing their attitude towards cognitive diversity.

"This is also an important assignment for our lecturers, namely to design an assignment in a way that requires that various forms of cognitive diversity be addressed, enabling every student to excel in something. Take, for example, the assignment to choose a group for a project. Children initially choose their friends to be in their group. But if their assignment is to make the best piece of work possible, they choose based on talent. So they choose someone who is good at drawing or who knows how to use the computer, for instance. That's when cognitive diversity kicks in."



### TOUR GUIDE



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Internationalisation of  
Higher Education

# "The journey is more important than the destination"

## 5.3 Internationalisation of Higher Education - Robert Coelen

Fryslân (or the province of Friesland) does not immediately come to mind when thinking in terms of internationalisation, yet Leeuwarden boasts a world-class research centre. Together with the University of Groningen (RUG) Campus Fryslân, professor Robert Coelen established the Centre for Internationalisation of Education. Its objective is to identify the effects of internationalisation on the individual, the organisation and society.

"I was always in search of the right way to embed internationalisation in society and more specifically in education. We know that the effect of going abroad during your studies benefits you later in your career. You learn how to deal with what we call 'cognitive diversity'. The main question for the professorship is therefore: how can you make students sensitive to cognitive diversity?

"The aim of our professorship is to embrace cognitive diversity across all education disciplines in order to train the entrepreneurs of the future.

Companies that embrace diversity are in a much better position, financially speaking. Knowing how to handle diversity is the basis for the future. We want our own students to experience this at NHL Stenden University of Applied Sciences. We still see that Dutch students work together with Dutch students, German students with German students, and so on, which is a real shame, because they do not take advantage of the cognitive diversity that the institution has to offer. It's a missed opportunity.

"We are currently conducting a study in which two groups of students work on an assignment. When explaining the assignment to Group 1, we list the benefits of cognitive diversity. We deliberately do not mention this term when explaining the assignment to Group 2. The aim of this experiment is to investigate whether the type of team that Group 1 puts together differs from Group 2's team composition. Both groups then have eight hours to work on the assignment. We take a close look at their work process as well. Does a group with cognitive diversity take a different approach than a homogeneous group?

"Ideally, I would like to have all students work together on projects. It doesn't matter what course or study programme they attend. They work together regularly on a topic that appeals to them. They automatically work together on a topic and make use of the cognitive diversity. The work process counts for eighty percent of marks and the final end product for twenty percent. The journey is more important than the destination. It's a lifelong lesson."

# "It's only when you have a better understanding of something, that you can change the world"

## 5.4 Open Innovation - Peter Joore

A hamburger made of grasshoppers or bioplastic payment coins made of sewage sludge: these are just two examples of innovative solutions that were tested during the DORP innovation programme at the Welcome to the Village festival. Peter Joore, professor of Open Innovation, focuses on sustainable solutions for complex issues in society. And where better than in a mini society?

"I approach everything I do from a design perspective. This involves two axes: the knowledge development axis and the innovation axis, i.e., devising new things. The professorship focuses on the combination of the two, namely knowledge-intensive innovations, devising solutions in which knowledge plays an important role. The design process and knowledge development are directly related, but are two separate processes. Designing takes place in the real world. Knowledge development is trying to add something to the abstract world in your mind. You try to understand something a bit better. That's essential, because it's only when you have a better understanding of something, that you can change the world.

"The solutions I used to design were physical products, but now they are more complex solutions, with the design process taking place at different abstraction and system levels. I view the process, the interplay of companies, social organisations, infrastructure and rules at all kinds of levels. What fascinates me is the interaction between the different levels and systems. In other words, the innovation ecosystem, which is made up of many different components. I try to link them together. We call the concept we use for this purpose living labs, i.e., mini societies.

"A good example of a mini society is festivals. There you can try out new ideas and products, which are difficult to test in the real world. Islands, as clearly defined environments, also lend themselves well to this and some city districts are also developing into city labs. We are currently working on a manual for festival innovations. Previously, we produced a manual for setting up innovation labs. Furthermore, we often act as a bridge between the government, companies and knowledge institutions. We try to bring them together. The concrete spin-offs at student level can be concrete ideas that are tested at festivals. I look upon every idea as being a building block for the larger whole.

"For me, it is always about the connection, the cross-disciplinary aspect, jointly creating solutions to wicked problems, i.e., issues for which there is no ready-made solution. Our university of applied sciences has more than thirty workshops working on this. My challenge is to turn all those individual workshops into a university-wide innovation network. The whole then becomes more than the sum of its parts."



# Hub

"Sustainability is everybody's and therefore nobody's responsibility. Everyone thinks that we should produce less waste, but we expect the government to draw up appropriate rules and regulations. A good example of a mini society that takes matters into its own hands is the Circular Quarter in Leeuwarden. That is the area around the Chancellery, the Provincial Government Building and the Blokhuispoort. This part of the city wants to become sustainable, not because it is imposed by higher orders, but because it is their own wish. This initiative originated from entrepreneurs and designers, but residents also participate. Many different initiatives and parties are coming together in this initiative and behaviours are changing.

"The Blokhuispoort is the hub of this project. It is where government, companies and education meet. There are many small companies here, ranging from hairdressers and goldsmiths to creative innovation drivers in the technical and cultural fields. When this project first started, the idea was for the Blokhuispoort to become the innovation centre of the Northern Netherlands.

"Our university of applied sciences is represented in the Blokhuispoort by our Future Design Factory, our Circular Design Lab, our master Design Driven Innovation and a number of other study programmes. My goal is to take a kind of helicopter view to see how we can reinforce each other. Not because it is imposed from above, but because it's what we want ourselves."



## TOUR GUIDE

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**NHL STENDEN**  
university of applied sciences



 Open Innovation





Circular Design



## Circular catalyst

"The Circular Economy transition agenda requires that every company takes steps to do business in a circular manner.

But how do you do that? Where do you start? Leeuwarden is setting a good example in its Circular Quarter, where catering entrepreneurs, shopkeepers and organisations in the Oosterstraat, the Tweebaksmarkt, the provincial government building, the Blokhuispoort, the town hall and the Chancellery are jointly seeking to find circular solutions.

"From replacing single-use plastics with reusable products to drawing up circular business and revenue models: in this research we look at all aspects and implications of sustainable retail. This is

an excellent example of transition research, in which we design at all levels at once. At product and service level, for example, we study the transport of the sales items. At product technology level and higher up at government level we focus on national policy, EU policy and even global goals. Together with stakeholders, we consider what they can do themselves and what they need help with.

"The DRIFT research institute in Rotterdam focuses on accelerating sustainability transitions by supporting organisations and entrepreneurs. They bring the entire industry together to create solutions at all levels at the same time. That's our dream too: to become the catalyst of circular entrepreneurship in the Northern Netherlands."



### TOUR GUIDE



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university of  
applied sciences

# "There's only one thing I want as a designer: to have an impact on society"

## 5.5 Circular Design - Marcel Crul

How can you design products that are circular by definition?

How can we prevent our need for plastics? And which plastics can easily be replaced by other materials? Associate Professor

Marcel Crul is the bridge between the Open Innovation and Circular Plastics professorships.

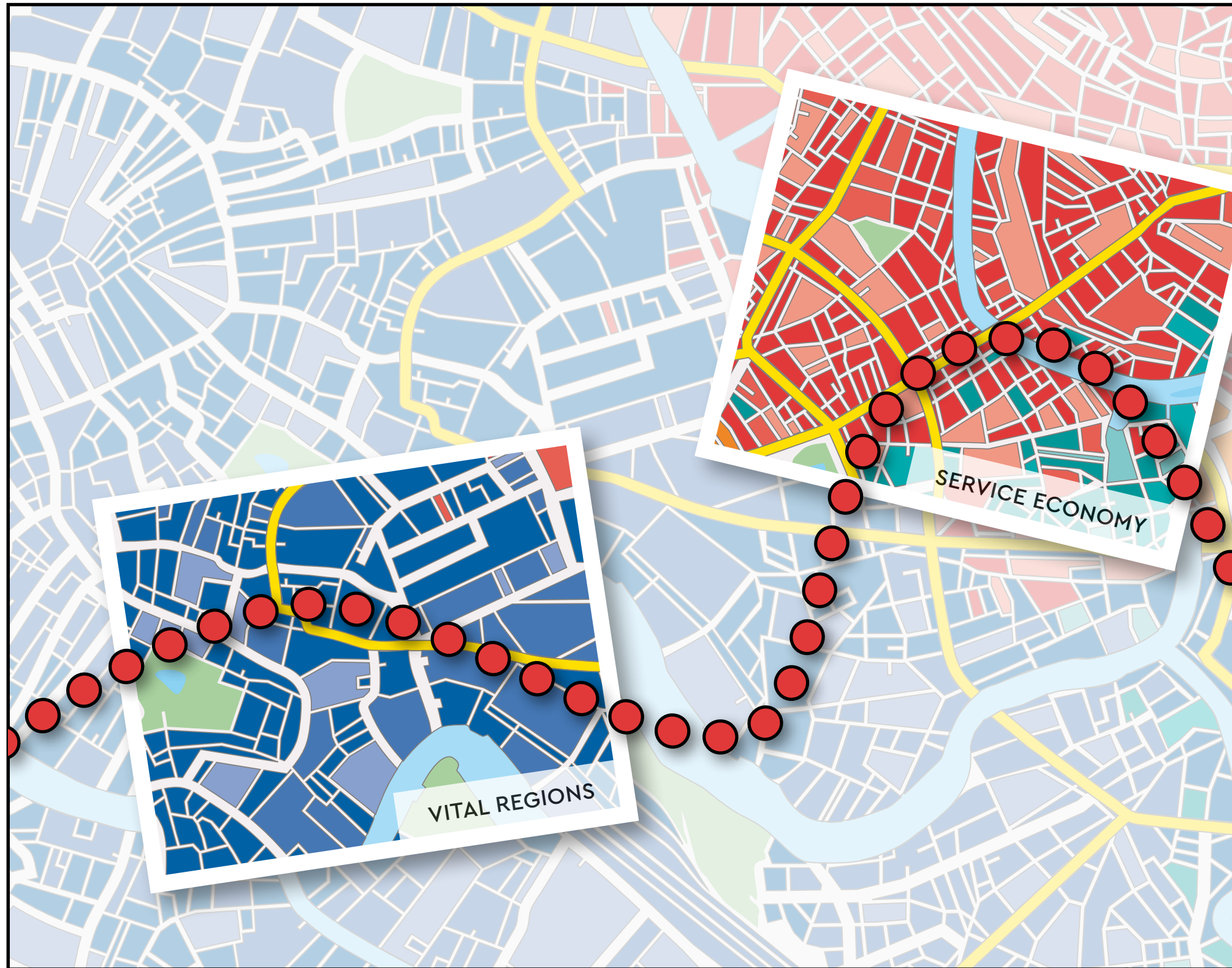
"It has taken only a few years for the concept of circularity to penetrate deeply into our society. It's not only the business community that is working on this; I have also noticed that circularity is popular among students. We have become acutely aware of the fact that we have to take an entirely different approach to how we live and how we manufacture. Within the Open Innovation and Circular Plastics professorships, I conduct research into circular design in the broadest sense of the word. Open Innovation does not necessarily have to be about plastics. I study the entire system that is needed to promote circularity, from the regional government to the rules in the European Union.

"Whether it's a 1-to-1 solution for a company or a generic solution for an entire industry, we produce tools in support of entrepreneurs. Prevention is pivotal in circularity. Companies and chains constantly produce tonnes of waste and then have to find ways to recycle that waste. So I always ask them: 'Why do you produce so much waste? Wouldn't it be better to change how you work?' But it takes much more energy to change your own behaviour, so companies still prefer to continue as usual and solve the problems after the fact. My challenge is to turn that around and have them consider circular solutions at the start of the process.

"Most of my research projects focus on the outset, and I also take a very critical look at the effect: the impact measurement. There's only one thing I want as a designer and that is to have an impact on society. That is why I meticulously test the prototypes I create in companies and organisations. If they have zero impact, they have no result whatsoever for me as a researcher. You might have learned a lot, but in terms of environmental impact, a hundred times zero is still zero.

"By having students view the world through circular glasses, we can have an enormous social impact on the world around us. Especially in this day and age, future employers will ask for your opinion and ideas about circularity. That is why we actively involve students in our research. From hospitality to architecture: circularity applies in every field."







## 6. Design Based Research in perspective

In this last chapter, our aim is to take a helicopter view of NHL Stenden's research one last time. To what extent do the research projects conducted by the professorships correspond and to what extent do they differ? Using the map as a metaphor, we discussed the individual professorships in more detail in the preceding chapters. In closing, we will examine what mutual connections can be identified between the various professorships.

In Section 6.1, professor Herman Blom examines how the various professorships integrate a specific design approach into their research. In Section 6.2, professor Robert Coelen examines the way in which internationalisation is given shape in the research

conducted by the various professorships. In Section 6.3, professor Peter Joore examines the relationship between the research subject, the solution that is being developed, and the change the professors aim to bring about.

These three reflections are not the last word on Design Based Research. On the contrary; they are meant to kick off the debate regarding the direction of NHL Stenden with respect to Design Based Research. Hopefully, this inventory and these reflections will help us to determine an even better course towards the future. At the end of the day, this atlas or travel guide is not intended as an end in itself, but as an inspiration to actually embark on the journey!



SMART SUSTAINABLE INDUSTRIES

DESIGN BASED EDUCATION & RESEARCH

# Situationally developed design processes

## 6.1 Herman Blom, professor Research

NHL Stenden is committed to providing Design Based Education (DBE) and Design Based Research (DBR). In this chapter, I examine the part that knowledge (obtained through research) plays in the design-oriented research conducted by the professorships. In which phase of the design process is knowledge gained, what knowledge is gained, how much interactivity is there with the stakeholders, and what role does interactivity play in the subsequent process?

I assume that all professorships give shape to design-oriented research, although the intensity and manner will vary greatly. The manner in which they give shape to their research depends strongly on the professorships' design strategy. Much is bound up with the generally implicit choice of a design strategy, in particular the place and role of research, but also the choice of process model (cyclic, linear?). The key question is: "Which implicit design strategy do the different professorships customarily apply?"

### Design strategies

In *Strategisch ontwerpen* (Strategic design), Blom and Van Lanen (2020)<sup>1</sup> present a classification of design strategies. Depending on questions, objectives, research traditions and in particular the relationship with the environment, each domain follows strategies with design processes that are appropriate for that domain.

The following strategies can be distinguished:

#### Analytical strategy (1)

The logically consistent and linear approach to the design process is pivotal. The design is based on theoretical data and empirically obtained data.

#### Democratic strategy (2)

The perceptions and visions of all stakeholders in the design process are pivotal. The design is based on broad consensus.

#### Functional strategy (3)

The pursuit of practicality for users in the context of use is pivotal. The design is based on evaluations of tests that demonstrate that the design works in practice.

#### Expert strategy (4)

The creativity, vision and expertise of the designer are pivotal. The design is based on the designer's convictions.

#### Evolutionary strategy (5)

Humankind's natural ability to shape the world to its will is pivotal. The designer creates conditions to activate stakeholders. The constantly evolving design is based on the learning process and the dynamic growth process that is rooted in practice and the resulting insights gained from stakeholders.

So there are several ways to organise a design process. A designer can have several reasons (with underlying motives) for choosing a particular strategy. The designer determines the strategy based on the characteristics of the design situation. In this context, Blom and Van Lanen (2020) mention situational design with determinants for the choice of strategy. There is often one leading strategy,

the so-called principal strategy, to which elements of other strategies can be added. These additional (secondary) strategies can improve the design process so that it can be geared more effectively to the specific characteristics of the design situation. The five strategies help professorships to strategically organise design processes and enable others to interpret the work of the professorships.

### **Design strategies within the professorships of NHL Stenden University of Applied Sciences**

Which design strategies do the professorships of NHL Stenden University of Applied Sciences use?

The analytical design strategy is often reflected in the presentation of the professorships. The analytical strategy appears to be the dominant principal strategy used by the professorships of NHL Stenden University of Applied Sciences. Many professorships of the Smart and Sustainable Industries focus area use this strategy in a fairly unadulterated form. These professorships are strongly driven by a desire to first obtain the required knowledge, and then to come up with a design that can be tested. The functional strategy is the secondary strategy of these professorships. It is a misconception that this approach would not work well in dynamic professional practice. We have noticed that these professorships make cyclical use of the analytical strategy, working through the design phases several times. This repetition enables one to view a problem at different levels or to tackle separate problems one by one. This short cyclical approach is also referred to as 'Design Sprints' or 'Sprints'. So as a rule, we work with prototypes that are tested. Stakeholders have little more than a passive role, namely that of informant, throughout the entire process.

We also notice that professorships in the domains of the Vital Region focus area use the analytical approach. We generally see a strong urge to acquire knowledge that results in advice, which is then discussed and elaborated with stakeholders for coordination and improvement purposes. Co-creativity here means that sharing knowledge leads to higher quality advice and interventions. The search for knowledge in the social and

economic domain is dominated by the creation of social technology. Stakeholders rarely seem to assist in designing tools, but do provide input on the practical value of those tools. They are often a source of information (respondent) for the designer who strives to map out the design problem and the value of the solution by means of a survey, (panel) discussion or observation. It is not the informant, but the designer who draws conclusions based on this information. Given the complexity of the challenges addressed, interventions are still rarely subjected to a testing process. Their intervention issues are often so extensive that test processes in the form of several iterations or even cycles are difficult to realise. However, many are now in preparation.

The democratic strategy calls for all stakeholders to reach consensus on the design problem, the requirements and the prototype. Stakeholders can influence not only the design process, but other parties as well with their input. However, they do not need to be involved at the start of the design process. The democratic strategy in the sense of a consensus strategy is not applied as a principal strategy throughout the entire design process. The knowledge acquired by the professorships is far too pivotal for that. However, the stakeholders' pursuit of coordination and consultation is dominant as a secondary strategy, not only in addition to the analytical strategy.

The functional strategy is spread across the domains. The Digital Innovation in Healthcare and Welfare, Serious Gaming, Data Science & Computer Vision and Smart Sustainable Manufacturing professorships represent the digital innovation implementation areas that seem to be ideal for research through design. That users work iteratively and co-create is obvious here. There are also professorships in other domains that test and further develop smaller interventions, namely Green Logistics, Multilingualism and Literacy and Sustainability in Hospitality and Tourism. The stakeholder as end user is used to enable iterative cycles around trials and prototypes. The user has a crucial advisory role during design testing. The user's recommendations have consequences for the continuation of the design process.

The expert strategy is apparent in the emphasis on top-down interventions, which seems to be the case in the educational domain of the Vital Region focus area (Professional identity in education, Vital teaching methodology). More cyclical use is made of educational tools in the dynamic field of professional education. The designer seems to start with a solution which is only related to needs and any problems experienced at a later stage.

These non-linear design processes are often difficult to plan and sometimes design decisions are in direct response to specific situations in which the designer carries out their task. This creates a paradoxical practice of 'support creation', 'vitalisation' or 'agency'. The designer gauges the observer's response to certain insights or ideas, and then decides whether or not to act on that response.

Lastly, in the evolutionary strategy, problem ownership occurs only after delegation. In the evolutionary strategy, the designer strives to maximise the design flexibility for the stakeholders. Joint problem ownership applies. The designer facilitates the design process. This strategy is apparently used in the Small N-design professorship where the prototype is embedded in the draft design as a kind of action research. The Talma professorship and the Knowledge Circulation in the Regional Knowledge Economy and Scenario Planning professorships would also like the stakeholders to take over the design process in a delegated process, with the idea that they would then assume the role of problem owner.

## In conclusion

Thinking in terms of professional products (Losse, 2018)<sup>2</sup>, we can distinguish various elaborations of applied research. This is with regard to the following professional products: analysis, advice, design, manufacture and handling. We see the analysis mainly as a professional product for the professorships, while prototypes are created in varying degrees and then entered into an iteration process. As the analysis is a dominant professional product, it is obvious that the analytical strategy is widely applied. In line with DBE, we should expect a greater variation in strategies

and perhaps aim for a greater variation in DBR strategies. The question then is whether there is a difference in strategy between that of the professorships and what we expect of students. This possible discrepancy could have consequences for what we expect of students. What does co-creation mean? After all, the term occupies a prominent place in the discourse on DBR. Various forms of stakeholder participation can be distinguished in the design process. The amount of influence on the development of the design and thus the role of the participant can differ. The question is how the design flexibility is distributed between the designer and stakeholders in the design-oriented research conducted by professorships: participation, sharing of experiences, consultation. As a follow-up study, it may be useful to take a closer look at the interactivity between the professorships as designers and the stakeholders. What is meant by co-creativity: consensus building, consultation or delegation of responsibility? The functional strategy is linked to the origin of DBE (prototyping). We see the functional strategy clearly in the domains where it has gathered a following, namely those of social media and technology. It must be investigated under what conditions the functional strategy can be done justice in other domains. Professorships can learn from each other in this respect as well. Finally, now that we have explained the design strategies in such detail, it seems an interesting plan to revisit the professorships and to investigate which design strategy has their preference or to which they want to give preference.

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	<b>Analytical strategy</b> <i>Evidence based design</i>	<b>Democratic strategy</b> <i>Consensus based design</i>	<b>Functional strategy</b> <i>Practice based design</i>	<b>Expert strategy</b> <i>Authority based design</i>	<b>Evolutionary strategy</b> <i>Action based design</i>
<b>Related terms</b>	linear, instrumental or rational strategy, waterfall method	deliberative, communicative or interactive strategy, relational approach	rapid prototyping, pragmatic strategy, user experience design (UXD or UED)	expert strategy, connoisseur approach, artistic approach	(complete) co-production or (complete) co-creation, open innovation, learning organisation
<b>Role of the designer</b>	<ul style="list-style-type: none"> <li>analyst</li> <li>theorist</li> <li>researcher</li> <li>scientist</li> </ul>	<ul style="list-style-type: none"> <li>connector</li> <li>mediator</li> <li>creator</li> </ul>	<ul style="list-style-type: none"> <li>experimenter</li> <li>pragmatist</li> <li>go-getter</li> </ul>	<ul style="list-style-type: none"> <li>authority</li> <li>expert</li> <li>connoisseur</li> <li>specialist</li> </ul>	<ul style="list-style-type: none"> <li>organiser</li> <li>facilitator</li> <li>stimulator</li> <li>supervisor/coach</li> <li>booster</li> </ul>
<b>Role of the stakeholders</b>	informant	collaboration partner	expert by experience / consultant	observer	problem owner
<b>Participation moments</b>	At the start of or after the design process in order to get feedback.	During much of the design process; in the event of large interest groups, participants who represent their colleagues can switch during the process.	In some sub-processes of the design process, particularly testing and implementation.	Few, possibly at the start or the end of the process or during delivery moments of intermediary products	Throughout the entire design process
<b>Manner of participation</b>	The informant provides information at the initiative of others.	The cooperation partner contributes to and has a say in joint planning, for example in a project group, but is also dependent on the influence of others.	The expert by experience gives their opinion on the design problem and (interim) solutions.	The observer plays no active role and is mainly a recipient of information. At times, the expert by experience acts as a mirror.	The problem owner initiates the design process and in any case has a direct and active influence on the origin, progress and execution of the design assignment.
<b>The designer uses prototypes or draft designs as ...</b>	a means of communicating the progress of the project upon completion of project phases.	a tool to visualise perspectives and to reach consensus	a preliminary version of the solution that can be tested with users with a view to improvement.	an aid during internal and external discussions.	a semi-finished product that should galvanise and encourage stakeholders to develop the product.
<b>Creates support by...</b>	using a consistent and traceable working method and providing evidential value.	including the interests of stakeholders in the design.	demonstrating that the design works in practice.	adding a persuasive narrative to the design and/or ensuring exclusivity.	making stakeholders themselves responsible for the design.
<b>Process flow</b>	<ul style="list-style-type: none"> <li>Linear</li> <li>occasionally cyclical as well</li> </ul>	<ul style="list-style-type: none"> <li>non-linear</li> <li>linear</li> </ul>	cyclical	<ul style="list-style-type: none"> <li>non-linear</li> <li>occasionally linear or cyclical as well</li> </ul>	<ul style="list-style-type: none"> <li>cyclical</li> <li>occasionally linear or cyclical as well</li> </ul>

Table 1: Five design strategies (based on Blom and Van Lanen, 2020)

# Professors use cognitive diversity to create world-wise innovations

## 6.2 Robert Coelen, Professor Internationalisation of Higher Education

How do the professors at NHL Stenden deal with internationalisation? The essence of the internationalisation of higher education (IoHE), or education in general, is to create an environment in which students can learn how to interact effectively with people from other cultures or other ethnicities. The most recent working definition of the IoHE was formulated by De Wit, Hunter and Coelen (2015):

*The deliberate process to integrate an international, intercultural, or global dimension into the purpose, functions and provision of post-secondary education, in order to improve the quality of education and research for all students and staff and make a meaningful contribution to society.*

Why are we in higher education so eager for students to acquire this skill? A good reason is that workplaces are increasingly filled with people from many different countries. Consequently, it is only logical that students learn these intercultural skills during their studies. This allows them as graduates to perform more effectively in their jobs and in society in general,

especially in a multicultural environment. However, there is another more compelling reason, that is based on the increased tendency of graduates to work in teams to solve complex or wicked problems.

If the members of a team have an equal share in the development of a solution, it is reasonable to assume that a higher the level of diversity of the team members increases the likelihood of an enhanced cognitive repertoire of such a team. A detailed explanation of this phenomenon falls outside the scope of this chapter. However, the following simple example will support this statement. Suppose students are instructed to draw up a business plan for an activity in China. If there were Chinese students in this cohort, each team would compete to have at least one Chinese student on the team. That would not happen if the task was to solve some molecular biological problem. However, even then an alternative way of thinking about such a problem may provide a fresh approach to the solution, in which case it would still be beneficial to put together an international team. How does this relate to the internationalisation of research?

The most compelling evidence for the effect of international cooperation, in which one would tap into a more extensive cognitive repertoire, can be found in the work of Marek Kwiek (2015, 2019) at Adam Mickiewicz University. He showed that international cooperation is more likely to lead to publishable output compared to only national collaboration. Another meta study conducted by Uzzi et al. (2013), in which they analysed 17.9 million articles across all scientific fields, suggested that science follows an almost universal pattern, i.e., the science with the greatest impact is mainly

based on exceptionally conventional combinations of previous work, but at the same time also has to do with the intrusion of unconventional combinations. Articles of this type were twice as likely to be highly cited works. New combinations of earlier work are rare, yet teams are 37.7% more likely than solo authors to insert new combinations in known knowledge domains. The cognitive diversity achieved by teams compared to single author papers is rewarded in terms of impact.

How are our professors faring in the context of these observations about international cooperation? Are they creating teams with significant diversity? Mind you, the diversity can, for example, also arise from interdisciplinary cooperation. Assuming that global innovation implies that solutions have wider applications than just our region or that the solution was created through cross-border collaboration and thus tapped into greater cognitive diversity, we can see in this book how our professors answer the question in which way their knowledge network has contributed to NHL Stenden's mission regarding global innovation.

Judging by the manner how most of our professors work, international cooperation is almost universal. International cooperation takes a variety of forms. One way is straightforward collaboration to develop solutions to global problems. Examples here are the cooperation with China, Brazil, Qatar, and Hong Kong. Another method our professors use is to seek cooperation to determine whether solutions that were valid in a regional/national environment can be applied elsewhere. This is particularly relevant for our international campuses. A third form is to collect information from foreign colleagues about how they would interpret a problem. This keeps us at the forefront of the themes we address, and thus competitive on the international stage. Lastly, by examining the views of people from other cultures in our Dutch environment, we can tap into a wealth of perspectives without even having to travel. An example here are the views that other cultures have on leadership. In all these cases, our professors make actual use of the cognitive diversity coming from diverse cultures or environments. This is a highly effective way to boost innovation. By travelling, either actually or virtually, it would be reasonable to view this as

a global innovation. It enables the professors at NHL Stenden University of Applied Sciences to contribute significantly to our institution's mission to work on world-wise or world-wide innovation.

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# Research + Design = Change

## 6.3 Peter Joore, Professor Open Innovation

In this last chapter we return to the question posed in Chapter 1:

How do the professors of NHL Stenden interpret Design Based Research? While discussing this topic, quite a few alternative concepts were mentioned including Design Thinking, Design Research, Design for Change, Research by Design, Research Based Design, Research in Design Context, Practice-Based Design Research, Design-Oriented Practical Research, Forward Learning, Learning by Doing and Action Research.

Although this multitude of terms would have you expect otherwise, a pattern can in fact be discovered in the manner in which the professors give shape to DBR. Five common elements may be distinguished which are explained in this chapter.



### Element A Questions arising from professional practice or society

The first common element is related to questions arising from professional practice or from society. Professors emphasise that their research always stems from a genuine problem in actual practice. However, professors are not meant to carry out advisory assignments for one organisation, like consultants do. They look into the question behind the question. In order to

make this happen, they may for instance bundle questions received from various parties into one project, with the professor acting as a connector initiating the network formation process. Professors focus on a wide variety of subjects, ranging from questions about leadership in organisations to questions regarding the way in which companies may structure their production processes. Other examples relate to how ships can sail more economically and with less pollution, or how certain substances can be extracted from waste water. Other professors focus on questions with respect to law enforcement, security and digitisation, or questions regarding the way that government deals with vulnerable citizens. Still others centre their attention on care for the elderly, people with mild intellectual disabilities, young people suffering mental illness or on people with debt problems. Some professors focus on questions received from the education sector, such as how to stimulate literacy in young children, how students may master a certain subject, or investigating the best way for teachers to coach students. The bottom line, then, is that professors cover the full spectrum of the professional field, but their projects always address specific questions arising from professional practice or from society.



### Element B Development or application of new knowledge

The second common element is related to the research itself. The manner in which professors conduct their research is as wide-ranging as science itself. They collect data by means of surveys or interviews, by way of measurements or observations, through literature reviews or archive research. They conduct material research, develop computer simulations or conduct measurements with cameras and other sensors. Still other professors emphasise the importance of mixed methods, the combination



of quantitative and qualitative research, focus on impact measurements, on action research or on the use of serious games. Several professors stress that they focus mainly on the application of knowledge, leaving it up to research universities to develop fundamentally new knowledge. Incidentally, you shouldn't think that a professorship always applies only one kind of research. On the contrary. Professor Welmoed van der Velde, for example, (see Section 4.1) describes how in one particular study she collects data on shipwrecks by taking samples in the sea, combined with historical archive research into the history of shipping disasters, combined with interviews with amateur divers searching for shipwrecks. The research methods are therefore just as broad as the issues that the professors tackle, but the common denominator is that they are always aiming at the development and application of new knowledge.



### Element C Development of new solutions

The third common element is related to the development of new solutions. This is also the aspect that many professors identify as being a distinguishing element of DBR. It is not just about establishing facts, but about developing solutions. The kind of solutions they generate is again very diverse. A solution might for instance be an advice pertaining to a local government's question as to how to improve digital security or increase entrepreneurial activities in the city. Solutions may also be provided in the form of a manual, a handbook, an instrument, a toolbox, a programme, a quick scan, a discussion guide, a knowledge chart, a route planner or a viewing aid. Various professors develop training in the form of a course, a learning method, a professionalisation approach, a training programme, a workshop or a webinar. Other examples of solutions they develop include a simulator for designing ship models, a performance measuring system for companies, a system with which water can be extracted from air, a new biocomposite material, a serious game to make people aware of their behaviour. All in all, the things that are being developed vary, with the common denominator being that it is all about the development of new solutions.



### Element D Implementation with the professional field

The fourth common element is related to the development of prototypes and the testing of solutions together with the professional field. One professor describes DBR as 'trying things out with your feet in the mud'. The iterative and repetitive aspect of the process is often emphasised, as is the fact that one shouldn't be afraid to make mistakes. The point is to make a start and try out the newly developed solution together with all parties involved. Several professors stress that collaborating with the professional field is not only necessary for testing the new design; it also has a more important aim, namely that the solution is actually implemented in practice. By jointly developing a solution and improving it along the way, people are more inclined to accept changes. You could say that this involves a design process at various system levels. The more concrete system level concerns the specific solution at issue, such as a specific digital innovation in a healthcare environment. At the more abstract system level, the design process pertains to redesigning the overarching care process. The particular digital innovation then constitutes one small element of the transition process of the healthcare system as a whole. Which brings us to the fifth and final element of DBR.



### Element E Actual change and impact

Ultimately, the professors stress that it is not about the research itself, nor about the developed solution, however promising it may be. The research and design should help to achieve a higher goal. This brings us to the fifth and perhaps most important element, namely the actual change that is realised in practice and in society. This element touches on the questions that arise from professional practice (Element A). But if nothing more is done about it, the formulated problem could become an interesting theoretical case upon which to reflect, without any action being taken. By not only conducting research (Element B), but also taking steps to design a solution (Element C), the process is set in motion. If that design is also tested (Element D), the process would seem to be almost

complete. However, these four elements are still not enough for a DBR project to be truly successful. At the end of the day, it is about the change that has actually been achieved (Element E). The quality of the research and the design process can mainly be measured by its impact. The involvement of the professional field plays an important part here. If organisations introduce an issue at the start of a project, and only return to collect the developed solution once the project has been completed, one can be pretty certain that this solution will never be implemented. The more actively organisations are involved in a project, the greater the chance that they will act on the results.

### Conclusion: Research + Design = Change

We have now described five elements of DBR. These are combined in the following description of DBR:

*Design Based Research is an approach in which the research question is inspired by professional practice (A) and in which knowledge is developed and applied (B) in order to support the development of new solutions (C) that are designed and tested together with the relevant stakeholders (D) with the overall objective of bringing about effective change in practice and society (E).*

As an example of the way in which the five elements are reflected in NHL Stenden's professorships we can mention a project conducted by professor Gabriël Antonio (Section 2.3) that is centred on the fact that tens of thousands of people die from smoking each year (Element A - Question arising from professional practice or society). The professorship's knowledge relates to the relationship between horizontal and vertical leadership (Element B - Development or application of new knowledge). Based on this knowledge, an instrument has been developed with which organisations can map their own smoking policy. (Element C - Development of new solutions). This instrument has been tested in conjunction with addiction institutes (Element D - Implementation together with the

professional field) with the ultimate goal of turning the Netherlands into a smoke-free country (Element E - Actual change and impact).

Another example of the five elements can be found in a project conducted by professor Job van 't Veer (Section 3.7) aimed at the diminishing independence of people with dementia (A). The knowledge that the professorship contributes relates to digital innovation in healthcare and welfare (B) and the developed solution is a digital environment that improves communication between the parties involved (C). This environment has been trialled together with institutions such as Alzheimer Nederland and the Dementia Network Friesland (D), with the ultimate goal of enabling those who are in the early stages of dementia to remain independent for as long as possible (E).

The five elements can also be seen in a project conducted by professor Joana Duarte (Section 3.15) focusing on the linguistic development of children who are new to the Netherlands (A). The knowledge that the professorship contributes relates to multilingualism and language perception (B). This knowledge has been incorporated into an augmented reality game for school children (C). This game has been tried out at several primary schools (D) proceeding from the underlying point of view that every language matters in our society.

A final example of the five DBR elements is a project conducted by associate professor Marcel Crul (Section 5.5) centred on the issue of single use plastics in the retail sector (A). The contributed knowledge relates to circular design (B). In the project, circular business and revenue models are being developed (C), which are tested with the cooperation of catering entrepreneurs and retailers in the Circular Quarter (D) with the aim of accelerating the transition towards a sustainable society (E).

### The five questions

The afore-mentioned examples might suggest that the professors of NHL Stenden already work along the lines of the described DBR method. Or is it just a matter of 'framing' in which we interpret everything the professors do in a similar way? If we want DBR to be a distinguishing concept, of course

there must also be projects that do not meet or only partially meet the description. In order to compare projects with each other, we can draw up a DBR checklist, not so much to approve or reject projects, but as a tool to reflect on the question how projects can have an even greater impact. Such a checklist could contain the following questions:

### Design Based Research Checklist



Question A) Is the project based on an **actual question** arising from professional practice or society?



Question B) Does the project develop and apply **new knowledge**?



Question C) Are **new solutions** being developed based on this knowledge?



Question D) Are these solutions **tested** together with the relevant stakeholders?



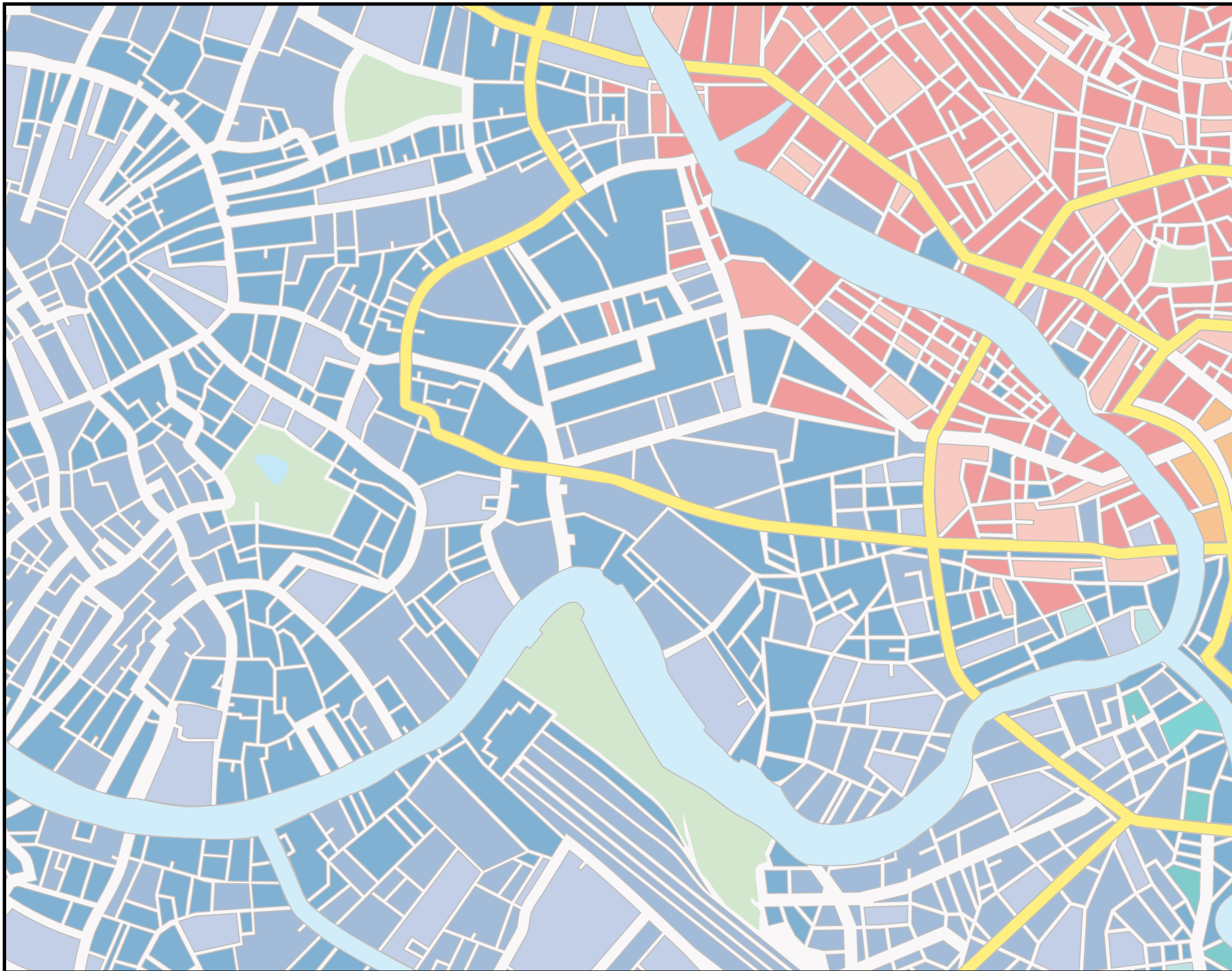
Question E) Does the project lead to **real change** in professional practice and society?

The first question concerns the extent to which a project ensues from a question arising from professional practice or from society (element A). If the answer is No, it could be a fictional case, for example, that has been completely written out in advance. In that case, a problem is tackled without it being an actual question that has arisen from professional practice. The second question concerns the extent to which new knowledge is developed or applied (Element B). If the answer is No, then we should actually not call it a research project. If the answer is Yes, there is still a long way to go. After all, research alone may not solve the practical issues, certainly not if the developed knowledge would remain unread on the bookshelf. The third question concerns the extent to which new solutions are developed (Element C). If the answer is

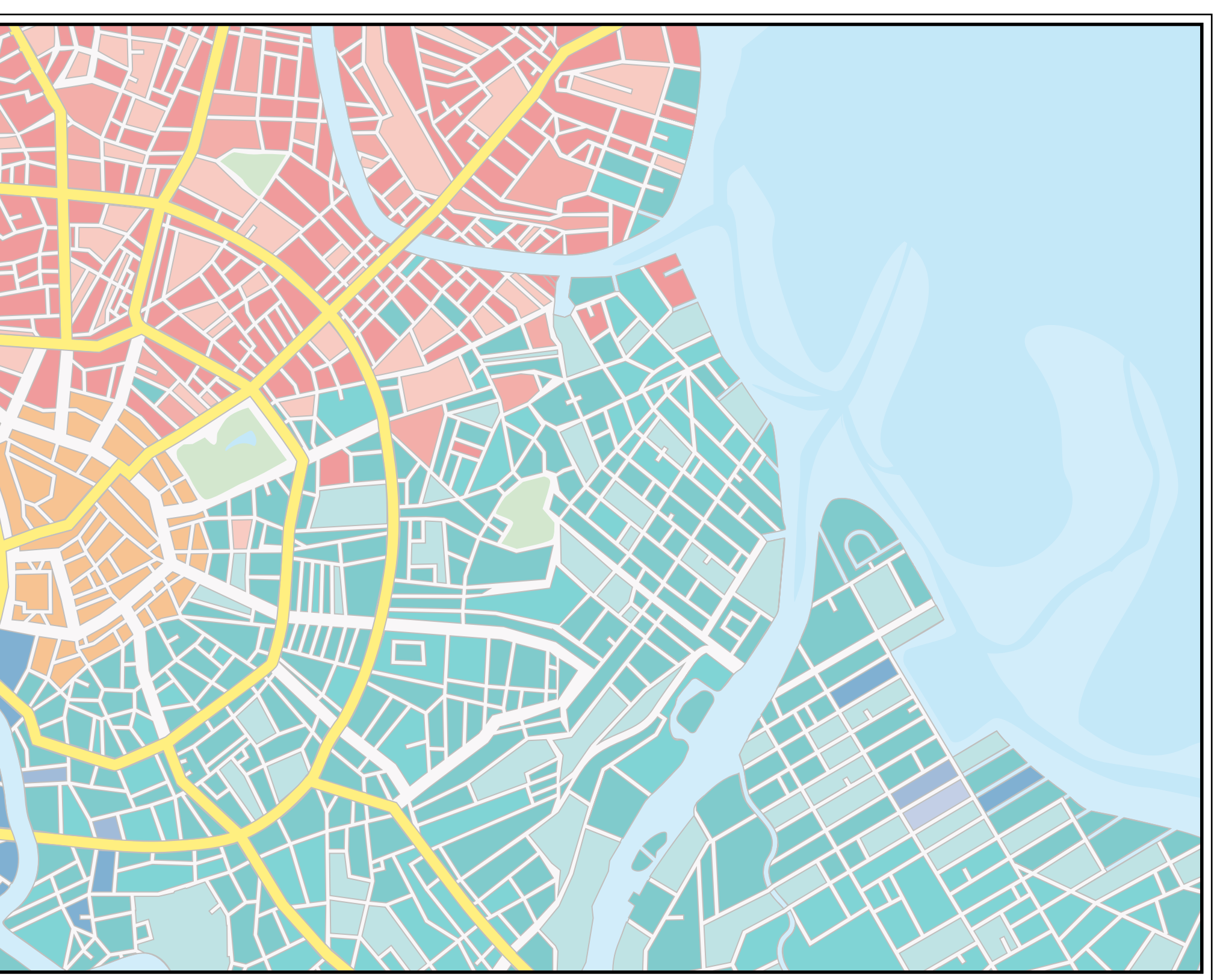
No, the design aspect is missing and no innovative solutions are called for. At the same time, a Yes answer to this question is not enough to ensure a DBR project's successful outcome. After all, newly devised solutions may often be no more than an interesting idea or a one-off pilot project, and as a result they do not achieve the intended effect. The fourth question is related to implementation together with the professional field (Element D). If the answer to this question is No, new solutions can be devised, but they will not be tested. If the answer is Yes, you could perhaps expect the DBR project to be perfect. A question has arisen from the professional field, research has been conducted, a new solution has been developed which has also been tested. What more do you want? However, a fifth question has been added that deals with the actual change (Element E). This is about honestly considering the actual impact of a project. If we were to rigorously apply this criterion, probably only a few projects per year would meet all our DBR criteria. After all, most new ideas are never actually implemented in practice. However, projects that are not applied on a large scale can still lead to change. In fact, the 99% seemingly unsuccessful initiatives are necessary to achieve the 1% successful innovations. As Thomas Edison said: "I have not failed, I've just found 10,000 ways that won't work."

### In conclusion

At first glance, the approximately forty professorships of NHL Stenden have absolutely nothing in common. Professors work on different issues, apply different research methods, develop all kinds of solutions and collaborate with different organisations. Nevertheless, there is a recognizable pattern to be discovered in the way professors interpret the concept of Design Based Research. In this chapter, an attempt has been made to formulate a description that is broad enough to do justice to the variety of professorships within NHL Stenden, but at the same time is sufficiently clear-cut to be of any significance. Obviously, this chapter is not meant to present any definitive statements regarding DBR. On the contrary, it should rather be considered as a starting point to promote the discussion about Design Based Research. This travel guide may now be finished, but the journey has yet to begin!





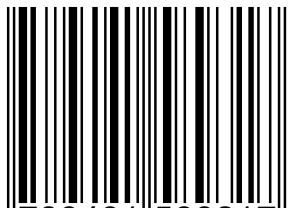


## RESEARCH ATLAS

### Design Based Research in Perspective

This atlas takes you on a journey of discovery along the professorships of NHL Stenden University of Applied Sciences. You will embark on a tour in search of the meaning of Design Based Research and discover how the professors interpret this inspiring concept. Forty stories illustrate how complex questions from professional practice and society are being translated into relevant knowledge and promising new solutions. The journey takes you through various fields with auspicious names such as Service Economy, Vital Regions and Smart Sustainable Industries. Embellished with maps and photographs, the atlas provides the traveller with arresting information. Ultimately, however, this guide is intended to inspire the reader to embark on a real journey and discover all that NHL Stenden's research has to offer.

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